Biosystems Engineering Undergraduate Student Handbook

2018-2019

Department of Biosystems Engineering
College of Agriculture
Samuel Ginn College of Engineering
Auburn University
It is my pleasure to welcome you to the Department of Biosystems Engineering at Auburn University. I am glad that you have chosen to be part of the profession that develops solutions to the challenges of providing essentials of life such as safe and plentiful supply of food and fiber, clean water to drink, renewable fuels and alternative energy sources, and safe and healthy environment. Our goal is to prepare students to become successful engineers, and to provide a family environment for all students in the department.

This handbook was developed to guide you in your journey through the undergraduate program in the department. My advice is that you use the handbook as often as possible (preferably once a semester) to check and reflect on your progress towards your professional and personal goals. Even though you will encounter several non-academic distractions around you as a college student, I will encourage you to make the best use of this opportunity you have to obtain a college degree. This will involve you making tough decisions not to be involved in as many extra-curricular activities as your non-engineering friends. However, I want to assure you that your success is very important to us. If you have any questions, feel free to stop by my office in Room 209 Corley Building. Also, I will appreciate it if you could send comments/suggestions for improvements to this handbook to Jon Davis at jnd0026@auburn.edu.

Finally, I sincerely wish you the best of luck as you progress through college life.

Again, welcome to the Department. War Eagle!

- Dr. Oladiran Fasina
Purpose of the Handbook

The purpose of this handbook is to be a guide for undergraduates during their time in the Biosystems family. Students are encouraged to keep a copy (print, digital, or both) with them. It should serve as a starting point for information on matters of academic policies, student activity, student conduct, contact information, who to see for what, curriculum information, and many other items.

How to Use this Handbook

This document contains links to internet sources; feel free to follow the links where more detailed information can be located. Be sure to check the Frequently Asked Questions and Quick Reference Guide—they will help you locate more information on those topics. This document is searchable! Just hit ctrl+F (command+F for Mac users) and type your search term—i.e. “Advising” or “Grade Adjustment.” There is also an index at the end of the handbook.

Disclaimer

This handbook is not meant to replace the policies, rules, regulations, etc. governing student activity while enrolled at Auburn University. This handbook is formatted with links to these policies, rules, and regulations. For specific questions regarding policy, advising, grades, regulations, rules, etc. please consult with your academic advisor.

Thanks and acknowledgement: Thanks to Amber Denham, Joy Brown, Genta Stanfield, and Dr. Fasina for providing editing, photos, and feedback on the content of the handbook. Thanks also to the Biosystems faculty who gave quality input and feedback on the content, style, and format of the handbook.

If you have questions or comments regarding this handbook, please contact Genta Stanfield (gms0008@auburn.edu) 334-844-5533 or Jon Davis (jnd0026@auburn.edu) 334-844-3509.
# Contents

Purpose of the Handbook ................................................................. 3
How to Use this Handbook ................................................................. 3
Disclaimer ......................................................................................... 3
Thanks and acknowledgement .......................................................... 3

**ABOUT BIOSYSTEMS ENGINEERING** .......................................................... 6
Mission ................................................................................................. 6
Vision ..................................................................................................... 6
Quick Facts about Biosystems ............................................................... 6
About the College of Agriculture .......................................................... 6
About the Samuel Ginn College of Engineering ....................................... 7
About Auburn University ....................................................................... 7

**OBJECTIVES & OUTCOMES FOR BSEN STUDENTS** .................................... 8
Educational Objectives .......................................................................... 8
Desired Student Outcomes ..................................................................... 8
Where do I fit in? .................................................................................. 9

**ACADEMIC ADVISING & POLICIES** ......................................................... 10
Advising ............................................................................................... 10
Advisor Responsibilities – What You Can Expect ..................................... 10
Advisee Responsibilities – What You Are Expected To Do ......................... 10
Academic Policies ................................................................................ 10

**UNDERGRADUATE PROGRAM & CURRICULAR MODELS** .......................... 11
Biosystems Engineering ......................................................................... 12
Bioprocess Engineering Option ............................................................. 14
Ecological Engineering Option ............................................................. 16
Forest Engineering Option ................................................................... 18

**UNDERGRADUATE COURSES** ................................................................ 20

**PRE-REQUISITE FLOW CHARTS** .............................................................. 21
Biosystems Engineering Pre-Requisites .................................................. 21
Bioprocess Engineering Option Pre-Requisites ......................................... 22
Ecological Engineering Option Pre-Requisites ........................................ 23
Forest Engineering Option Pre-Requisites ............................................. 24

**BSEN STUDENT ORGANIZATIONS** .......................................................... 25
American Society of Agricultural and Biological Engineers (ASABE) ....... 25
Quarter-Scale Tractor Team Competition ................................................. 25
Lawnmower Clinic ................................................................................. 26
E-Day ..................................................................................................... 26
Alpha Epsilon (Delta Beta Chapter) .......................................................... 26
Other Student Organizations .................................................................. 26

**SCHOLARSHIP INFORMATION** .............................................................. 29

**CAREER INFORMATION** ...................................................................... 30
What will I learn in this major? .............................................................. 30
What types of employers will hire me with this degree? ............................. 30
Recent employment examples of Biosystems engineering graduates: .............................................................. 31
Engineering Career Connection ..................................................................................................................... 31

CO-OP, STUDY ABROAD, INTERNSHIP AND UNDERGRAD RESEARCH PROGRAMS ...... 31
Study Abroad ............................................................................................................................................... 31
Recent study abroad trips of Biosystems engineering students ............................................................. 32
Co-Op ......................................................................................................................................................... 32
Internships .................................................................................................................................................. 33
Undergraduate Research .............................................................................................................................. 33
Accelerated Bachelor’s/Master’s Program (ABM) ...................................................................................... 33

CAMPUS INFORMATION & FAQ ............................................................................................................. 34
Frequently Asked Questions ....................................................................................................................... 34
Things to do around Auburn & Opelika ....................................................................................................... 35

CONTACT INFORMATION ...................................................................................................................... 36
Faculty ......................................................................................................................................................... 36
Staff ............................................................................................................................................................. 38

QUICK REFERENCE GUIDE .................................................................................................................... 39
NOTES PAGE ............................................................................................................................................ 41

Corley Courtyard
ABOUT BIOSYSTEMS ENGINEERING

Founded in 1919, the Biosystems Engineering (BSEN) department works with both the College of Agriculture (CoAg) and the Samuel Ginn College of Engineering (COE) to deliver quality education in four main areas: bioenergy and bioproducts, ecological engineering, food and biological engineering, and production and process engineering.

Biosystems engineers ensure that we have the necessities of life: safe and plentiful food to eat, pure water to drink, clean fuel and energy sources, and a safe, healthy environment in which to live. Biosystems Engineers at Auburn apply engineering to problems and opportunities presented by living things and the natural environment. For more on the history of BSEN, click here.

**Mission**

The mission of the Biosystems Engineering Department is to develop and disseminate engineering knowledge to solve problems in biological systems, natural resources, and the environment. This mission supports economic development, sustainability and improved quality of life for the citizens of Alabama.

**Vision**

Our faculty and staff endeavor to be recognized nationally for excellence and for the impact that the Department makes through its work.

We are committed to:

- Offering an excellent student experience.
- Focusing on stakeholder needs.
- Providing a family environment for students, staff, and faculty.
- Fostering a collegial work experience for faculty and staff.

**Quick Facts about Biosystems**

- Biosystems Engineers develop solutions to challenges faced society in relation to the environment and natural resources, biological systems, agriculture, food and forestry.
- Biosystems Engineering has three pathways to help you meet your career goals - Biosystems Engineering, Ecological Engineering and Forest Engineering.
- Biosystems Engineering is an increasingly visible discipline that addresses basic global needs.
- Biosystems Engineering is an ABET-accredited engineering degree.
- Biosystems Engineering has a great “family” environment; students and faculty all know each other and work closely and our class sizes are small enough that faculty are always available to mentor students.
- Biosystems Engineering has 38% female students; the highest proportion of any engineering program at Auburn University.

**About the College of Agriculture**

The College of Agriculture traces its roots back to 1872 with the establishment of the Alabama Agricultural and Mechanical College as a land-grant college. Throughout its history, the college has helped advance Alabama’s agricultural economy while improving the nutrition, health and standard of living for all citizens.
The College of Agriculture has eight departments, 11 undergraduate majors, 23 focus areas and a range of multidisciplinary programs.

**About the Samuel Ginn College of Engineering**

Auburn University has been offering engineering courses since 1872 and has a long and rich tradition of excellence in engineering education. The Samuel Ginn College of Engineering, the state's most prestigious engineering program, produces more than one third of Alabama's engineering graduates and is consistently ranked among the highest public universities offering doctoral programs.

As a major presence in engineering education, you can expect excellent academic, research and outreach programs; computer and laboratory facilities that are second to none; and a world-class faculty. With a dynamic and innovative research program, as well as eight departments offering 12 academic programs, the college is recognized as a major contributor to the region's economic development and industrial competitiveness.

**About Auburn University**

Auburn University has developed into one of the largest universities in the South, remaining in the educational forefront with its traditional blend of arts and applied science and changing with the needs of today while living with a respect for the traditions and spirit that are Auburn. Follow the links below to learn more about Auburn University:

- Quick Facts
- Auburn History
- Visitors' Guide
- Traditions
- Vision

![Algae and aquaponics research](image1)

![REU poster presentation](image2)
OBJECTIVES & OUTCOMES FOR BSEN STUDENTS

Educational Objectives

The educational objectives of the Biosystems Engineering instructional programs are to produce graduates that can:

- Utilize systems approach as a result of their biosystems engineering training to identify, develop and implement resilient, safe and practical solutions to current and future societal challenges especially those associated with food, water, energy, environment and health.
- Provide leadership in professional, societal and global issues; make progress towards achieving professional registration and other appropriate certifications; collaborate with other professionals, and evolve into other careers such as management, research and business.

Desired Student Outcomes

The Biosystems Engineering degree program promotes the competencies and abilities, within the context defined by the Biosystems Engineering program objectives, which allow students to:

- Apply knowledge of mathematics, science, and engineering;
- Design and conduct experiments, as well as analyze and interpret data;
- Design a system, component, or process to meet desired needs;
- Function on multi-disciplinary teams;
- Identify, formulate, and solve engineering problems;
- Understand professional and ethical responsibility;
- Communicate effectively;
- Gain a broad education necessary to understand the impact of engineering solutions in a global and societal context;
- Recognize the need for, and an ability to engage in life-long learning;
- Gain knowledge of contemporary issues; and
- Use the techniques, skills, and modern engineering tools necessary for engineering practice.
Where do I fit in?

A common question among Biosystems students is “Where do I fit in – Engineering or Agriculture?” The answer is simple – both! As a BSEN major you enjoy access to the resources and communities of both Colleges! This means you can participate in a wider range of activities and have a broader base of support. It allows you to get involved in both colleges, or select the one where you feel most comfortable.

You are eligible for scholarships in both colleges, can participate in student organizations of both colleges, and can be awarded honors and awards from both.

***Remember, however, that all advising is handled within the Samuel Ginn College of Engineering (through your faculty advisor and the Engineering Student Services office)
ACADEMIC ADVISING & POLICIES

Advising

All Pre-Biosystems and Biosystems engineering majors are advised by Genta Stanfield, the departmental Academic Advisor located in 219A Corley Building. You can make an appointment by logging into AU Access and clicking on the Advise Assist link or by clicking the owl logo to the right. Please bring a tentative planned schedule to your registration advising appointment.

Academic advising is collaboration between student and advisor. In this collaboration, advisors present students with university resources for academic, professional, and social development. Students will have the opportunity to realize academic and personal goals as they share their ambitions and aspirations with their academic advisors.

Advisor Responsibilities – What You Can Expect

You can expect your advisor to:

- Understand and effectively communicate curriculum information, graduation requirements, and university and college policies and procedures,
- Encourage and guide students as they define and develop realistic goals,
- Encourage and support students as they gain the skills to develop clear and attainable educational plans,
- Provide students with information and strategies for utilizing the available resources and services on campus,
- Assist students in understanding the purposes and goals of higher education and its effects on their lives and personal goals,
- Monitor and accurately document students’ progress toward meeting their goals,
- Be accessible for meeting with advisees via regular business hours for advising and e-mail,
- Assist students in gaining decision making skills and skills in assuming responsibility for their educational plans and achievements,
- Maintain confidentiality,
- Assist students in working closely with their professors.

Advisee Responsibilities – What You Are Expected To Do

As an advisee, you have clear responsibilities in the advising partnership in order to be successful:

- Make an appointment to meet with your advisor prior to your registration time ticket each semester,
- Come to each advising session prepared with questions and/or a proposed course schedule,
- Keep an up-to-date advising file complete with all documents and materials discussed during advising sessions,
- See your academic advisor at the first sign of academic difficulty,
- Review and be familiar with course requirements and course sequencing in your major,
- Agree to attend all class meetings from the first day of instruction,
- Register for your classes in a timely manner. (Avoid the need to drop/add after the semester begins if at all possible),
- Confer with your advisor prior to withdrawing from a course,
- Read and be responsible for all information/emails sent from the Academic Advisor, ECE Department and Engineering Student Services Office,
- Take responsibility for your own actions.

Academic Policies

A complete list of undergraduate Academic Policies can be found in the AU Bulletin. This handbook does not list out the full policies; students may access them directly in the bulletin where the most up to date copies are found. For questions regarding specific information and application of academic policies, please consult your assigned Academic
Advisor or Engineering Student Services. Note: Wherever departmental and university policy conflict, the AU Bulletin takes precedence.

Policies cover the following topics:

- **Academic Advising**
- **Academic Programs and Curricula**
  - Second Baccalaureate/Concurrent Degrees, Double Major, Accelerated Bachelors/Masters, Online Learning, Residence Policy, Change of Major or Curriculum, Internal Transfers, Curriculum Model Change, Academic Program Assessment
- **Accommodation Policy for Students with Disabilities**
- **Appeals of Suspension**
- **Auburn University’s General Education Goals and Outcomes**
- **Bachelor’s Degree Requirements**
  - Graduation
- **Class Attendance and Examinations**
  - Excused Absence, Final Exams, Examinations, Academic Grievance Policy
- **Core for Students Starting College Before Fall 2011**
- **Core Curriculum**
  - Student Learning Outcomes (SLO), English Composition Requirements, Literature Requirements, History Requirements, Oral Communication Requirements
- **Dean’s List and Graduation Honors**
- **Enrollment**
  - Registration and Scheduling, Undergraduate Transient Students, Classification, Course Load
- **Grade Adjustment**
- **Grades**
  - Definitions, Incompletes, Grade Changes, Grade for Withdrawals, Grade Average and Quality point computation, Academic Warning, Academic Suspension
- **Policies and Procedures for Admissions**
- **Policies on Directed Studies**
- **Policy on Withdrawals and Resignation**
- **Repeat Courses**
- **Satisfactory Progress**
- **Special Academic Opportunities**
  - The Honors College, National Honor & Recognition, International Academic Opportunities, Service Learning & Student Engagement, Co-Op Program
- **Student Records**
  - Confidentiality, Access, Release of Educational Records, Right to a Formal Hearing

**UNDERGRADUATE PROGRAM & CURRICULUM MODELS**

The department is truly an interdisciplinary unit with academic programs housed in the Samuel Ginn College of Engineering, and research and extension programs housed in the College of Agriculture. Four curriculum pathways (biosystems engineering pathway, bioprocess engineering option, ecological engineering option, and forest engineering option) are used to prepare graduates for productive professional careers in biosystems industries and related natural resource and environmental systems sectors. More information about each of the three pathways can be found below. Prospective students apply for admission through Samuel Ginn College of Engineering and complete the Pre-Biosystems Engineering, Pre-Bioprocess Engineering, Pre-Ecological Engineering, or Pre-Forest Engineering program.
The Biosystems Engineering degree program is accredited by the Engineering Accreditation Commission of ABET, and is the only accredited Biosystems Engineering in Alabama.

Download the Biosystems Undergraduate Brochure

Biosystems Engineering

The Biosystems Engineering pathway emphasizes application of engineering to biological systems and natural resources, and is built on a strong foundation of biological sciences in additional to traditional chemistry and physics topics. Students in the Biosystems engineering pathway complete the full set of basic engineering courses required of all disciplines in the College of Engineering. Students obtain additional training in process engineering for biological materials; environmental engineering for treatment and processing of biological wastes; environmental control systems for agricultural production facilities; structural analysis and design; soil and water resources engineering; and design of machine systems and mobile equipment.

Download the Biosystems Curriculum Model (pdf)
Download the Biosystems Curriculum Flowchart (pdf)
Download the Biosystems Engineering Career Fact Sheet (pdf)
Download the “Strategies for a Successful Biosystems Engineering Career” (pdf)

E-Day Demonstration
# CURRICULUM FOR BIOSYSTEM ENGINEERING (BSEN) PATHWAY

## FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMP 1200</td>
<td>Intro to Computing</td>
<td>2</td>
</tr>
<tr>
<td>MATH 1610</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1030</td>
<td>Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1031</td>
<td>Chemistry I Lab</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 1110</td>
<td>Intro to Engineering</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 1600</td>
<td>Engineering Physics I</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 1120</td>
<td>English Composition II</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 1100</td>
<td>Engineering Orientation</td>
<td>0</td>
</tr>
<tr>
<td>*Tech &amp; Civilization I or World History I</td>
<td>*Tech &amp; Civilization II or World History II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 1100</td>
<td>English Composition I</td>
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Total: 16

**SOPHOMORE YEAR**

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<tr>
<td>BSEN 2210</td>
<td>Eng Methods for Biosystems</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 2010</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2050</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2630</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 1020</td>
<td>Principles of Biology &amp; Lab</td>
<td>4</td>
</tr>
<tr>
<td>BSEN 2240</td>
<td>Biol Bioenvr Heat &amp; Mass Transfer</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2070</td>
<td>Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2350</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2650</td>
<td>Linear Differential Equations</td>
<td>3</td>
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<tr>
<td>BIOL 1030</td>
<td>Organismal Biology &amp; Lab</td>
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Total: 16

**JUNIOR YEAR**

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<tr>
<td>CHEM 1040</td>
<td>Chemistry II</td>
<td>3</td>
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<tr>
<td>BSEN 3310</td>
<td>Hydraulic Transport in Biosys.</td>
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</tr>
<tr>
<td>BIOL 3200</td>
<td>Microbiology</td>
<td>4</td>
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<tr>
<td>CSES 2040</td>
<td>Basic Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>BSEN 3230</td>
<td>Natural Resource Conservation Eng</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 3240</td>
<td>Process Engineering in Biosys.</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 3610</td>
<td>Instrument &amp; Controls Biosys.</td>
<td>3</td>
</tr>
<tr>
<td>STAT 3010</td>
<td>Statistics for Engineers &amp; Scientists</td>
<td>3</td>
</tr>
<tr>
<td>Social Science Core+</td>
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Total: 15

**SENIOR YEAR**

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<tr>
<td>BSEN 3210</td>
<td>Mechanical Power for Biosystems</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 5220</td>
<td>Geospatial Tech for Biosys</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 4210</td>
<td>Irrigation Systems Design</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 4300</td>
<td>Prof. Practice in Biosystems Eng.</td>
<td>2</td>
</tr>
<tr>
<td>Biosystems Engineering Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PHIL 1020/1040/1120 Ethics</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 17

**Total of 126 SEMESTER HOURS**

*The AU Bulletin lists the University Core Curriculum requirements for students in the College of Engineering. Students must complete a sequence in either Literature or History. Students should complete the **World History or Tech and Civ Course sequence** to ensure that all SLOs are met. + **ECON 2020 preferred.**

Approved course electives

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<tr>
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<tbody>
<tr>
<td>FOEN 5230</td>
<td>Engineered Wood Structures</td>
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<tr>
<td>BSEN 5540</td>
<td>Biomass and Biofuels Engineering</td>
<td></td>
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<tr>
<td>BSEN 5510</td>
<td>Ecological Engineering</td>
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</tr>
<tr>
<td>BSEN 5560</td>
<td>Site Design for Biosystems</td>
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</tr>
<tr>
<td>BSEN 4250</td>
<td>Hydraulic Control Systems Design</td>
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<tr>
<td>BSEN 5270</td>
<td>Metabolic Engineering for Bioprocess</td>
<td></td>
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<tr>
<td>BSEN 5450</td>
<td>Commercial Poultry and Livestock Housing</td>
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<tr>
<td>BSEN 5280</td>
<td>Life Cycle Assessment for Biological Sys</td>
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<tr>
<td>BSEN 5250</td>
<td>Deterministic Modeling for Biosystems</td>
<td></td>
</tr>
<tr>
<td>BSEN 4260</td>
<td>Renewable Energy Engineering in Biosys</td>
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<tr>
<td>CIVL 3310</td>
<td>Geotechnical Engineering I</td>
<td></td>
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<tr>
<td>CIVL 3230</td>
<td>Introduction to Environmental Engineering</td>
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<tr>
<td>BSEN 5280</td>
<td>Life Cycle Assessment for Biological Sys</td>
<td></td>
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<tr>
<td>BSEN 5250</td>
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<td></td>
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<tr>
<td>INSY 3600</td>
<td>Engineering Economy</td>
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Bioprocess Engineering Option

The focus of the Bioprocess Engineering option is to produce engineers that seamlessly combine engineering and natural sciences to designing and developing systems, processes and equipment that convert biological and agricultural materials to value-added products such as food, nutraceuticals, polymers and pharmaceuticals. Bioprocess engineers provide a bridge between the research lab and the economic, large-scale implementation of technologies used to convert these biological materials to value-added products. The bioprocess engineering option is coordinated by the Samuel Ginn College of Engineering. Students should apply for admission to the Samuel Ginn College of Engineering and complete the Bioprocess Engineering option portion of the Pre-Biosystems Engineering program.

Download the Bioprocess Engineering Option Curriculum Model (pdf)
Download the Bioprocess Engineering Option Curriculum Flowchart (pdf)
Download the Bioprocess Engineering Career Fact Sheet (pdf)
Download the “Strategies for a Successful Biosystems Engineering Career” (pdf)

Process Engineering in Research Lab
# CURRICULUM FOR BIOPROCESS ENGINEERING (BPEN) OPTION
## BIOSYSTEMS ENGINEERING DEPARTMENT

### FRESHMAN YEAR

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<td>Chemistry I &amp; Lab</td>
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### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSEN 2210</td>
<td>Engng Methods for Biosystems</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 2010</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2050</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2630</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 1020</td>
<td>Principles of Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 1021</td>
<td>Principles of Biology Lab</td>
<td>1</td>
</tr>
<tr>
<td>Social Science Core*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
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<td>16</td>
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</table>

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSEN 3310</td>
<td>Hydraulic Transport in Biosystems</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 2070</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 2071</td>
<td>Organic Chemistry I Lab</td>
<td>1</td>
</tr>
<tr>
<td>STAT 3010</td>
<td>Statistics for Engineers &amp; Scientists</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 1030</td>
<td>Organismal Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 1031</td>
<td>Organismal Biology Lab</td>
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</tr>
<tr>
<td>Social Science Core</td>
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<tr>
<td>Total</td>
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</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BSEN 5280</td>
<td>Lifecycle Analysis for Biol. Systems</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 5220</td>
<td>Geospatial Tech for Biosystems</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 5540</td>
<td>Biomass and Biofuels Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 4300</td>
<td>Prof. Practice in Biosystems Eng</td>
<td>2</td>
</tr>
<tr>
<td>Biosystems Engineering Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PHIL 1020/1040/1120</td>
<td>Ethics</td>
<td>3</td>
</tr>
<tr>
<td>Fine Arts Core</td>
<td></td>
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</table>

Total of 127 SEMESTER HOUR.

- The AU Bulletin lists the University Core Curriculum requirements for students in the College of Engineering. Students must complete a sequence in either Literature or History.
- Students should complete the World History or Tech and CIV course sequence to ensure that all SLOs are met.
- +ECON 2020 preferred, however if on pre-professional track that will require the MCAT, PSYC 2010 preferred.

## Approved Biosystems Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSEN 5270</td>
<td>Metabolic Engineering for Bioprocess</td>
</tr>
<tr>
<td>BSEN 5450</td>
<td>Commercial Poultry and Livestock Housing</td>
</tr>
<tr>
<td>BSEN 5260</td>
<td>Renewable Energy Engineering in Biosystems</td>
</tr>
<tr>
<td>BSEN 4980</td>
<td>Undergraduate Research</td>
</tr>
<tr>
<td>PFEN 3100</td>
<td>Fundamentals of Polymers</td>
</tr>
<tr>
<td>PFEN 4200</td>
<td>Polymers from Renewable Resources</td>
</tr>
<tr>
<td>INSY 3600</td>
<td>Engineering Economy</td>
</tr>
<tr>
<td>MATL 5700</td>
<td>Biomaterials</td>
</tr>
<tr>
<td>MATL 5750</td>
<td>Microstructure and Mechanics of Skeletal Tissues</td>
</tr>
<tr>
<td>MATL 5720</td>
<td>Biomedical Applications of Polymers</td>
</tr>
<tr>
<td>CHEN 3660</td>
<td>Chemical Engineering Separations</td>
</tr>
<tr>
<td>CHEN 3380</td>
<td>Phase and Reaction Equilibria</td>
</tr>
</tbody>
</table>

Courses for Pre-Health: BIOL 1020/1021, BIOL 1030/1031, CHEM 1030/1031, CHEM 1040/1041, PHYS 1600, CHEM 2070/2071, BCHE 3200,
The ecological engineering option was developed to meet a growing demand for engineers with the ability to solve environmental problems using knowledge of natural ecological and biological principles. This option therefore provides more emphasis on the use of engineering to preserve and enhance our environmental and natural resources. Ecological engineering option students complete the full set of basic engineering courses required of all disciplines in the College of Engineering. Students obtain additional training in unique ecological engineering courses such as watershed modeling, site design, ecological engineering, environmental engineering, and GPS/GIS. Students are also required to take an additional ecology elective beyond the basic Biosystems Engineering curriculum. Learning areas include:

- Non-point source pollution
- Watershed modeling
- Stream and river restoration
- Natural resource conservation

**Download the Ecological Engineering Option Curriculum Model (pdf)**

**Download the Ecological Engineering Option Curriculum Flowchart (pdf)**

**Download the Ecological Engineering Career Fact Sheet (pdf)**

**Download the “Strategies for a Successful Biosystems Engineering Career” (pdf)**

3D printing for algae research with Dr. Blersch
# CURRICULUM FOR ECOLOGICAL ENGINEERING OPTION

## FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 1200</td>
<td>Intro to Computing</td>
<td>2</td>
</tr>
<tr>
<td>MATH 1610</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1030</td>
<td>Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1031</td>
<td>Chemistry I Lab</td>
<td>1</td>
</tr>
<tr>
<td>*Tech &amp; Civilization I or World History I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 1100</td>
<td>English Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 1100</td>
<td>Engineering Orientation</td>
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## SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BSEN 2210</td>
<td>Engineering Methods for Biosys</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 2010</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2050</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2650</td>
<td>Linear Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 1020</td>
<td>Principles of Biology</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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## JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1040</td>
<td>Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 3310</td>
<td>Hydraulic Transport in Biosys</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 3200</td>
<td>Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>CSES 2040</td>
<td>Basic Soil Science</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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## SENIOR YEAR

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>BSEN 5510</td>
<td>Ecological Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 5560</td>
<td>Site Design for Biosystems</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 5522</td>
<td>Geospatial Tech for Biosystems</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 4300</td>
<td>Prof. Practice in Biosystems Eng</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

Total of 127 SEMESTER HOURS

*The AU Bulletin lists the University Core Curriculum requirements for students in the College of Engineering. Students must complete a sequence in either Literature or History. Students should complete the **World History or Tech and Civ Course sequence** to ensure that all SLOs are met. + ECON 2020 preferred.

### Approved Electives

<table>
<thead>
<tr>
<th>Ecological Engineering electives (one of the following)</th>
<th>Ecology Electives (one of the following)</th>
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<tbody>
<tr>
<td>CIVL 5250 Biological Principles of Environmental Engng</td>
<td>BIOL 3060 Ecology</td>
</tr>
<tr>
<td>CIVL 4210 Water and Wastewater Treatment and Design</td>
<td>BIOL 5700 Applied and Environmental Biology</td>
</tr>
<tr>
<td>INSY 3600 Engineering Economy</td>
<td>CSES 5060 Soil Microbiology</td>
</tr>
<tr>
<td>BSEN 4210 Irrigation Systems Design</td>
<td>CSES 5080 Soil Resources and Conservation</td>
</tr>
<tr>
<td>BSEN 5260 Renewable Energy Engineering in Biosystems</td>
<td>CSES 5000 Soils and Environmental Quality</td>
</tr>
<tr>
<td>BSEN 5540 Biomass and Biofuels Engineering</td>
<td>FORY 4230 Forest Ecology</td>
</tr>
<tr>
<td></td>
<td>FISH 5320 Limnology</td>
</tr>
</tbody>
</table>
Forest Engineering Option

The Forest Engineering option at Auburn, the only one of its kind in the South, has evolved through more than two decades of cooperation between Auburn's Samuel Ginn College of Engineering and the School of Forestry and Wildlife Sciences. The focus of the Forest Engineering option is to prepare students that can solve engineering problems in forest ecosystems and in the forest products industry. The option is administered by the Department of Biosystems Engineering and students enroll in the College of Engineering. Graduates are eligible for registration as Professional Engineers, and may also become registered foresters upon completion of a minor in forest resources. In addition to completing the full set of engineering fundamentals courses, forest engineering students obtain additional specialization in process engineering for forest products; structural design using engineered wood products; land and water conservation engineering; design of forest roads and transportation systems; and design of forest machine systems and mobile equipment. Students in the program also take courses in ecology, biology, silviculture, mensuration, economics, forest management, and forest operations. Education as both an engineer and a forester gives the forest engineer a broad selection of career opportunities.

Download the Forest Engineering Option Curriculum Model (pdf)

Download the Forest Engineering Option Curriculum Flowchart (pdf)

Download the Forest Engineering Career Fact Sheet (pdf)

Download the “Strategies for a Successful Biosystems Engineering Career” (pdf)

Dr. Adhikari holds a pine seedling
# CURRICULUM FOR FOREST ENGINEERING OPTION

## FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COMP 1200 Intro to Computing</td>
<td>2</td>
</tr>
<tr>
<td>MATH 1610 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1030 Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1031 Chemistry 1 Lab</td>
<td>1</td>
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<tr>
<td>&quot;Tech &amp; Civilization I or World History I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 1100 English Composition I</td>
<td>3</td>
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<tr>
<td>ENGR 1100 Engineering Orientation</td>
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<tr>
<td><strong>Total</strong></td>
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## SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BSEN 2210 Eng Methods for Biosystems</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 2010 Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 2050 Statics</td>
<td>3</td>
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<tr>
<td>MATH 2630 Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 1020 Principles of Biology</td>
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## SUMMER PRACTICUM

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<tr>
<th>Course</th>
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<tr>
<td>FORY 3020 Forest Biology</td>
<td>3</td>
</tr>
<tr>
<td>FORY 3050 Field Mensuration</td>
<td>4</td>
</tr>
<tr>
<td>FORY 3060 Forest Management</td>
<td>1</td>
</tr>
<tr>
<td>FOEN 3040 Forest Surveying</td>
<td>2</td>
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## JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BSEN 3210 Mechanical Power for Biosys</td>
<td>3</td>
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<tr>
<td>BSEN 3310 Hydraulic Transport in Biosys</td>
<td>4</td>
</tr>
<tr>
<td>FORY 3180 Measurements I</td>
<td>3</td>
</tr>
<tr>
<td>FORY 3100 Dendrology</td>
<td>3</td>
</tr>
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## SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BSEN 5220 Geospatial Tech for Biosys</td>
<td>3</td>
</tr>
<tr>
<td>BSEN 4300 Prof. Practices in Biosys Eng.</td>
<td>2</td>
</tr>
<tr>
<td>BSEN 5560 Site Design for Biosys</td>
<td>3</td>
</tr>
<tr>
<td>FOEN 5710 Timber Harvesting Methods#</td>
<td>3</td>
</tr>
<tr>
<td>FORY 5230 Silviculture</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Total 127 SEMESTER HOURS

*The AU Bulleing lists the University Core Curriculum requirements for students in the College of Engineering. Students must complete a sequence in either Literature or History. Students should complete the World History or Tech and Civ Course sequence to ensure that all SLOs are met.

+ ECON 2020 preferred. ; #Course is only offered every other even years

### Approved Electives

| BSEN 3610 Instrumentation and Controls in Biosystems                  | BSEN 5230 Waste Management Utilization |
| BSEN 5230 Engineered Wood Structures                                  | BSEN 4250 Hydraulic Control Systems Design |
| BSEN 5540 Biomass and Biofuels Engineering                            | BSEN 5260 Renewable Energy Engineering in Biosystems |
| BSEN 5510 Ecological Engineering                                     | INSY 3600 Engineering Economy |
| BSEN 5560 Site Design for Biosystems                                 | |
| BSEN 3240 Process Engineering in Biosystems                          | |
UNDERGRADUATE COURSES

The Auburn Bulletin provides a detail listing of all Biosystems Engineering courses, programs, degree requirements and details about policies.

Dr. Dougherty and seniors testing the courtyard basins for Lab BSEN 5560

Samford Hall in Spring
PRE-REQUISITE FLOW CHARTS
Biosystems Engineering Pre-Requisites

Freshman
Fall
- ENGL 1100
- ENGR 1100
- MATH 1610
- CHEM 1030
- CHEM 1031

Freshman
Spring
- ENGL 1120
- ENGR 1110
- PHYS 1600
- MATH 1620
- HIST 1210
or History
World Sequence

Sophomore
Fall
- BSEN 2210
- ENGR 2050
- MATH 2630
- ENGR 2010
- BIOL 1020

Sophomore
Spring
- ENGR 2350
- ENGR 2070
- MATH 2650
- BSEN 2240
- BIOL 1030

Junior
Fall
- BSEN 3310
- CSES 2040
- CHEM 1040
- BIOL 3200

Junior
Spring
- STAT 3010
- BSEN 3610
- BSEN 3230
- BSEN 3240
- ECON 2020
Social Science

Senior
Fall
- BSEN 5220
- BSEN 3210
- BSEN 4300
- BSEN 4210
- BSEN ELECT

Senior
Spring
- PHIL 1020/1040
- Fine Arts
- Literature
- BSEN 4310
- BSEN ELECT
- BSEN 5230

Prerequisites
Prerequisites/ Co-requisites

BIOSYSTEMS ENGINEERING PATHWAY FLOWCHART FOR COURSES
Bioprocess Engineering Option Pre-Requisites

Freshman
Fall
- ENGL 1100
- ENGR 1100
- MATH 1610
- CHEM 1030/1031
- HIST 1210
  or World History Sequence

Freshman
Spring
- ENGL 1120
- ENGR 1110
- PHYS 1600
- MATH 1620
- HIST 1220

Sophomore
Fall
- BSEN 2210
- ENGR 2050
- MATH 2630
- ENGR 2010
- BIOL 1020/1021

Sophomore
Spring
- ECON 2020
  Social Science
- ENGR 2070
- MATH 2650
- BSEN 2240
- CHEM 1040/1041

Junior
Fall
- STAT 3010
- BSEN 3310
- CHEM 2070/2071
- BIOL 1030/1031

Junior
Spring
- BSEN 4240
- BSEN 3610
- BSEN 3240
- BCHE 3200
- BIOL 3200
- CHEM 3000/3011

Senior
Fall
- BSEN 5280
- BSEN 5220
- BSEN 4300
- BSEN 5540
- BSEN ELECT
- BSEN 5230

Senior
Spring
- BSEN ELECT
  Literature
- BSEN 4310
  Fine Arts
- Prerequisites
  Prerequisites/Co-requisites

BIOPROCESS ENGINEERING OPTION FLOWCHART FOR COURSES
Ecological Engineering Option Pre-Requisites

Freshman
Fall
- ENGL 1100
- ENGR 1100
- MATH 1610
- CHEM 1031

Freshman
Spring
- ENGL 1120
- ENGR 1110
- PHYS 1600
- MATH 1620
- HIST 1210
- or History World Sequence

Sophomore
Fall
- BSEN 2210
- ENGR 2050
- MATH 2630
- ENGR 2010
- BIOL 1020

Sophomore
Spring
- Fine Arts
- ENGR 2070
- MATH 2650
- BSEN 2240
- BIOL 1030

Junior
Fall
- BSEN 3310
- CSES 2040
- CHEM 1040
- BIOL 3200
- ECN 2020 Social Science

Junior
Spring
- STAT 3010
- BSEN 3610
- BSEN 3230
- CIVL 3230

Senior
Fall
- BSEN 5220
- BSEN 5560
- BSEN 4300
- BSEN 5510
- BSEN ELECT

Senior
Spring
- PHIL 1020/1040
- ECOLOGY ELECT
- Literature
- BSEN 4310
- BSEN 5520
- BSEN 5230

Prerequisites

Prerequisites/Co-requisites

ECOLOGICAL ENGINEERING OPTION FLOWCHART FOR COURSES
Forest Engineering Option Pre-Requisites

Freshman
- Fall
  - ENGL 1100
  - ENGR 1100
  - MATH 1610
  - CHEM 1030
  - HIST 1210
  - COMP 1200

Freshman
- Spring
  - ENGL 1120
  - ENGR 1110
  - PHYS 1600
  - MATH 1620
  - HIST 1220
  - PHYS 1600

Sophomore
- Fall
  - BSEN 2210
  - ENGR 2050
  - MATH 2630
  - ENGR 2010
  - BIOL 1020
  - ENGR 1110

Sophomore
- Spring
  - ENGR 2350
  - ENGR 2070
  - MATH 2650
  - CHEM 1040/1041
  - STAT 3010
  - ENGR 2050

Summer Practicum
  - FORY 3020
  - FORY 3050
  - FORY 3060
  - FOEN 3040
  - BSEN 3310
  - BSEN 3210

Junior
- Fall
  - FORY 3100
  - FORY 3180
  - BSEN 3310
  - BSEN 3230
  - CIVL 3310

  - Fine Arts
  - ECON 2020
  - Social Science

Junior
- Spring
  - BSEN 5220
  - BSEN 5560
  - BSEN 4310
  - FOEN 5710
  - FORY 5230

  - Literature

Senior
- Fall
  - BSEN 4300

Senior
- Spring
  - PHIL 1020/1040

Prerequisites
Prerequisites/Co-requisites

FOREST ENGINEERING OPTION FLOWCHART FOR COURSES
American Society of Agricultural and Biological Engineers (ASABE)

Faculty Advisor: Timothy McDonald

Meetings: 2nd Tuesday of each month at 6:00 pm in 302 Corley

Annual Activities: Student Picnic (fall and spring), Ag Roundup, E-Day, Lawnmower Clinic

The goal of the ASABE (American Society of Agricultural and Biological Engineers) student branch at Auburn University is to promote the interest and involvement of students (pre-professionals) in ASABE, and to encourage the advancement of agricultural, biological, food, environmental, and ecological engineering. Agricultural, Food, and Biological Engineers develop efficient, effective, and environmentally sensitive techniques and methods of producing food, fiber, timber, and renewable energy sources for a growing world population. Also, the ASABE is designed to allow students to gain friendships, career opportunities, and public relations.

The Auburn ASABE student branch typically meets monthly in the Corley Building to discuss and plan upcoming events while participating in fun team development activities. As a member of ASABE, students have an opportunity to be involved in several engineering competitions. Through these competitions students develop skills such as design, teamwork, and apply knowledge obtained through engineering courses. Joining the ASABE would be beneficial to a student while pursuing an undergraduate degree.

For more information on joining the Auburn student branch of the ASABE call 334-844-3551 or email jnd0026@auburn.edu.

Quarter-Scale Tractor Team Competition

The Auburn student branch of the ASABE competes annually in the ASABE International Quarter Scale Tractor Design competition in Peoria, Illinois. The purpose of this competition is to promote teamwork, communication, technical writing and oral presentation skills. Teams are given a motor and a set of tires, the rest of the design and construction of the tractor is up to the team. Auburn ASABE students have been participating in the Quarter Scale competition since 2002. The value to students in participating in Quarter Scale is the experience of working on a team to solve a complex engineering problem, and presenting the solution in a professional environment. The competition consists of a formal presentation, pulling contest, maneuverability course, and a durability course.

The Auburn ASABE supports the quarter scale team by raising funds. To join the Quarter Scale team, one needs only to be a member of the student branch of ASABE. The Biosystems Department supports the Quarter Scale team by providing sponsorship, work spaces, tools, faculty guidance, transportation, and funding. For more information on the Quarter Scale tractor team, see Tim McDonald or Jon Davis.
Lawnmower Clinic
The ASABE Student chapter’s annual fundraiser is the Lawnmower Clinic. ASABE students repair, clean, and generally prepare Auburn and Opelika residents’ lawnmowers for spring and summer. For a small fee, residents can bring their lawnmower to be serviced. Mowers are serviced by replacing oil, checking spark plugs, sharpening blades, and basic tune-up for spring-summer use.

E-Day
E-Day is a yearly College of Engineering event providing middle and high school students the opportunity from Alabama and surrounding states to learn about the different engineering programs at Auburn University. The Biosystems engineering ASABE student branch members volunteer at departmental displays, visit with prospective students, and lead tour groups through the department facilities/programs.

Alpha Epsilon (Delta Beta Chapter)
Alpha Epsilon the Alabama Delta Beta Chapter at Auburn University is an honor society that promotes high ideals for the engineering profession, gives recognition to biological and agricultural engineers who manifest worthy qualities of character, scholarship and professional attainment, and encourages and supports improvements in the biological and agricultural engineering profession. Another goal of the honor society is to be an instrument of greater service to mankind.

Active members are students enrolled in the Biosystems Engineering Department at Auburn University. Membership in Alpha Epsilon for undergraduate engineering students is limited to (1) juniors who have a minimum cumulative scholastic rank in the upper quarter of the college class and (2) seniors who have a minimum cumulative scholastic rank in the upper third of the college class. Graduate students can also be inducted as members of this honor if they would have met the requirements for membership as undergraduates at the institution they attended, had the organization existed there at that time. Graduate students not eligible for membership as undergraduates will be eligible after the completion of at least seven semester hours (ten quarter hours) of graduate course work with a minimum grade point average equivalent to 3.25 on a 4.00-point scale, if they have an undergraduate degree in Biosystems Engineering or closely related field.

Other Student Organizations
Ag Ambassadors
The Ag Ambassadors are a highly select group of young men and women dedicated to enhancing the image of Alabama agriculture, the College of Agriculture, the Alabama Agricultural Experiment Station, the Alabama Cooperative Extension System and Auburn University. The Ag Ambassadors was created in 1983 to assist with college- or university-sponsored events. The Ambassadors are available to speak on topics related to science, agriculture and natural resources to school assemblies, agriculture-oriented groups, business groups, banquets or
similar events. All Ambassadors are majoring in the College of Agriculture, in agriscience education in the College of Education, or in other closely related fields.

**Cupola Engineering Ambassadors**
The mission of the Cupola Engineering Ambassadors is to promote, unify, and serve the Samuel Ginn College of Engineering. Cupola Engineering Ambassadors act out this mission by:

- Providing tours of the College of Engineering to prospective students and families
- Hosting alumni events and tailgates
- Assisting with engineering events (BEST Robotics competitions, E-Day, PEAK Camp)
- Facilitating student appreciation days (Welcome Back BBQ and Breakfast)
- Helping with recruiting events (TALONS Days, War Eagle Days)
- Fundraising for Engineers without Borders with the Short Circuit 5K

**Society of American Foresters**
The objectives of this Chapter of the Society is to advance the science, technology, education, and practice of professional forestry in America, especially in the Southeastern region, to use the knowledge and skill of the profession to benefit society, and to maintain a closer fellowship among all students interested in forestry.

**Forest Products Society**
The Forest Products Society is an international not-for-profit technical association founded in 1947 to provide an information network for all segments of the forest products industry.

**Engineering Student Council**
The purpose of the Engineering Student Council is to be the voice of the engineering student body. The council is made up of Executive officers, six SGA senators, and a representative from each engineering student organization. Together, they are able to keep students informed and encourage involvement by publicizing speakers, receptions, meetings, and other events pertaining to Engineering throughout the year.

**Tau Beta Pi**
Tau Beta Pi was founded in 1885 at Lehigh University in Pennsylvania and is the nation's oldest and most prestigious engineering honor society. Tau Beta Pi recognizes the most outstanding engineering students in the nation and gives them a forum to apply their talents to better the world in which they live. Auburn has the oldest chapter in Alabama, inducting students since 1921. Members strive to maintain the honor and dignity of Tau Beta Pi and use their talents to better the world.

**National Society of Black Engineers**
The purpose of NSBE is to increase the number of culturally responsible Black Engineers who excel academically, succeed professionally and positively impact the community.

**Society of Women Engineers**
For more than six decades, SWE has given women engineers a unique place and voice within the engineering industry. The organization is centered on a passion for members' success and continues to evolve with the challenges and opportunities reflected in today's exciting engineering and technology specialties.

**Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS)**
MANRRS promotes academic and professional advancement by empowering minorities in agriculture, natural resources, and related sciences.

To view all College of Agriculture student organizations click [HERE](http://agriculture.auburn.edu/student-life/clubs-and-organizations/)

To view all Samuel Ginn College of Engineering student organizations click [HERE](http://eng.auburn.edu/student-organizations/index)
1930's Ag engineering students

ASABE International Quarter Scale competition in Peoria, Illinois
Financial assistance based on academic ability and/or financial need is available to Biosystems Engineering students through Auburn University, Samuel Ginn College of Engineering, and College of Agriculture. BSEN students are also eligible for the following departmental scholarships:

<table>
<thead>
<tr>
<th>Scholarship</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture Alumni Association Annual Scholarship</td>
<td>Must be a current student enrolled in the College of Agriculture with a declared major in Agribusiness or Biosystems Engineering, with preference given to students who demonstrate financial need</td>
</tr>
<tr>
<td>Alabama Ag Credit, ACA Endowed Scholarship</td>
<td>Must be an incoming freshman awarded a Spirit of Auburn University Scholarship, with preference given to students majoring in agriscience education or biosystems engineering, or pursuing an undergraduate degree from the College of Agriculture or the School of Forestry and Wildlife Sciences; students majoring in a pre-professional curriculum are not eligible for consideration.</td>
</tr>
<tr>
<td>Alabama Section of American Society of Agricultural and Biological Engineers Endowed Scholarship</td>
<td>Must be enrolled in the College of Agriculture with a declared major in biosystems, ecological or forest engineering.</td>
</tr>
<tr>
<td>Dr. William E. Hardy, Jr./First South Farm Credit Endowed Scholarship</td>
<td>Must be an incoming freshman enrolled in the College of Agriculture awarded a Spirit of Auburn Scholarship, with preference given to students majoring in agriscience education or biosystems engineering, or pursuing an undergraduate degree from the College of Agriculture or the School of Forestry and Wildlife Sciences.</td>
</tr>
<tr>
<td>Fred A. Kummer Endowed Scholarship</td>
<td>Must have declared major in Biosystems Engineering</td>
</tr>
<tr>
<td>Hop King Endowed Scholarship</td>
<td>Must have declared major in Biosystems Engineering</td>
</tr>
<tr>
<td>Irene and William Gill Annual Scholarship</td>
<td>Must have a declared major in Biosystems Engineering, with preference to female students who demonstrate financial need although gender of the applicant shall not be the_controlling factor in awarding the scholarship.</td>
</tr>
<tr>
<td>Lawrence County Farmers Federation Endowed Scholarship</td>
<td>Must be enrolled in the College of Agriculture with a declared major in agricultural economics, agronomy, animal sciences (excluding pre-vet and equine), biosystems engineering, fisheries, horticulture, or poultryscience, a resident of Lawrence County, Alabama, and a member (or dependent of a member) of the Alabama Farmer’s Federation. To receive consideration, select “Alabama Farmers Federation” when prompted while completing the General Application within AUSOM.</td>
</tr>
<tr>
<td>Lawrence County Friends of Agriculture Endowed Scholarship</td>
<td>Must be enrolled in the College of Agriculture with a declared major in agricultural economics, agronomy, animal sciences (excluding pre-vet and equine), biosystems engineering, fisheries, horticulture, or poultry science and be a resident of Lawrence County, Alabama.</td>
</tr>
<tr>
<td>Lee W. Richards Endowed Scholarship</td>
<td>Must be enrolled in the Samuel Ginn College of Engineering and declared a major in biosystems or environmental science, with preference given to residents of Georgia who demonstrate financial need.</td>
</tr>
<tr>
<td>Maxwell E. Jones Memorial Endowed Scholarship</td>
<td>Must be enrolled in the College of Agriculture with a declared major in biosystems engineering.</td>
</tr>
<tr>
<td>Russell and Adelaide Roberson Endowed Scholarship</td>
<td>Must be enrolled in the College of Agriculture with a declared major in biosystems engineering and demonstrate financial need, with preference to a member of the Farmhouse Fraternity.</td>
</tr>
<tr>
<td>William P. Adkins Memorial Endowed Scholarship</td>
<td>Must be a sophomore enrolled in the College of Agriculture with a declared major in biosystems engineering.</td>
</tr>
</tbody>
</table>
Pulp & Paper Foundation Scholarship

Must be enrolled in the Samuel Ginn College of Engineering and declared a major in biosystems, chemical, electrical, or mechanical engineering. Requires additional coursework (5 hours) and an internship or CoOp with Foundation company. See Advisor for more information.

To search all available scholarship opportunities for undergraduates at Auburn University, students can utilize the Auburn University Scholarship Opportunity Manager (AUSOM)

Additional Scholarship Opportunities:

Alabama Chapter of Soil and Water Conservation Society Annual Scholarship deadline: April 30
American Council of Engineering Companies Scholarship deadline: January 4
SMART Scholarship (Dept of Defense)
NOAA Ernest F. Hollings Scholarship apply in September

CAREER INFORMATION

What will I learn in this major?

Engineering design and problem solving • Stream and river restoration • Renewable energy engineering in biological systems • Biomass conversion techniques, design and implementation for energy, biofuels, and biopower production • Sustainability engineering • Watershed modeling • Water resources engineering • Hydraulic control systems design • Machine automation design • Precision and turf irrigation systems, water and wastewater system design • Waste management treatment and system design • Project site plan development for production agriculture, forestry, and rural development • Soil erosion, hydraulic structures and channel hydraulics system design • Biological product preservation and value-added processing and conversion • Food engineering • Metabolic engineering • Geospatial technologies (GPS, GIS) and remote sensing systems • Biomass materials characterization, handling, transportation and storage • Formation, classification, properties, management, fertility and conservation of soils in relation to the growth of plants • Soil-forming processes, physical properties of soils, subsurface investigations, soil classification, permeability, effective stress, time-settlement analysis, and compaction • Design of agricultural, forestry and natural resource machines and equipment • Development of skills in technical writing and oral presentations • Global outlook on engineering

What types of employers will hire me with this degree?

Food processing industry • Agricultural and construction equipment manufacturers • Electronic instrumentation and control companies • Manufacturing firms • Civil engineering consulting firms • Construction & Geotechnical firms • Land grant universities • Biological production, management, and design companies including: agricultural, forest products, nursery, turf, greenhouses, and mining • Agricultural and environmental design and consulting firms • Bulk product handling, processing, and transport manufacturers • Research and education facilities • USDA Agriculture Research Service • USDA Forest Service • USDA Natural Resource Conservation Service • Alabama Department of Environmental Management • Environmental Protection Agency • Department of Defense • Defense contractors •
Architectural and building firms • Forest product and mining companies • State Departments of Transportation • Alternative fuel production companies • Power/utilities companies • Research laboratories and/or firms

Recent employment examples of Biosystems engineering graduates:

- **Engineering Consulting Firms:** AMEC, CDG, CH2M, Goodwyn, Mills and Cawood, Hazen and Sawyer, HDR, HMB, Krebs, Michael Baker, Mott MacDonald, SCS Engineering, Thomas and Hutton, TTL
- **Utilities and Energy:** Alabama Power, Halliburton (oil company), Georgia Power, Southern Company
- **Off Highway Vehicle:** Caterpillar, John Deer, Kershaw, Bush Hog
- **Local and State Regulations:** ADECA (Alabama), ADEM (Alabama), Georgia, Florida, Kentucky, North Carolina, South Carolina, Tennessee
- **Municipalities:** Auburn, Charlotte (NC), Montgomery (AL)
- **Federal and State Civil Service:** Department of Transportation (DOT), US Army Corps of Engineers, USDA-NRCS, USDA-ARS, U.S. Forest Service
- **Food Companies:** Frito Lay, Pepsi Co, ADM, Cargill
- **Military:** Air Force, Army, Marines, Navy
- **Manufacturing:** Altec, D&F Equipment, Ecotech, Kyson Warren, Lewis M. Carter, WestRock
- **Forestry and Bioproducts:** Georgia-Pacific, International Paper, Packaging Corporation, Weyerhaeuser
- **Others:** Graduate School, Peace Corps, NGO’s Professional and Medical Schools

**Engineering Career Connection**

The College of Engineering encourages all students to take advantage of our many career-building tools; Co-Op’s, internships, summer jobs or undergraduate research. These opportunities allow a student to gain real world experience in their chosen engineering field. Successful completion within one of these areas will help build a resume; establish a professional network; and help determine the next steps after graduation.

Auburn Engineering is committed to the success and professional development of our students from when they are accepted into the college until graduation. The Engineering Career Connection assists students looking to take the next step in their college career by building and sharing connections with corporate recruiters, Auburn University Career Center, and alumni to provide students with the information, experience and resources they need to pursue their internship and employment goals.

**CO-OP, STUDY ABROAD, INTERNSHIP AND UNDERGRAD RESEARCH PROGRAMS**

**Study Abroad**

**Study abroad** experiences allow you to learn about cultures and perspectives in a way that may not be possible on campus. Take classes or gain hands-on experience by completing an internship with an international company, contribute to a service-learning project with an NGO, improve foreign language fluency by immersing yourself in your chosen language, or conduct research with experts in your field.

Regardless of the experience you choose, you will build skills highly sought by employers: adaptability, flexibility, communication skills, intercultural awareness, problem-solving skills, and more. Considering only 10% of U.S. undergraduate students participate in an international experience, those who do so gain an advantage over peers in the competitive job market as well as in graduate and professional school applications.
With a variety of program types, lengths, locations, courses, and costs, you can find a program that fits your interests and will keep you on track for graduation.

Quick Facts about Studying Abroad:

- Programs are possible in any country as long as it does not have a Travel Warning issued by the U.S. Department of State – AU students have studied on every continent, including Antarctica!
- Program lengths range from one week to one academic year.
- Courses for Auburn and non-Auburn programs are pre-approved prior to departure.
- Programs are available for all majors and student levels.
- Credit can count toward majors, minors, core curriculum, and general electives.
- Course load is equal to the same term on campus, ensuring students stay on track for graduation.
- Foreign language ability is not required, as courses are available in English and the host language.
- Costs can be comparable to an equivalent term at AU, and scholarships, financial aid, PACT, VA benefits, and other aid may be applicable.
- Housing options include residence halls, apartments, homestays, and hotels.
- Experiences abroad build skills sought by employers.
- Ready to get started? Attend a Study Abroad 101 session, held every Thursday at 3 p.m. and Friday at 11 a.m. in 242 Foy Hall.

Recent study abroad trips of Biosystems engineering students

- Spain, England, Germany, New Zealand, Australia, China, France, Mexico

Co-Op

Cooperative education can confirm or redirect career decision-making through on-the-job experience in a chosen field . . . since co-ops "TEST DRIVE" their career! Cooperative Education enhances classroom learning and adds relevance to education by integrating academic theory with real world work experience. Co-Ops have the opportunity to test classroom learning in the laboratory of the real world.

How does Co-Op work?

By alternating terms of school and work, students obtain paid, practical work experience in the career of their choice. Experience that means better qualifications when competing for a job at graduation.

The Co-Op Advantage

- Co-Op experience improves employment prospects at graduation.
- Co-Op graduates are in possession of transferable, relevant work experience.
- Many employers hire only graduates with strong experience in the field.
- Co-Op grads have established relationships with potential employers.
- Co-Op grads often receive higher starting salaries at graduation than regular graduates.
- Professional confidence is increased when students know they can successfully perform in the workplace.

When do I apply?

Students are eligible to begin Co-Op as early as the summer after their freshman year! Information Sessions are held the first two weeks of every semester.
Internships

Biosystems students interested in internships can locate opportunities through the Auburn University Career Center. Biosystems engineering students have interned or co-oped at companies such as Briggs and Stratton, International Paper, Georgia Pacific, Alliance Source Testing, Cox Enterprises, D&F Equipment, Weston Solutions, Case New Holland, John Deere, Knox Kershaw, Washington State Department of Natural Resources, and City of Montgomery Water Works Board.

Undergraduate Research

Undergraduate students are encouraged to participate in ongoing research activities in the department. Several BSEN students have also found research opportunities in collaborating departments in the College of Agriculture, Samuel Ginn College of Engineering and School of Forestry and Wildlife Sciences. Participation in research can be for course credit (BSEN 4980) or you can be paid a stipend (by faculty or through other sources such as a fellowship with the Office of Undergraduate Studies) as an undergraduate researcher. Research opportunities are not limited to Auburn University. There are several opportunities to participate in research (mostly during summer) around the country through funded prestigious programs such as NSF-REU, DOE-SULI and NIH-SIP. Research experience as an undergraduate student enables you to experience the culture of research and life as a scientist. It is a risk-free way to investigate (and also in a hands-on environment) whether a research career is a good fit for you. Equally important is that research experience allows you to stand out among your peers. The professor that you worked for as a researcher student will always be glad to write a letter of recommendation for you for after-college employment, professional schools, and for graduate school. You might wonder why so much importance is placed on research. Several studies have shown that research experience improves students’ ability in the following areas: tolerances for obstacles, learning to work independently, time management, problem-solving skills, ability to interpret results and analyze data, self-confidence, presentation skills, etc. Contact or discuss with your faculty advisor if you are interested in undergraduate research.

Accelerated Bachelor's/Master's Program (ABM)

The accelerated bachelor's/master's degree program is designed to provide an opportunity for highly motivated students to gain an in-depth understanding of Biosystems Engineering beyond that of typical bachelor’s level graduates and make them more competitive for employment positions or for graduate studies. Specifically, the program allows students to take three 6000 level courses (minimum of 9 credit hours) that will count for both the bachelor’s and master’s degrees. The accelerated degree program will also provide an opportunity for students involved in undergraduate research to build on that research and develop it into a Master’s thesis. For more information about the ABM program, see Dr. Sushil Adhikari (sza0016@auburn.edu) – Graduate Admission Committee Chair, or Jon Davis (jnd0026@auburn.edu) – Undergraduate Program Coordinator, or Genta Stanfield (gms0008@auburn.edu) – Academic Advisor.
Your time at Auburn is valuable. Make the most of it and take advantage of the numerous programs and activities that the University has to offer. Read below for information on all things Auburn. If you can’t find the answer to your question, see your advisor or you can also try the legendary James E. Foy Information Desk (334-844-4244).

<table>
<thead>
<tr>
<th>Frequently Asked Questions</th>
<th>Campus Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where is everything?</td>
<td>Campus Map</td>
</tr>
<tr>
<td>How do I get there?</td>
<td>Tiger Transit (bus) routes</td>
</tr>
<tr>
<td>Where can I park?</td>
<td>Parking Services</td>
</tr>
<tr>
<td>Where can I eat?</td>
<td>Dining on Campus</td>
</tr>
<tr>
<td>Where can I work out?</td>
<td>Recreation &amp; Wellness Center</td>
</tr>
<tr>
<td>How do I get my student ID?</td>
<td>Tiger Card (ID)</td>
</tr>
<tr>
<td>Where can I find a place to live?</td>
<td>Housing &amp; Residence Life</td>
</tr>
<tr>
<td>What if I need medical attention?</td>
<td>AU Med Clinic</td>
</tr>
<tr>
<td>Where is the library?</td>
<td>Library</td>
</tr>
<tr>
<td>How do I pay my tuition &amp; fees?</td>
<td>Go to EBill in the My Finances tab of AU Access</td>
</tr>
<tr>
<td>How do I get athletic tickets?</td>
<td>Student Tickets</td>
</tr>
<tr>
<td>Can I get a job on campus?</td>
<td>AU Career Center</td>
</tr>
<tr>
<td>How do I get involved?</td>
<td>AUinvolve for Student Organizations and events</td>
</tr>
<tr>
<td>How can I schedule my advising?</td>
<td>Advise Assist</td>
</tr>
<tr>
<td>Can I get a scholarship?</td>
<td>AUSOM</td>
</tr>
<tr>
<td>Can I get financial aid?</td>
<td>Student Financial Aid Office</td>
</tr>
<tr>
<td>How can I join a fraternity or sorority?</td>
<td>Greek Life</td>
</tr>
<tr>
<td>Can I get a tutor?</td>
<td>Academic Support</td>
</tr>
<tr>
<td>Can I change my major?</td>
<td>Policy</td>
</tr>
<tr>
<td>How do I GAP a class?</td>
<td>Policy</td>
</tr>
<tr>
<td>Where are all the Student Policies?</td>
<td>AU ePolicy Handbook</td>
</tr>
<tr>
<td>Where can I buy books?</td>
<td>AU Bookstore ...you can also buy online or at off-campus stores.</td>
</tr>
<tr>
<td>When do classes start?</td>
<td>Academic Calendar</td>
</tr>
<tr>
<td>Where is Corley Building?</td>
<td>350 Mell Street</td>
</tr>
<tr>
<td>Are there intramural sports?</td>
<td>Campus Recreation</td>
</tr>
<tr>
<td>Where is the hospital?</td>
<td>East Alabama Medical Center</td>
</tr>
</tbody>
</table>
Things to do around Auburn & Opelika

Auburn is a vibrant, thriving community of 62,000 residents with a neighboring city right next door in Opelika (pronounced Oh-pah-like-ah). Below are some of the more popular attractions for students to enjoy and take advantage of while living in Auburn.

Chewacla State Park – Constructed in the 1930’s, Auburn’s historic Chewacla State Park offers nearly 700 acres of park to relax in, a 26 acre lake for swimming, boating & fishing, camping areas, greenspaces, waterfalls, hiking trails, and nearly 15 miles of 1st class mountain biking trails. There is a small entrance fee.

City of Auburn Parks – The City of Auburn features 12 parks, including Kiesel Park and Town Creek Park, which are the most popular with students. Kiesel is a “pet-friendly” park and many students take their dogs to play there. City parks are free to the public.

Downtown Auburn – Toomer’s Corner, restaurants, shopping, entertainment, and many annual events are found in downtown. Adjacent to campus and within walking distance of many student housing options, downtown offers a great place to get a bite, shop, and hang out. Downtown Opelika – Only a short ride from Auburn, Downtown Opelika offers a wide variety of restaurants, entertainment and shopping options. Situated around the historic district and the railroad, the renovated streets are a friendly and welcoming atmosphere.

Athletics – Football, Basketball, Softball, Baseball, Gymnastics, Soccer, Equestrian, and many other teams have games during fall and spring. Some events require tickets, others are free.

Columbus, Georgia – only 30 minutes from Auburn, Columbus offers a multitude of shopping and dining venues, in addition to one of the only urban whitewater rafting locations in the southeast.

Jule Collins Smith Museum of Fine Art – featuring almost 2000 works of art ranging from traditional to contemporary, JCSM is located next to main campus.

Golf – The Auburn-Opelika area is home to 6 golf courses within a 15 minute drive: Grand National, Moore’s Mill, AU Club, Saugahatchee, Indian Pines, and Auburn Links at Mill Creek. Indian Pines, Mill Creek, and Grand National are the most popular with students.

Louise Kreher Ecology Preserve – located in north Auburn, this 120 acre preserve has 5 miles of trails. Biking, pets, and vehicles are prohibited, making the preserve a great place to relax and enjoy nature.

These are just a few of the options open to students to explore while in residence at Auburn. For more information on activities in and around Auburn you can visit the Auburn Opelika Tourism Bureau web page. Also visit the City of Auburn web page to learn more about parks, cultural arts, volunteer opportunities, and local events happening throughout the year.
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Office Administrator: Amber Denham
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Phone: (334) 844-3574
Hours: 7:45 am to 4:45 pm
3rd Floor of Corley labs and classrooms are accessible 24/7 with swipe card access except for University holidays and Game Days.

Social Media: Follow BSEN on LinkedIn & Facebook

Advising: Genta Stanfield, M.Ed.
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(334) 844-5533
By appointment – use Advise Assist (click on the owl!) to schedule

Office of Engineering Student Services
1210 Shelby Center
Phone Number: (334) 844-4310

Classification
Freshmen............completed 29 hours or less
Sophomore............completed 30 hours and is in the 31st to 60th credit hour
Junior .....................completed 60 hours and is in the 61st to 90th credit hour
Senior .................completed 90 hours and is in the 91st hour or higher

Academic Standing
Academic Warning status is imposed at the end of any term for which the student’s cumulative GPA on Auburn course work is below 2.0.
Academic Suspension Any student who is on Academic Warning status will be placed on Academic Suspension if both of the following conditions apply: (1) the term GPA is below 2.2 and (2) the cumulative GPA on Auburn course work is below that required for the designated number of hours earned as follows:

<table>
<thead>
<tr>
<th>Hours Earned</th>
<th>Cumulative GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30.999</td>
<td>1.50</td>
</tr>
<tr>
<td>31-60.999</td>
<td>1.80</td>
</tr>
<tr>
<td>61-90.999</td>
<td>1.90</td>
</tr>
<tr>
<td>91 or more</td>
<td>1.97</td>
</tr>
</tbody>
</table>

All students, whether beginning freshmen or transfers, are not subject to suspension until they have received one semester warning.

Course Withdrawals
No grade penalty is assigned for dropping a course on or before the 15th class day (5th class day in summer). A student who withdraws from a course prior to the 15th class day during fall or spring semester will have no grade
assignment; however, after the first 15 days a W (Withdrawn Passing) grade will be recorded for the course. Students may withdraw from a course via the web up through the last business day prior to the opening of registration for the following term in spring and fall semester and the posted date in the summer.

A course may be dropped with a W deadline only under unusual conditions such as serious illness of the student, serious illness or death of a member of the student's immediate family or other seriously disruptive circumstances. When approval for dropping the course under such circumstances is granted by the student's dean, a W may be assigned only when the instructor indicates that the student is clearly passing the course. Otherwise, a grade of WF (Withdrawn Failing) is assigned. A grade of W does not affect GPA, however a WF affects GPA the same as an F.

Also, be aware that dropping a course can result in a $100 drop fee per course dropped. You can check the academic calendar on the Auburn website for more details.

Excused Absences

Students with a valid excuse for non-attendance of class or examination periods per the AU Bulletin Policy of Class Attendance should first take their excuse documentation to the Engineering Student Services office, which will validate the excuse and provide them with paperwork to present to their professor.