جـــامعـــة
عبـــدالله الســـالـــم
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University
AASU

Bachelor of Science in Bioresources and Agricultural Engineering

2024-2025

1) Introduction

The Bachelor of Science in Bioresources and Agricultural Engineering (BAE) is an interdisciplinary program designed to prepare students for careers in the sustainable management and engineering of natural and agricultural resources. The program integrates principles from engineering, biology, food science, and environmental science to develop technologies and processes that enhance the efficiency and sustainability of agricultural production and bioresource management. This program addresses the growing global need for innovative solutions in food production, resource conservation, and renewable energy.

2) Program Educational Objectives (PEOs)

Graduates of the Bioresources and Agricultural Engineering program will:

1. Apply engineering principles and technologies to solve complex problems in bioresource and agricultural systems.
2. Design, develop, and manage sustainable practices for efficient resource utilization, agricultural production, food technology, and environmental conservation.
3. Engage in lifelong learning and professional development to stay current in their field, particularly in emerging technologies and innovations in food science and agricultural engineering.
4. Work effectively in multidisciplinary teams and assume leadership roles in diverse professional settings.
5. Communicate technical information clearly to diverse audiences, including agriculture, food technology, and bioresource management stakeholders.
6. Uphold ethical standards and contribute to the well-being of society through professional practice.

3) Program Learning Outcomes (PLOs)

The AASU BAE program offers hands-on experience in a wide range of engineering skills areas. The main program objectives include the creation of graduates who meet the following criteria:

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.

4) General Program Presentation

Graduating with a Bachelor of Science in Bioresources and Agricultural Engineering (BAE) necessitates the successful completion of a total of 132 credit hours (CH). These credit hours are distributed across different requirements, encompassing courses that are essential as well as those that can be chosen based on stream preference. The table below shows how 132 credit hours are distributed across requirements:

Table 1: BAE credit hours distribution.

General Education Requirements	
College Requirements	
Program Requirements	
Total Credits Hours	

5) General Education (36 Credits)

Students here are required to complete 36 credit hours distributed over five sections as follows:

Communication (9 Credits)

Table 2: General education communication courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
ENL101	English for Academic Studies	(3 credits)	3		ICT 095*
ENL102	English Composition	(3 credits)	3	ENL101	
ENL201	Writing and Research	(3 credits)	3	ENL102	

*Preparatory Program; ICT 095 Information Technology Basics.

Innovation and Creativity (6 Credits)

Table 3: Innovation and Creativity Ethics compulsory course.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
GEN150	Professionalism and Ethics	(3 credits)	3		

Table 4: General education innovation and creativity elective courses (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
GEN131	Creativity and Problem Solving	(3 credits)	3		
BUS101	Entrepreneurship Essentials	(3 credits)	3		

ENI110	Intro. to Innovation and Creativity	(3 credits)	3
ENI140	Design Thinking	(3 credits)	3
ENI150	Innovation in Business Models	(3 credits)	3
ENI160	Innovation and Globalization	(3 credits)	3

Global Citizen (6 Credits)

Table 5: General education global citizen compulsory course.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
INF120	Computers and Information Systems	(3 credits)	3	ICT095	

Table 6: General education global citizen elective courses (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
GEN201	Globalization and Sustainability	(3 credits)	3		
GEN202	Global Citizenship in the Digital Age	(3 credits)	3		
BUS201	Global Economics and Trade	(3 credits)	3		

Art and Humanities (9 Credits)

Table 7: General education art and humanities compulsory course.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
HST 101	Islamic Culture and Values	(3 credits)	3		

Table 8: General education art and humanities elective course group I (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
HST102	Kuwait History	(3 credits)	3		
ARB101	Arabic Communication skills	(3 credits)	3		
ART101	Art Appreciation	(3 credits)	3		
ART102	Intro. to Media and Communication	(3 credits)	3		

Table 9: General education art and humanities elective course group II (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
PHL101	Introduction to Philosophy	(3 credits)	3		

LAW101	Law and Society	(3 credits)	3
PSY 101	Introduction to Psychology	(3 credits)	3
SOC 101	Introduction to Sociology	(3 credits)	3

Math and Science (6 Credits)

Table 10: General education math and science courses (6 credits).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite	Note
MAT101	Calculus I	(3 credits)	3	IMP099* or Equivalent		
PHY101	Physics I	(3 credits)	3		MAT101	

*Preparatory Program: IMP099 Precalculus.

6) College Requirements (43 Credits)

- **Math and Science (21 Credits)**

Table 11: Math and Science courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
PHY105	Physics I Lab	(1 credit)	3		PHY101
MAT102	Calculus II	(3 credits)	3	MAT101	
MAT201	Calculus III	(3 credits)	3	MAT102	
PHY102	Physics II	(3 credits)	3	PHY101 MAT101	
PHY107	Physics II Lab	(1 credit)	3	PHY105	PHYS102
CHM101	Chemistry I	(3 credits)	3		
CHM105	Chemistry I Lab	(1 credit)	3		CHM101
MAT202	Linear Algebra	(3 credits)	3	MAT101	
MAT240	Differential Equations	(3 credits)	3	MAT102	

- **Engineering requirements (22 Credits)**

Table 12: Engineering courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
ENG205	Electrical and Electronic Circuits	(3 credits)	3	PHY102 MAT102	
ENG206	Electrical and Electronic Circuits Lab	(1 credit)	3	ENG205 PHY107	
ENG207	Programming	(3 credits)	3	MAT202	
ENG208	Introduction to Energy and Sustainability	(3 credits)	3	PHY102	

				CHM101 CHM105
ENG209	Statics and Strength of Materials	(3 credits)	3	PHY102
ENG304	Engineering Probability & Statistics	(3 credits)	3	MAT102
ENG308	Numerical Methods	(3 credits)	3	MAT201 MAT240
ENG309	Engineering Project Management and Economics	(3 credits)	3	ENG304

7) Program Requirements (53 Credits):

- **Program Requirements (44 Credits)**

Table 13: Program courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
BIO101	Biology	(3 credits)	3		
BAE101	Introduction to Bioresources and Agriculture Engineering	(3 credits)	3		BAE102
BAE102	Introduction to Bioresources and Agriculture Engineering Lab	(1 credit)	3		BAE101
ESE211	Industrial Electronics	(3 credits)	3	ENG205	
BAE230	Mechanical Systems in Agriculture I	(3 credits)	3	PHY102	BAE231
BAE231	Mechanical Systems in Agriculture I Lab	(1 credits)	3		BAE230
BAE310	Remote Sensing Data and Methods	(3 credits)	3	MAT102	
BAE320	Agricultural Structures Planning	(3 credits)	3	PHY102 CHM101	
BAE330	Mechanical Systems in Agriculture II	(3 credits)	3	BAE230	BAE331
BAE331	Mechanical Systems in Agriculture II Lab	(1 credit)	3		BAE330
BAE340	Microbiology and Food Safety	(3 credits)	3	CHM101 BIO101	BAE341
BAE341	Microbiology and Food Safety Lab	(1 credit)	3		BAE340
BAE360	Bioresource Engineering	(3 credits)	3	CHM101 BIO101 ENG208	
BAE430	Mechanical Systems in Agriculture III	(3 credits)	3	BAE330	
BAE450	Agricultural Robotics and Automation	(3 credits)	3	ENG205	BAE451

BAE451	Agricultural Robotics and Automation Lab	(1 credit)	3		BAE450
BAE490	Capstone Design 1	(3 credits)	3	Program Approval	
BAE491	Capstone Design 2	(3 credits)	3	BAE490	

- **Program Electives (9 Credits)**

Table 14: Program elective courses (3 courses are required).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
BAE401	Lean Six Sigma	(3 credits)	3	BAE101	
BAE402	Controlled Environment Systems	(3 credits)	3	BAE360	
BAE423	Integrated Engineered Solutions in the Food-Water-Energy Nexus	(3 credits)	3	BAE340	
BAE427	Ecological Systems Engineering Design	(3 credits)	3	BAE320	
BAE455	Bioconversion	(3 credits)	**5**	BAE320 BAE330	
BAE461	Aquaponics Engineering	(3 credits)	3	BAE360	
BAE463	Biosystems Analysis and Design	(3 credits)	3	BAE360	
BAE468	Controlled Environment Engineering	(3 credits)	3	BAE360	
BAE471	Food Processing Plant Sanitation	(3 credits)	3	BAE340	
BAE473	Food safety	(3 credits)	3	BAE340	
BAE475	Geomatics	(3 credits)	3	BAE310	
BAE480	Internship	(3 credits)	3	Program Approval	
BAE495	Special Topics in Bioresources	(3 credits)	3	Program Approval	
BAE496	Special Topics in Agricultural Engineering	(3 credits)	3	Program Approval	

- Students can take up to three credits of technical electives from another program or institution.