### Biosystems Engineering Courses

#### Year I Courses
- **ABE 1111**: Engineering Mathematics I
- **ABE 1112**: Engineering Drawing
- **ABE 1113**: Introduction to Biosystems Engineering
- **ABE 1114**: Introduction to Information Systems
- **ABE 1115**: Engineering Mechanics
- **ABE 1116**: Engineering Thermodynamics
- **ABE 1117**: Electrical Engineering I
- **ABE 1211**: Engineering Mathematics II
- **ABE 1212**: Strength of Materials I
- **ABE 1213**: Engineering Materials Science
- **ABE 1214**: Mechanics of Fluids
- **ABE 1215**: Engineering Graphics and Design
- **ABE 1216**: Electrical Engineering II

#### Year II Courses
- **ABE 2111**: Engineering Mathematics III
- **ABE 2112**: Geographic Information Systems and Remote Sensing
- **ABE 2113**: Strength of materials II
- **ABE 2114**: Introduction to Computer Programming
- **ABE 2115**: Mechanics of Machines
- **AAG 2113**: Crop Production and Management
- **ABE 2211**: Engineering Hydraulics
- **ABE 2212**: Engineering Surveying
- **ABE 2213**: Soil Mechanics
- **ABE 2214**: Applied Statistics for Engineers
- **AFS 2201**: Principles of Food Processing and Preservation
- **AFS 2212**: Chemistry of Biological Systems
- **AAP 2212**: Animal Production and Management

#### Year III Courses
- **ABE 3111**: Surface Water Hydrology
- **ABE 3112**: Renewable Energy Sources & Utilization
- **ABE 3114**: Farm Planning and Farm Structures
- **ABE 3113**: Farm Power Systems and Management
- **ABE 3115**: Agricultural Production Machinery and Management
- **ABE 3116**: Design of Machine Elements
- **ABE 3117**: Applied Thermodynamics
- **ARD 3102**: Entrepreneurship and Small Business Management
- **ABE 3211**: Physical Properties of Biological Materials
- **ABE 3212**: Drying of Agricultural Products
- **ABE 3213**: Principles and Practices of Irrigation and Drainage
- **ABE 3214**: Engineering Project Planning & Management
- **AFS 3212**: Applied Biochemistry
- **AFS 3213**: Food and Industrial Microbiology
- **ARD 3201**: Research Methods
- **ABE 3311**: Industrial Training II

#### Year IV Courses
- **ABE 4111**: Engineering Economics
- **ABE 4112**: Operations Research
- **ABE 4113**: Control Systems Engineering
- **ABE 4114**: Ground Water Hydrology
- **ARD 4103**: Gender and Rural Development
- **ABE 4211**: Solid Waste Management & Utilisation
- **ABE 4212**: Principles of Environmental Engineering
- **ABE 4213**: Water and Waste Water Treatment
- **ABE 4214**: Engineering Design Project
- **ARD 4201**: Human Resource Management
- **ARD 3102**: Entrepreneurship and Small Business Management

### How to enrol into the programme

Candidates can fill PUJAB forms for government scholarships from their respective schools. Adverts for private admission is published in the major Newspapers of Uganda and at the University websites (www.gu.ac.ug), usually from March to May.

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**What is Biosystems Engineering?**

Biosystems Engineering is a science-based discipline that integrates engineering principles with applied biological sciences to ensure adequate supply of food and fibre, clean drinking water, renewable energy, and a safe and healthy environment.

Biosystems Engineers study engineering courses as well as biological sciences that are of relevance to engineers. Examples of biological courses include microbiology, biochemistry, animal and crop sciences. These are relevant in the design of various engineering systems for food production and agro processing, water treatment, renewable energy and environmental management.

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**Message from Head of Department**

The world is currently faced with development challenges like food insecurity, climate change, limited access to clean water and energy. Biosystems Engineering graduates from Gulu University are equipped with knowledge and skills to contribute to addressing these challenges.

The Department of Biosystems Engineering has well-trained staff committed to providing high quality education with hands-on experiences, and are dedicated to mentoring students to succeed in their career. Students are grounded on a strong theoretical background and practical skills as well as industrial experience, making them relevant in the job market.

Biosystems Engineers have diverse employment opportunities in industry, government, academia and NGOs. They have proven to be excellent employees as well as job creators. Our graduates are versatile and are part of a global community addressing contemporary development challenges.

It will be our pleasure and honour to receive your feedback on the address below.

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** Programme Features**

The programme emphasizes strong theoretical as well as practical orientation of the graduates. Fundamental engineering and biological sciences are rigorously covered in first and second year, while professional courses are covered in the third and fourth year of the programme. Students acquire practical skills during workshop practice in recess term of year and industrial trainings during second and third year. These exposures help students to gain real world engineering experiences, thus helping them to become relevant in the job market. Fourth year students undertake engineering design projects to help them gain skills to transform engineering knowledge acquired during the training to solve real world problems.
Employment Opportunities

Since 2012, over 80 students have graduated and are gainfully employed in various sectors including Government Ministries and Agencies, NGOs, private sector industries especially those dealing in agriculture, food processing, and transport. Others are gainfully self-employed in consultancies and engineering services provision. A few have successfully completed their Master’s Degree studies.

Competencies of Biosystems Engineers (A snapshot)

1) Food production and value addition: Design and maintenance of food production processing and preservation technologies, which include agricultural mechanisation, irrigation, farm buildings, food storage facilities etc.

2) Environmental management: Treatment and utilization of solid waste and wastewater, specifically design of incinerators, landfills, and composting plants for organic wastes, lagoons and constructed wetlands for treatment of sewerage and other liquid organic wastes etc. Water quality analysis and treatment is also included.

3) Soil and water resources conservation: Floods and droughts forecast and management. Design of hydraulic structures such as valley tanks, dams, culverts, and weirs. Design of soil conservation structures like terraces and contour bands. Development of shallow wells, boreholes and protected springs.

4) Renewable energy engineering: Design of improved bioenergy technologies such as biomass stoves, gasifier plants and biogas digesters. Solar thermal applications in water heating, crop drying and photovoltaic systems for applications which require electricity. Design and management of micro- and pico-power plants from renewable resources such as hydropower and wind.

5) The 21st Century graduates competencies: Entrepreneurship, communication, teamwork, networking, information and communication technology (ICT) skills.

Admission requirements

A’level combinations: PCM, BCM, PCB, PEM, PM-TD. Candidates must have passed biology, mathematics and chemistry with at least a credit at O’level. Courses are weighted as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential</td>
<td>3</td>
<td>Two of Biology, Mathematics or Physics</td>
</tr>
<tr>
<td>Relevant</td>
<td>2</td>
<td>One of Chemistry, Economics and Technical Drawing</td>
</tr>
<tr>
<td>Desirable</td>
<td>1</td>
<td>General Paper, Computer Science or Subsidiary Mathematics</td>
</tr>
</tbody>
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Scholarship opportunities include Government of Uganda merit scholarships, students’ loan and the district quarter schemes. Other organisations such as Muljibhai Madhivani Foundation, Mastercard foundation, FAWE Uganda scholarships, UMECS, Windle Trust etc., grants scholarships to Biosystems Engineering students.

The Bsc in Biosystems Engineering programme at Gulu University is accredited by the Uganda National Council for Higher Education and recognised by the Uganda Institution of Professional Engineers (UIPE). All undergraduate students register with the UIPE.