BSC. AGRICULTURAL AND BIOSYSTEMS ENGINEERING

Introduction

Increasing world population usually demands for increased and efficient agricultural production. Efficient agricultural production and processing requires *energy*, *machinery* and *structures* of various categories. Agricultural production causes *environmental degradation* when cultivation is done on marginal lands, hill slopes, riverbanks, forests and water catchment areas. Human settlement introduces problem of *waste management*. In the attempt to sustain human population, *industries* have been developed. As a result, air pollution problems have been created. Chemicals used in the agricultural industry have significant impact on *water quality*. Kenya, like most developing countries, is already experiencing serious environmental pollution in its exploitation of soil and water resources, especially in urban and rural settlements exemplifying the ready market for **Agricultural and Biosystems Engineers.**

There is thus need to develop sufficient human capacity to exploit the natural resources and at the same time be capable of handling the concomitant pollution problems from a technological point of view. There is therefore need to produce engineers for the agricultural and biological sector but with a better focus (i.e. more specialized) in ***bio-production systems***, ***agricultural mechanization, agricultural processing***, ***agricultural structures engineering*** and ***soil, water and environment engineering.***

Entry Requirements

1. A candidate wishing to be admitted into the B.Sc. degree programme in Agricultural and Biosystems Engineering must satisfy the minimum University entry requirements and College of Engineering and Technology regulations.
2. In addition to the above, the candidate must have obtained a minimum grade C+ (plus) in each of the following subjects: Physics, Chemistry, Mathematics, and Biology or Geography OR C+ (plus) in each of the following subjects: Physical Sciences, Biological Sciences, Mathematics, and Geography or any of the Group IV subjects at K.C.S.E. or its equivalent.
3. Alternatively, admission shall be granted to holders of Diploma in Agricultural or Mechanical Engineering or any other relevant course (with Credit and above) from Jomo Kenyatta University of Agriculture and Technology or from other institutions recognized by the University Senate. Such candidates shall enter the programme at the second year of study unless otherwise specified by the Department

Course work

- The Bachelor of Science in Agricultural and Biosystems Engineering programme in J.K.U.A.T is a five year course with each academic year divided into two semesters
- A student in Bachelor of Science in Agricultural and Biosystems Engineering shall, during his/her five years of study, have a minimum of sixteen (16) compulsory units in each year of study. One unit is equivalent to 45 contact hours spread over one semester of 14 teaching weeks. Two hours of tutorial or three hours of practical is equivalent to one lecture hour.
- In addition, every student is required to carry out an internal practical attachment (at the JKUAT workshops and labs) at the end of the second year of study and industrial attachments (at approved industries with systems relevant to the curriculum) at the end of the third and fourth year of study.
- In the fourth and fifth year of study, a student is required to specialize in any of the following options:

    1. Biomechanical and Processing Engineering
    2. Soil, Water and Environmental Engineering

Course Units

Year 1

Semester 1

HRD 2101	Communication Skills
SCH 2107	Physical and Inorganic Chemistry for Engineers
SMA 2170	Algebra
SMA 2177	Applied Geometry
SMA 2172	Calculus-I
SPH 2173	Physics for Engineers-I
EBE 2101	Introduction to Agricultural and Biosystems Engineering
ICS 2174	Introduction to Computer Science
SZL 2111	HIV/AIDS
HRD 2102	Development Studies and Social Ethics
EMG 2102	Engineering Drawing and Design-I

EMG 2104	Introduction to Material Science
SCH 2121	Organic Chemistry for Engineers
SPH 2174	Physics for Engineers-II
SMA 2173	Calculus-II
AHS 2101	Animal Production
HRD 2103	General Economics

Year 2

ICS 2175	Computer Programming-I
EGE 2230	Engineering Surveying
EMG 2105	Engineering Drawing and Design-II
AHS 2130	Crop Production
SMA 2270	Calculus-III
EEE 2235	Electrical Engineering-I
EMG 2203	Engineering Mechanics-Statics
EMG 2206	Engineering Thermodynamics-I

SMA 2271	Ordinary Differential Equations
SMA 2370	Calculus-IV
ICS 2276	Computer Programming-II
EMG 2106	Workshop Processes and Practice
EEE 2236	Electrical Engineering-II
EMG 2207	Engineering Mechanics-Dynamics
EMG 2302	Engineering Thermodynamics-II
EMG 2205	Fluid Mechanics-I
EBE 2201	Internal Practical Attachment

Year 3

EMG 2301	Fluid Mechanics-II
STA 2270	Statistics

EBE 2301 Soil Science

EBE 2302 Introduction to Agricultural and Construction Machinery

EBE 2303 Project Planning and Management

SMA 2371 Partial Differential Equations

EMG 2208 Mechanics of Machines-I

EMG 2303 Solid and Structural Mechanics-I

EBE 2304 Hydraulics and Pump Technology

EBE 2305 Design of Machine Elements

EMG 2304 Mechanics of Machines-II

EMG 2309 Solid and Structural Mechanics-II

EBE 2306 Irrigation and Drainage Engineering

EBE 2307 Agricultural Process Engineering

HRD 2401 Entrepreneurship Skills

EBE 2308 Engineering Hydrology

Year 4

Common Units

EBE 2401 Soil Mechanics

EMG 2414 Numerical Methods for Engineers

EMG 2204 Computer Aided Drawing and Design

EBE 2402 Remote Sensing and GIS

EBE 2403 Engineering Instrumentation

EBE 2404 Engine and Tractor Technology

Specialisations

Biomechanical & Processing Engineering Option

EBE 2405 Properties of Biological Materials

EMG 2424 Production Technology

Soil, Water & Environment Engineering Option

EBE 2406 Applied Environmental and Microbiology Ecology

EBE 2407 Irrigation System Design and Management

Semester 2

Common Units

EBE 2408 Farm Structures- Materials and Types

EBE 2409 Soil and Water Conservation

EBE 2410 Computer Modelling and Simulation

EBE 2411 Engineering Economics

EBE 2412 Structural Design

EBE 2413 Sociology, Extension and Enterprise Management

Specialisations

Biomechanical & Processing Engineering Option

EMG 2502 Heat Transfer

EBE 2414 Agricultural Field Machinery

Soil, Water & Environment Engineering Option

EBE 2415 Waste Water Engineering

EBE 2416 Drainage systems Design and Management

EBE 2417 External Practical Attachment-II

Year 5

Common Units

EBE 2501 Systems Engineering

EBE 2502 Environment Impact Assessment and Audit

EBE 2503 Engineering Project-I

Specialisations

Biomechanical & Processing Option

EBE 2504 Refrigeration and Air Conditioning

EBE 2505 Postharvest Technology of perennial Crops

EBE 2506 Greenhouse Design and Management

EBE 2507 Mechanization Management

EBE 2508 Pollution and Waste Management

Soil, Water & Environment Engineering Option

ECE 2302 Engineering Geology

EBE 2509 Solid Waste Management

EBE 2510 Watershed and Water Resources Engineering

EBE 2511 Aquacultural Engineering

EBE 2512 Design of Rainwater Harvesting Systems

Common Units

EBE 2513 Engineers in Society

EBE 2514 Industrial Management and Safety

EBE 2515 Engineering Project-II

Specialisations

Biomechanical & Processing Engineering Option

EBE 2516 Farm Structures-Design and Management

EBE 2517 Postharvest Technology of Perishable Crops

EBE 2518 Energy Resources Engineering

AFS 2431 Food Microbiology and Toxicology

Soil, Water & Environment Engineering Option

EBE 2519 Land Use Planning and Reclamation

EBE 2520 Design and Construction of Hydraulic Structures

EBE 2521 Air / Noise Pollution and Radiation Control

EBE 2522 Design of Soil and Water Conservation Structures