

AGRoECOlogical FARMing Master Programme for a sustainable agriculture in West Africa



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# **AGRECOFARM Academic courses outlines**

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# 1 Introduction

# **1.1** Purpose of the document

The following report shows the process followed to build and design new educational programmes in agroecology and sustainable food systems at the different partner universities in West Africa to enrich teaching programmes in the domain of sustainable agriculture and food systems development

This reporting template was developed by ISARA and was completed and fill in by partner HEIs in West Africa, with information regarding their own university and development of an agroecology programme and curriculum there.

Note: In this report the designed academic course in agroecology for different West African universities are presented. The VET courses are presented in deliverable D3.2 which is specifically dedicated to them.

# 2 Methodology

## 2.1 Methodology used to develop the master programme and curriculum

The meeting organised in France in June 2024 had as objective to start to design and lay the foundation for new educational programmes in agroecology and sustainable food systems at the African partners' universities.

Several methodologies are available for educational programme design and among them, the ADDIE Approach is one of the most commonly used. ADDIE stands for Analyze, Design, Develop, Implement, Evaluate (Figure 1). This methodology was to initiate the design of the new master programmes in agroecology and sustainable food systems.

**Analyze:** Target training needs, identify audience characteristics, identify the prerequisites, specify the course's place in the programme.

**Design:** Clarify the learning objectives, identify the content, plan the class flow, choose teaching methods, decide on learning activities and assessments.

**Develop:** Write the course plan, create the content, develop the teaching material, create assessments

**Implement:** Integrate the course into the learning platform, set up the classroom, prepare technological teaching tools, communicate with students

**Evaluate**: Evaluate the course and teaching, identify changes to make



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Figure 1. The 5 phases of the ADDIE MODEL (source: Branch (2009),

https://obsidianlearning.com/projects/addie-model/)



Each African partner university had to do some preliminary work before their visit in Europe and the workshops to outline already some elements of futures programmes which included audience, level of studies and prerequisites





# 2.1.1. First Phase: Analysis

The objective is mainly to understand the people you are targeting with a new programme (education profile of future students, ...) and the professional sectors that your education programme want to focus on (for which job/type of jobs are you training your students, which skills are associated with these jobs....). This work is specific to each country as the existing as well as the emerging needs in the region in terms of professional skills in the sustainable farming sector can be country-dependent. This step is essential to be sure that a master programme will offer relevant learning opportunities for young people allowing them to match the needs of the job market and to tackle the current challenges and initiatives in the agriculture sector.

## 2.1.1.1 Analysis phase

Before the visit in Europe, representatives of each university have to fill in two different tables (annex 1).

In the first table partners were asked to provide information on Audience, Level and field of studies and Prerequisites for the master degree.

**Audience:** identify the people to be targeted and that are likely to apply to this master degree in agroecology (i.e. professionals, bachelors' students, ...)

**Level of studies:** the level of studies of the persons that will be enrolled in the master and the main topics of study.

**Prerequisites:** identify the requirements (prerequisites) needed by applicants to be enrolled in the master, including which undergraduate study programmes are eligible for application.

In the second table partners were asked to fill in a table with a list of jobs and the necessary related competences/skills needed.

**Job:** develop a list of the job opportunities that will be available with this master degree or careers opportunities that are searched on the job market by companies, institutions, etc.

**Competences link to the job:** which skills are needed to fulfil these positions.

## 2.1.2 Design phase

This second phase was developed during the workshop in France. The aim of the design phase is to start to develop the pedagogical content of the master programme which will be composed by different courses including lectures,





practical work, field trips, etc.

The design part is divided in two different steps. First, partners were asked to design a programme structure with different courses, the major topics and contents they should include, as well as how many credits<sup>1</sup> they cover. Partners used the EU system where a semester is equivalent to 30 ETCS credits (ECTS – European Credit Transfer System).

The following information have been filled in:

- Duration of programme: 1 year, 1.5 years or 2 years
- Total number of credits of the programme.
- Planned number of courses.

**Table 1.** Template of Topics and teaching tools/approaches

	Major topics and content	Teaching tools/approaches to be used
Course 1		
Course 2		
Course 3		
Course		

**Teaching tools**: lectures, seminars, practical work, group work, field trip, literature review, lab work, Internship...

After having identified the basic courses, its timeline, number of credits and semester attribution was built by partners and filled up in Table 2 to outline the architecture and planning of the new programme.

**Table 2.** Template of the master degree Architecture/ Planning

Course titles	Duration (weeks)	Number of credits (for each course)	Semester (in which semester the courses will take place)
1			
2			

<sup>&</sup>lt;sup>1</sup> Some African Universities as Nigeria for example uses 'units' instead of credits. 1 unit can be equivalent to 15 hours, or 15 hours of lecturer, or 45 of practical.





# *3* Curricula development in the African partners' Universities<sup>2</sup>

# 3.1 Overview of the master programme and curricula for each university

This section shows the programme that has been designed by each African partner university.

# 3.1.1 UNIVERSITY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES UMUAGWO, IMO STATE (UAES), Nigeria

# **A. Title of the Masters Programme:** Agroecology and Food Systems

**B. Length of the Masters Programme:** two (2) years; time frame for accreditation of the programme: two (2) months; total credits: 66

## C. Targeted public, level of studies and prerequisites

Target audience	Level and Field of studies	Prerequisites		
Agriculturist	First Degree in Agriculture	B. Agric or any other related		
		degree with first class or second		
		class honours or B.Sc. Agric.		
		Econs, Agric.Ext., Animal Sc. Crop		
		Sc, Fisheries and Aquaculture,		
		Forestry and Wildlife		
Food Experts /	First Degree in Agriculture or	B. Agric or any other related		
Consultants	related fields	degree with first class or second		
		class honours		
Engineers	First Degree in Engineering	B. Eng. (Agric Engineering) with		
		first class or second class		
		honours		
Researchers and	First Degree in Agriculture,	B. Agric. Eng. (Agric Eng.), B.Sc.		
lecturers	Sciences and Engineering	Botany/Zoology or any other		
		related degree with first class o		
		second class honours		
Environmentalists	First Degree in Environmental	B.Sc. Environmental Sciences		
	Sciences or Studies	and Toxicology, B.Sc.		
		Botany/zoology or any other		
		related field		
Urban planners /	First Degree in Urban planning	B. Sc. Urban planning, Geography		
Geographers	and Geography	or any other related field		

<sup>2</sup> More detailed information on course descriptions, programmes and objectives, can be found in the syllabus developed for each University (Annex 2).





Foresters	First	Degree	in	Forestry	and	B. S	Sc	Forestry	and	Wildlife,	Β.
	wildli	fe				Agri	ic c	or any oth	ner re	lated field	d

## D. Description of each semester

# FIRST SEMESTER

# Course 1. Agricultural Production Systems (3 credits)

The students will understand the concepts, principles and interactions within agricultural production systems. They will gain knowledge on how to evaluates different farming systems, develops skill sets in crop and animal management, apply economic and policy principles in making salient decision in agricultural production. It covers the following topics: advanced agricultural production systems, principles and practices in soil resource and fertility management, principles and practices in crop production and animal production in relation to agroecology and environmental sustainability, agricultural economics.

## **Course 2. Statistics and Research Methodology in Agroecology (4 credits)**

The course uses statistical and biometrical techniques to analyse and interpret data in agroecology systems. Emphases are laid on experimental design, data analysis, inference and writing of research proposals. The students will learn to use statistical principles to conduct researches and interpret research findings in agroecology. It covers the following courses: advanced statistics, experimental designs, hypothesis testing and confidence intervals, regression model, biometrical techniques, statistical software applications, research development and writing of research proposals.

## **Course 3. Agroecology and Sustainable Environmental Management (3 credits)**

The course deals with salient topics including agroecology systems, principles of soil and water management and conservation, biodiversity and ecosystems, sustainable agricultural practices, climate change and agriculture. The students will learn to apply agroecological principles to sustainable environmental management, develop strategies for climate-resilient agriculture and discuss issues concerning agroecology.

## Course 4. Agroecology Systems and Knowledge Transfer (3 credits)

This course covers systems thinking in agroecology, knowledge transfer systems, community participation and outreach, innovation and scalability in agroecology, policy and governance in agroecology, communication outreach and advocacy, field trips and farm visit. Students will learn how to apply system thinking in solving problems in agroecological systems, develop effective knowledge transfer strategies and mobilize communities in participating in agroecological projects.

# Course 5. Postharvest Handling of Agroecological Produce (3 credits)





The course explains advanced principles and practices of post-harvest handling techniques and management of agroecological produce. The following topics will be discussed: post-harvest handling, isolation, identification and control of post-harvest pests and diseases, handling and storage techniques, quality and safety standards of agroecology produce, post-harvest management systems, sustainable post-harvest practices, value addition and processing of agroecology produce, policy in post-harvest handling. Students will learn to apply post-harvest principles in solving problems related to food losses and develop effective storage techniques to reduce post-harvest losses.

# SECOND SEMESTER

# Course 6. Plants and Animal Health Management in Agroecological Systems (3 credits)

The course explains the principles of plant and animal health management in agroecological systems in view of using sustainable and comprehensive approaches to control pests and diseases in plants and animals. It deals with relevant topics in advanced levels including agroecology and health management, management of pests and diseases in crops and animals, weed management, biological control, bio pesticides and comprehensive health management. The students will learn to develop health management strategies in agroecology systems.

# Course 7. Horticulture and Landscape Management (3 credits)

The course is more based on empirical knowledge than theory. It explains the advanced concepts and practices of horticulture and landscape management in relation to sustainable and environmentally friendly production strategies. The students will be taken to ornamental garden or site and landscaped buildings and environment; here plants will be identified and described. The students will be asked to propagate a number of ornamental plants and landscaped a given environment. In class, the following topics will be taught; advanced horticulture, plant biology and identification landscape design and management, plant propagation and production, lawn and ornamental management, urban agriculture and landscape maintenance. The students will learn to apply horticultural principled and practice in enhancing the aesthetic values of a place, identify and select plants for landscaping.

# Course 8. Circular economy in agroecology (3 credits)

The course deals with the principles and practices of circular economy with reference to sustainable agroecology. It covers circular economy, agroecological concepts and principles, circular agroecology systems, waste management strategies, circular business models in agroecology, policy and regulation. The students will learn to apply circular economy principles in agroecology and discuss effectively on issues concerning circular economy.

# Course 9. Agribusiness and Farm Management (3 credits)





The course describes the concepts and principles of agribusiness and farm management in relation to agroecology and sustainable agricultural enterprise. It covers advanced agribusiness, farm management, agricultural marketing, agricultural finance, agricultural policy and regulation, entrepreneurship and leadership. The students will learn to apply the principles of agribusiness to develop farm management strategies and demonstrate leadership qualities.

# Course 10. Internship (3 credits)

At the beginning of this semester, students are allowed to go for internship in an identified agricultural company for two months, after which they will return and make a presentation on the knowledge acquired at the course of their internship programme. The students will be externally assessed at the organization where they did their internship as well as internally in the University.

# THIRD SEMESTER

# Course 11. Identification and Production of Neglected/Endangered Plant and Animal (3 credits)

The course describes the identification, conservation and sustainable production of neglected and endangered plant and animal species. Emphasis will be placed on their importance in agroecology and food security. The students will be exposed to the following topics: Neglected / endangered species, plant identification and conservation, animal identification and conservation, sustainable production strategies, market survey and economic viability, agroecological restoration, community participation and outreach. The students will gain knowledge on the identification and conservation of neglected and endangered plant and animal spp.

# Course 12. Land and Soil Resource Management (3 credits)

The course explains the principles and practices of sustainable land and soil resource management. Emphasis is laid on land and soil resources dynamics and soil degradation and conservation strategies. The following topics will be taught: Land and soil resources, fundamentals of soil science, soil degradation and conservation, land use planning and policy, watershed management, climate change and land and soil management.

# Course 13. Remote Sensing and Geographic Information System (3 credits)

The course is a practical oriented course that explains the application of remote sensing and GIS technologies in agroecology. The students will be exposed to the following topics: remote sensing and GIS, fundamentals of remote sensing, fundamentals of GIS, satellite and aerial imagery, precision agriculture and monitoring, GIS Data analysis and mapping. The student will acquire practical knowledge on how to apply remote sensing and GIS principles to solve problems in agroecology system.





# Course 14. Agroforestry and Climatology (3 credits)

The course explains the principles and concepts of agroforestry in relation to climatology and climate change. It focuses on sustainable food production and mitigation of climate change with agroforestry practices. It covers advanced agroforestry, fundamentals of climatology, agroforestry and climate change, carbon sequestration and mitigation, agroclimatology and weather patterns.

# Course 15. Gender, Entrepreneurship and Innovation (3 credits)

The course discusses interactions amongst gender, entrepreneurship and innovation in agroecological systems, emphasizing on equitable and sustainable development. It covers the following topics: Gender and agroecology, entrepreneurship in agroecology, innovation in agroecology, gender and entrepreneurship, innovative business models, policy and regulatory frameworks. Students will develop skill set gender sensitive entrepreneurship and apply intersectional perspectives to agroecological innovation.

# FORTH SEMESTER

# Course 16. Agroecology Policy, Planning and Development (3 credits)

The course explains the policy, planning and development aspects of agroecology, focusing on sustainable agriculture, food systems and rural development. Agroecology policy, policy framework and governance, agroecological planning, development theories and practice, agroecological project development and communication.

# Course 17. Agroecology and Food Security (3 credits)

Definition and scope of agroecology and food security, food security frameworks and indicators, sustainable agriculture practices, food system analysis, nutrition and public health, policy and governance. The students will understand how to apply agroecological approaches to food security.

# Course 18. Advanced Irrigation Practices in Agroecology (3 credits)

This course explores the principles and practices of advanced irrigation systems in agroecology, focusing on sustainable water management, crop water productivity, and ecosystem services. Students will learn about innovative irrigation technologies, water saving strategies and precision irrigation methods

# Course 19. Special Seminar (1 credits)

Each student is expected to come up with a seminar paper that states one of challenges in food production in Africa and proffer solution to these problems using agroecological principles.

# Course 20. Research Thesis (10 credits)

Each student is expected to carry out an experiment (field or/and) on Agroecology depending on their core area or area of specialization and a well written thesis will be





produced from the field experiment. The thesis will be vetted and examined by an external examiner from any of the partner University in West Africa.





# E. Graphical representation of Master Programme













# 3.1.2 FEDERAL UNIVERSITY OF AGRICULTURE ABEOKUTA (FUNAAB), Nigeria

# A. Title of the Master Programme: M.Sc. Agroecology

# B. Length of the Master Programme: two (2) years; total credits: 62

## C. Targeted public, level of studies and prerequisites

Audience	Level and field of studies	Prerequisites		
Agronomists/Crop scientists;	Bachelor of Agriculture	Bachelor's degree in a relevant field		
Horticulturist's botanists; Soil	(Crop Production)/	- Minimum GPA of 3.0 and English		
scientists, Entomologists/pest	Bachelor of Agricultural	language proficiency - Prerequisite		
management specialists; Agric.	Engineering	courses (e.g., ecology, evolution,		
Engineers - Farm power, Machinery,		genetics, botany, zoology, soil science,		
Irrigation and Biosystems		Agricultural Engineering)		
Engineers.		- Research experience in a related field		
Animal Production Specialist,	Bachelor of Animal	Bachelor's degree in Animal Science or		
Animal Physiologist, Animal	Science	relevant field. Minimum GPA of 3.0 and		
Nutritionist, Animal Geneticists,		English language proficiency.		
Pasture and rangeland specialists,		- Prerequisite courses in Animal		
Veterinary and Animal Health		Science Veterinary Medicine,		
Experts		- Research/work experience in a		
		related field		
Sustainable development	Bachelor of Agricultural	Bachelor's degree in Agricultural		
professionals; Agricultural	Economics/Administrati	Economics or relevant field,		
Administration experts; Rural	on / Extension/ Food	- Minimum GPA of 3.0 and English		
development/Extension specialists,	Science	language proficiency		
Food Scientists		- Prerequisite courses (e.g., Agriculture		
		or statistics)		
		- Research/work experience in a		
		related field.		
Ecologists, Agroforestry and	Bachelor of Environment	Bachelor's degree in Environmental		
aquatic experts. Conservation	Science	Science, and a relevant field		
specialists, Environmental		- Minimum GPA of 3.0 and English		
scientists, biologists; Climate		language proficiency		
change adaptation specialist,		-Prerequisite courses (e.g., ecology,		
ayrometeorologists, Ecosystem		evolution, or statistics)		
professionals		- Research and work experiences in a		
		related field.		





#### D. Description of each semester

FIRST SEMESTER

#### Compulsory Agroecology Courses

#### Course 1. Agroecology Systems and Practices (3 Credits)

This course covers a dynamic range of cross-cutting and mutually relevant enriching topics to agroecology. The course gives an overview of agroecological principles and techniques, farming system interactions, and management strategies to maximize its potential for increasing farmer profitability. Nexus of biodiversity - elements of agroecology, historical development, and global perspectives. Agroecological systems diversity. Agroecology transitions. Regenerative agriculture - regenerative use of natural resources and ecosystem service. Ecological restoration - Planning and design of stabilization programs. Conservation management solutions in a range of agricultural environments. Ecological principles and trophic interactions and resource use efficiency of production systems. Agroecology policies, regulations, frameworks, and mechanisms. Knowledge transfer policies. Agroecology and artificial intelligence application.

#### Course 2. Climate Change and Global Food Systems (3 Credits)

This course will provide an overview of the concept of climate change, food security, and their interlinkages. Numerous topics will be discussed during this course: Impacts of climate change on food and farming systems, Promotion of agroecology for climate resilient agriculture, Adaptation of farming practices to climate change impacts, Clean energy and carbon sequestration techniques in agriculture, Assessment and minimization of environmental impacts of climate change on production systems, Climate change adaptation and mitigation initiatives, Sustainability relationships between agriculture and ecosystems, Weather events and their effects on food systems, Analysing the impacts of climate change on agricultural systems, Role of cover crops in climate resilience, Enhanced ecosystem resilience and stability, biodiversity, and genetic resources preservation, Integrated farming systems and biodiversity conservation, Natural resource management and optimisation, and Climate-smart agricultural practices implementation minimizing waste and reducing environmental impacts, promoting biodiversity, and developing action plans for implementing climate resilience strategies.

## Course 3. Statistics and Research Methodology (3 Credits)

This course serves as a cornerstone for understanding the application of scientific principles in agricultural practices. It gives the groundwork for students to apply scientific methodologies in agricultural experimentation. Students will delve into the fundamental concepts that underpin agricultural experiments and statistical analysis in the field of agricultural sciences. This course deals with the ability to design data collection and perform statistical analysis to a modern standard in scientific disciplines spanning ecology, agriculture, and environmental sciences. It explores the interpretation of experimental results, emphasizing the computation of simple measures of central tendency and drawing meaningful conclusions. Students will develop the ability to match





evidence generated by statistical analysis to research objectives/hypotheses, and to deal with different common data types. By mastering these statistical techniques, students can draw inferences from their experiments and evaluate the reliability of their results. This course will impart key skills important for research for roles involving data analysis, evidence-based interpretation, or statistical numeracy in any way. By fostering a deep understanding of research principles and statistical techniques, this course empowers students to contribute meaningfully to the advancement of agroecology and innovation.

# **Option compulsory courses (a, b, c or d; 8 credits)**

a. Crop and Mechanization

# Course a.1. Cropping Systems and Plant Health Management (2 Credits)

The course gives an overview of the historical development of agroecology, terms, and definitions of concepts, agroecological practices, plant interactions, types of cropping systems, agronomic considerations, mixture productivity measurements, scaling up agroecology for food sovereignty and resilience, research methods in agroecological cropping systems, FAO's ten elements of agroecological framework, system analysis, innovation in agroecology. Definition of pests; pests of major local crops; effects of diseases caused by: viruses, bacteria, fungi, and nematodes. Control of crop diseases; advantages and limitations of different pest assessment and control methods. Students are expected to learn the principles and practices of Organic pest management; companion planting; Organic pesticides; beneficial organisms; ecosystem processes and biological functioning; and preventive measures to keep off pests and diseases.

# Course a.2 Agrometeorological Modelling and Crop Yield Prediction (2 Credits)

The course provides a critical evaluation of crop and agro-meteorological models developed for the prediction of crop production and agricultural operations, methods for climatological analysis and classification, and physiological and correlative approaches to modelling the impact of weather variability on crop yield. The layout of the Agrometeorological station and installation for on-farm research. Yield predictions under conditions of uncertainty. The course will give an overview of the climatic resources of a given area for effective crop planning. How to evolve weather-based effective farm operations. Importance of crop weather relationships in all vital crops and forecast crop yields based on agroclimatic and spectral indices using remote sensing. Students will learn the influence of weather on the soil environment on which the crop is grown and the influence of weather in a protected environment for improving their design to increase crop production.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

b. Livestock Systems Agroecology

# Course b.1. Agroecology and Livestock Production Systems (2 Credits)





This course introduces students to agroecological principles related to livestock production practices in Nigeria. It combines theoretical learning with practical case studies to foster a comprehensive understanding of agroecology's role in livestock production. Overview of livestock production in agroecosystems. Scaling out and scaling up agroecological niche innovations in animal production. Input substitution and maximization of outputs per animal or per unit area. Importance of genetic, species, and functional diversity in livestock production. Infrastructure and technology to agroecological transitions in livestock systems. Role of indigenous knowledge in developing sustainable livestock practices. Students are introduced to livestock nutrition for efficient feeding practices, water use, energy, and product management. Livestock as inputs for farming activities. Techniques for composting and nutrient cycling. Waste recycling strategies: manure composting, biogas, nutrient cycling, and reintegration of waste into production. Risk management and adaptive practices in Nigerian livestock systems.

# Course b.2. Environmental Physiology and Health Management in Farm Animals (2 Credits)

This course examines the principles of environmental physiology and its application to health management in farm animals, emphasizing agroecological practices suited to Nigeria's unique agricultural and environmental context. Students will learn how to foster sustainable livestock systems that align with environmental, social, and economic values. The course covers exploring the diversity of livestock species and breeds suited to different Nigerian agro-eco-zones, focusing on their physiological adaptations to various environmental conditions. Impacts of climate change on animal physiology. Physiological and behavioural responses of animals to heat and cold stress. Resilient health management strategies to safeguard livestock in the face of environmental stressors. Efficient resource use (water, feed, and energy) to maximize animal health outcomes with minimal ecological footprint. Integrating animal welfare standards and ethical treatment of animals to promote social values within livestock management systems. Traditional and ethnoveterinary practices that enhance animal health, and co-existence with modern techniques with policies that support sustainable livestock production and animal welfare regulations.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

c. Agribusiness and Sustainable Food Systems

# Course c.1. Sustainable Agrifood System Development and Policy (2 Credits)

This course equips students with the knowledge and tools required to apply systems thinking to complex agricultural and food (agrifood) systems challenges in an integrated manner, and to design appropriate policies and strategies to promote sustainable agrifood system development. Topics include an introduction to sustainable agrifood



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systems; concepts and analytical framework for a sustainable agrifood system, Systems thinking in sustainable agrifood systems development, and Operational approaches to sustainable agrifood systems development. The economics of sustainable agrifood system development and policies. Methods for analysing costs and benefits of agrifood system policies for producers, consumers, and taxpayers. Policy interventions for promoting sustainable agrifood system development, including their motivations, policy instruments, and consequences for factor owners and related commodity markets.

# Course c.2. Ecological Economics (2 Credits)

This course introduces students to the core concepts and tools of ecological economics, aiming to prepare them to understand, analyse, and manage the environmental and social dimensions of economic activity particularly in agriculture. The course is structured under three key sections. The first, "Introduction to ecological economics," covers: Key economic concepts, principles and tools and their applications, History of economic thoughts and the contemporary perspectives, and Development challenges in a globalizing world. The second part of the course, "Sustaining and containing ecosystem" presents the ecosystem as a whole, including: ecosystem goods and services, the biotic and abiotic resources, and the circular flow model from ecological economics," presents key microeconomic analytical tools for market-based decision analysis, highlighting their uses and limitations. Key topics include: basic market equation, supply and demand analysis, market failure, non-market valuation techniques, Social Cost – Benefit Analysis, and market & non-market policy instruments for addressing market failure.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

d. Natural Resources and Environment

## Course d.2. Agroforestry Components Interaction (2 Credits)

This course introduces students to Agroforestry principles within the framework of agroecology, emphasizing sustainability, environmental stability, food production, and ethical and locally adapted value systems. Students will learn how agroforestry concepts help in adaptation, biodiversity management, and farming system stability with man, animals and the environment as the main focus. Through theoretical and practical approaches, the course examines the role of agroforestry in shaping resilient and sustainable agroecological systems. The course seeks positive interactions between agroforestry components, aiming to achieve a more ecologically diverse and socially productive output. It introduces students to the definition, productive and service roles, biological characterization, and genetic evaluation of Multipurpose trees. It gives an overview of the selection of tree/crop/fodder combinations, factors to be considered, tree crops, arable crops, animal classes, and types of pastures. Students will learn different systems to optimize positive interactions between various biological components like





trees, shrubs and crops. Students will learn the component interaction in different ecological zones between trees/crops/pastures/animals, and positive and negative interactions and trade-off: Nutrient cycling in component systems dynamics of crop residues, animal waste, coppicing nitrogen fixation, etc. The course covers case studies of tree/crop/pasture/animal component combinations.

# Course d.2. Aquatic Ecology (2 Credits)

This course intends to acquaint students with the knowledge of aquatic environment biology as it affects the welfare, growth and performance of Fish and other aquacultures. It explores the production processes and procedures of aquatic organisms in a sustainable and resilient ecosystem that supports biodiversity. The course combines theoretical learning with practical case studies to foster a comprehensive understanding of agroecology role in aguaculture. The course outlines the biodiversity, guality and guantity of freshwater ecosystems. It deals with the concepts of aquatic ecology - life cycles, habitat needs of fish, habitat components, and seasonal movements. Efforts to mitigate pollution and improve aquatic ecosystems classification and characteristics. Management approaches and technologies are also covered to restore and sustainably develop aquatic environments. The Physio-Chemical parameters of different aquatic environments, plankton, and benthos in various Aquatic ecosystems. Primary and Secondary Production, Energy budget, limiting factors controlling fish production in various Ecological systems. Fish husbandry. Inland and Marine fisheries resources migration and resource distribution. Students will learn aquatic ecosystem functions across freshwater, evaluate how different threats to aquatic systems alter ecosystem functions and processes, and interpret how these manifests in biodiversity outcomes.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

## SECOND SEMESTER

## **Compulsory Agroecology Courses**

## Course 4. Gender Equality and Social Inclusion in Agrifood Systems (3 Credits)

The course provides an in-depth exploration of Gender Equality and Social Inclusion in agrifood systems. It focuses on equal access to resources and inclusionary formal and informal institutional norms and agribusiness practices. The agrifood system, which involves the production, processing, distribution, and consumption of food, presents many gender-based and social inequalities that can impact sustainable agricultural practices and rural development. This course focuses on understanding and addressing these inequalities through gender-responsive and inclusive approaches to policy, practice, and development interventions. The course gives an overview on introduction to gender equality and social inclusion, gender roles and social dynamics, access to resources and gender-based inequalities, policy and programmatic approaches to GESI, tools for gender equality and social inclusion with case studies and application in agrifood systems.





# Course 5. Agroecology Systems and Practices 2 (3 Credits)

An overview of agroecology and organic agriculture strategies. Role and principles of organic agriculture within agroecology. Organic agriculture as an agroecological approach. Merits and demerits of organic agriculture in food systems, production resilience, and socio-environmental governance. Integration of organic management practices with conservation agriculture techniques. Biodiversity benefits of organic farming and agroecology as a holistic approach to promote the use of diverse crop and animal species in an environmentally sensitive manner while maintaining profitability. Crop diversification and soil management to reduce the use of external inputs. Ecosystem services - biological pest control, nutrient cycling, and hydrological services. Role of pollinators and other beneficial organisms in managing pests and diseases in crop and livestock using agroecological principles. Regulation of feeding standards in livestock, characteristics of feed resources, grazing management, manure management, and ethnoveterinary measures. Organic and Agroecology transitioning, conversion, and certification. organic waste utilization, organic products, marketing, and recordkeeping.

## Course 6. Circular Bioeconomic and Sustainable Livelihoods (3 Credits)

The course deals with the concept of circular bioeconomy: ethics, drivers, and opportunities of a circular bioeconomy. Bioeconomy for sustainable food and agriculture. The course gives an overview of biomass as the basis of the food system and future bioeconomy and provides knowledge on ecological principles to guide biomass use towards a circular bioeconomy. Innovative processes to produce biomaterials and bioenergy, consumption minimization of virgin and waste resources in improving livelihoods. Bio circular economy concept and industrial and restorative or regenerative ecology. Bioeconomy products. Overview of a nature-powered economy. Economic model on the use of renewable natural capital, replacement mode of non-renewable, fossil-based products currently in use. Traditional and Indigenous knowledge, knowledge cocreation and exchange agriculture and fragile environments in the food system, issues of governance; social behaviour, and markets. Socio-economic considerations and policy frameworks supporting sustainable agriculture and advocacy skills for promoting agroecology at various levels.

## **Option compulsory courses (a, b, c or d; 8 credits)**

a. Crop and Mechanization

## Course a.3. Tropical Soil Conservation and Mechanized Agroecosystems (2 Credits)

This course introduces students to soil water movement, soil aeration drainage, and plant growth. It focuses on drainage systems and selection and cropping systems with soil moisture and soil moisture determination. Students will learn about water erosion, wind erosion, sediments, and control as well as evapotranspiration losses and control and its impact on crop yield. The objectives, methods and equipment for land clearing and development will be examined and the selection of machinery, mechanics of operation and vegetation types, and land reclamation including earthmoving machinery and earthmoving mechanics will be carried out





## Course a.4. Horticultural Produce and Post-Harvest Management (2 Credits)

The course deals with the ecological consideration for the cultivation of organic horticultural crops, agroecology and land preparation, crop establishment, and management. Students will learn principles of agroecology and horticultural crop protection – weeding, pests and diseases management, soil fertility management and agroecology, harvesting, and postharvest management of horticultural crops – and record keeping. This course focuses on understanding the definition of produce and the scope of horticultural produce, environmental factors affecting produce cultivation and the definition of postharvest, the importance of postharvest management, post-harvest management activities, postharvest handling structures, and produce for industrial utilization. Students will learn methods of grading horticultural produce and post-harvest natural treatment of horticultural crops.

**+ two Elective Courses (2 credits each)** – *Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.* 

b. Livestock Systems Agroecology

# Course b.3 Farm Animals Ecology (2 Credits)

This course focuses on the interaction between animal populations and their wider environment, the ecosystem. It emphasizes the principles of farm animal ecology within the concept of sustainable, ethical, and locally adapted livestock management in Nigeria. Students will learn concepts that apply to the interconnectedness of animals and their environment including their behaviour, distribution, abundance, and adaptation strategies. Relationship between animals, landscapes, and human communities. Species and breed diversity in livestock. Integrated agrosilvopastoral systems to maximize land and resource use for a sustainable ecosystem. Benefits of diverse ecosystems for disease resistance, productivity, and adaptability. An overview of livestock breed development that has characteristics to cope with sustainable resources. Animal welfare and behaviour management for enhanced ecological stability. Preservation of traditional practices. Discussion on policies impacting livestock production, environmental protection, and community-based governance.

## Course b.4: Ecological Pasture and Forage Management (2 Credits)

This course delves into the sustainable management of pastures and forage, emphasizing ecological practices that bolster both environmental health and productivity in Nigeria. Students will explore the interplay between diverse plant species and livestock. By focusing on the efficient use of resources and innovative recycling techniques, the course aims to develop resilient pasture systems that can adapt to environmental and economic challenges. The course gives an overview of agroecology and its relevance to pasture and forage management in Nigeria. Importance of ecological pasture systems for livestock productivity and environmental sustainability. Strategies for enhancing plant diversity in pastures. Integrated livestock-forage systems that optimize ecosystem functions.





Strategies and efficient practices for maximizing forage yield and quality with minimal external inputs. Nutrient cycling in pasture systems. Climate-adaptive strategies for maintaining pasture productivity under stress. Students will be trained in traditional knowledge and cultural practices in pasture management. Pastoralism and its role in promoting food sovereignty and cultural identity. Discussion on policies supporting sustainable pasture management and access to land. Value addition, local markets, and economic solidarity in pastoral communities.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

c. Agribusiness and Sustainable Food Systems

## Course c.3 Production and Operations Management in Agroecology (2 Credits)

This course introduces students to concepts, processes and tools of production and operations management with focus on agroecology-based production systems. Topics include introduction to production and operations management (concepts, processes, agroecology production system characteristics, and operations strategy development), agroecology product design and process development, agroecology farm site location and layout planning, improving production processes, quality management in operations, lean thinking, and supply chain management.

## Course c.4 Agribusiness Management (2 Credits)

This course exposes students to fundamental management principles, tools and techniques and their practical applications to agribusiness enterprises embracing agroecology. Topics shall include the concepts and scope of agribusiness management; decision environment & evaluation criteria; data gathering & record keeping for effective agribusiness management; agribusiness planning & budgeting; agroecology project appraisal & investment analysis; raising and managing financial capital; product marketing; and leadership & personnel management, among others. Students shall undertake a case study of selected farms practising agroecology and their business model.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

d. Natural Resources and Environment

## Course d.3. Control and Management of Ecological Disasters (2 Credits)

The course gives an overview of types of ecological disasters, their prevention, mitigations and control when they occur. It focuses on the implications of different ecological disasters to agroecological projects. Students will learn about engineering design and landscape management principles to prevent disasters as well as identification of man-made features that can prevent disasters from being avoided.





Students will learn about ecological concepts, their application to disaster management, and strategies that disaster management professionals implement to protect vulnerable communities and limit hazards. Identification of ecological disaster-prone areas of the country. Students are expected to learn case studies: (a) Ecological problems in the Niger Delta Area, (b) Soil erosion areas of Southern Nigeria, and (c) Desertification areas of Northern Nigeria. The course gives strategies for mitigation and prevention mechanisms and efforts to reduce the potential damage and suffering those disasters can cause, as well as plans to minimize the agricultural community's vulnerability to disasters. Management of ecological disaster in Nigeria: the role of Individual, government, non-governmental organizations and multi-national companies.

# Course d.4.Environmental Impact Assessment and Auditing (2 Credits)

This course introduces students to the principles of analysing scenarios around agroecological projects to determine how eco-friendly, suitable and sustainable it will be within the context of social, economic, cultural, and anthropological values, emphasizing, ethical, and locally adapted management principles in different ecosystems. Students will learn how to carry out surveys that will lead to making informed decisions about the necessity of the project focusing on the interconnectedness of Man, environment, and Production. Students are taught to interpret and communicate information about the impact, analyse site and process alternatives, and provide solutions to sift out or abate/mitigate the negative consequences on man and the environment. They will also learn the art and act of monitoring existing agroecological projects to determine if they still comply with the ecological principles upon which it was built. Through theoretical and practical approaches, the course will examine different agroecological concepts and their suitability for establishment at a time. The course deals with impact prediction, evaluation and mitigation, monitoring, and auditing. Students are exposed to environmental Impact Assessments of other Development Projects - New Farm Settlements, Agroecological tourism projects; Road Networks, Electricity Generation, etc. Improving the effectiveness of project assessment. Strategic Environmental Assessment.

**+ two Elective Courses (2 credits each)** – Students are free to choose courses as electives from any of the option compulsory courses or any course of interest within the existing master programmes in the University.

## THIRD SEMESTER

# Course 7. Group work Project (6 Credits)

The group work offers the opportunity for students to be involved in real-life projects in a group work during the whole semester responding to a demand from an external client and using different methodological and project management tools (defining leadership, schedule, deliverables). Students will have the opportunity to discuss and write for their clients a group report containing description, analysis, and suggestions for improving agroecological situations. The students will also write an individual learner document





containing a description and reflection on the experiences from the casework and their links to relevant theory.

# Course 8. Seminar I (2 Credits)

Students will present a seminar before embarking on their research work. Candidates shall be expected to present a formal half-hour seminar on their work plan and state of scientific knowledge in the chosen area of research. The research work should normally start after certification of the soundness and practicability of the project by the programme-domiciled centre and should be guided by suggestions raised at the seminar.

## Course 9. Internship (6 Credits)

The internship offers the student a unique opportunity to gain work experience in a company related to Agroecology. Training on how to demonstrate cooperation, understanding, and practical benefit of the daily operations in the company. Involvement in a mutually useful work relationship of learning opportunities. Demonstrate the importance of responsibility and personal interactions to the success of a career. Skilled to understand the notion of applied research supporting individual farms or a certain farming sector. Knowledge and skills related to research methodologies and the analysis of farming systems.





#### FORTH SEMESTER

# Course 10. Seminar II (2 Credit)

At the end of the research project, the candidate shall deliver a one-hour post-data seminar on the results obtained. The departmental board of Examiners will certify the seminar as satisfactory before a student can proceed to write up his/her thesis. This seminar shall be based on the outcome of the undertaken research project related to agroecology under the guidance of the Supervisor(s).

## Course 11. Thesis (12 Credits)

The primary objective of this course is to assess student's depth of understanding, knowledge, and competence in agroecology. A student is intended to demonstrate the ability to conduct rigorous research, analyse data, and present their findings coherently and structured concerning agroecology. The dissertation will study the impact of a participatory agroecological intervention in a sustainable farming system. The student's outcome on a detailed understanding of basic and applied agroecology and the issues associated





#### E. Graphical representation of Master Programme



**Option Compulsory Courses** 





a. Crop and Mechanization

Course a.1 - Cropping Systems and Plant Health Management (2 credits) Course a.2 - Agrometeorological Modelling and Crop Yield Prediction (2 credits) + Two Electives (2 credits each) b. Livestock Systems Agroecology Course b.1 - Agroecology and Livestock Production Systems (2credits) Course b.2- Environmental Physiology and Health Management in Farm Animal (2 credits) + Two Electives (2 credits each)

c. Agribusiness and Sustainable Food Systems Course c.1- Sustainable Agrifood System Development and Policy (2 credits) Course c.2- Ecological Economics (2 credits) + Two Electives (2 credits each)

d. Natural Resources and Environment Course d.1- Agroforestry Components Interaction (2 credits) Course d.2 - Aquatic Ecology (2 credits) + Two Electives (2 credits each)







a. Crop and Mechanization Course a.3-Tropical Soil Conservation and Mechanized Agroecosystems (2 credits) Course a.4 - Horticultural Produce and Post-Harvest Management (2 credits) +two Electives (2 credits each)

#### b. Livestock Systems Agroecology

Course b.3 - Farm Animals Ecology (2credits) Course b.4- Ecological Pasture and Forage Management (2 credits)

+two Electives (2 credits each)

c. Agribusiness and Sustainable Food Systems Course c.3- Production and Operations Management in Agroecology (2 credits) Course c.4- Agribusiness Management (2 credits) + two Electives (2 credits each)

# d. Natural Resources and

Environment Course d.3- Control and Management of Ecological Disasters (2 credits) Course d.4 - Environmental Impact Auditing (2 credits) +two Electives (2 credits each)



AGRECOFARM Academic courses outlines









# 3.1.3 UNIVERSITY OF ENERGY AND NATURAL RESOURCES (UENR), Ghana

**A. Title of the Master Programme:** MPhil Agroecology and Food Systems

# B. Length of the Master Programme: 2 years; Total Credits: 69

#### C. Targeted public, level of studies and prerequisites

Audience	Qualification	Prerequisites
The MPhil degree in Agroecology and Food Systems will serve the needs of the students having their BSc degrees in agriculture, agribusiness, agricultural economics, natural resources management, environmental science, related agriculture, agripreneurship and policy areas and who wish to imbue the knowledge, skills and competencies in agroecological and food systems approaches to address the needs of farmers, policy makers, traders and consumers nationally and globally.	To qualify for admission into the MPhil Agroecology and Food Systems programme, applicants should: - be graduates of any accredited university recognised by the Academic Board and the Ghana Tertiary Education Commission. -usually have obtained a minimum of a Second Class (Lower Division) degree in Agriculture, Agribusiness, Agricultural Economics, Natural Reesources, Environmental Science, Climate Science, Climate Change or a related field.	The candidate must demonstrate an adequate intellectual capacity for independent work, maturity, effective decision-making, and problem-solving potential. These competencies will be assessed on the face of the CVs submitted and during the entrance interview and case studies examinations.

## D. Description of each semester

## FIRST SEMESTER

In the first semester, the following courses will be taught.

## **Course 1. Sustainable Crop Production, (3 credits)**

This course aims at equipping students with knowledge and skills in sustainable crop production. In detailed the course will delve into common principles and practices associated with sustainable crop production from ecological, economic, social, and ethical perspectives; Sustainable crop production practices (mulching, safe use of mineral and organic fertilisers, cover cropping, crop residue management, provision of windbreaks,.The concept of agroecology as an integrated approach to sustainability; soils, nutrients and their management; climate, weather and water. Establishing of an agroecology farm; integrated rice and fish sytems, integrated crop-livestock production. Integrated farming; mixed farming (e.g., crop-livestock), long crop rotation (minimum four





different crops), spatial crop diversity, minimum soil cultivation, use of cultivars resistant to abiotic and abiotic stresses, modifications to sowing times, targeted application of nutrients; and setting up ecological infrastructure (3–5% of cropping area for nonagricultural vegetation). Impacts of climate change on crops; sustainable cropping systems (fallows systems, strip cropping, multiple cropping, contour strip cropping, crop rotations, alley farming, intercropping, afforestation, re-afforestation, agroforestry systems, organic farming etc) and their impacts on biogeochemical cycles; sustainable management of agricultural wastes (compost-making); climate smart agriculture

## Course 2. Integrated Pest Management, (3 credits)

The course will train students on the application of integrated pest management principles under agroecology and food systems. The course content will include; overview of pest management principles; exploration of natural pest control agents; analysis of pesticide resistance; cultural practices affecting pest populations and plant health; utilisation of biological control methods; assessment of chemical control impacts on the environment; exploration of host plant resistance; regulatory frameworks; economic decision models in pest management; ecological strategies for pest control; biotechnological advancements in pest management; addressing global challenges in pest management practices. Concept of Integrated Pest Management (IPM); role of ipm in sustainable agriculture; pest identification; setting an action threshold; monitoring; prevention; control. IPM benefits and case studies on IPM.

# Course 3. Soil Fertility and Sustainable Land Management, (3 credits)

The teaching aims at equipping students with knowledge and skills in soil fertility and sustainable land management practices. The course content include; general concept of soil fertility and productivity; fertility of tropical soils; soil organic matter, its properties and maintenance, liming and its soil-plant relationships; factors affecting the ability of the soil to supply nutrients in available forms; essential nutrients: source of supply, physiological roles, relative quantitative requirements, availability categories, forms and amounts in soil and plant; fertiliser production and fertiliser management, types and sources of fertilizer, application methods, rates and timing, handling and storage; crop growth and responses to soil nutrients, nutrient absorption, maintenance and loss in soil fertility in extensive and intensive agriculture; Manures and organic wastes; Composition, general properties, use of manure, and management, use of sewage sludge and waste water; soil sampling and analysis; The fate of applied nutrients as commercial fertilisers and manure; Techniques for soil fertility evaluation and the development of suitable fertiliser recommendations and nutrient management plans.

Concept of Sustainable Land Management (SLM); cropland, grassland, woodland and forest areas use and degradation effect on productivity, ecosystem functions, biodiversity and water resources, and vulnerability to climate change. Principles of SLM; land-user-driven and participatory approaches; integrated use of natural resources at ecosystem





and farming systems levels; multilevel and multistakeholder involvement; and targeted policy and institutional support, including development of incentive mechanisms for SLM adoption and income generation at the local level.

## Course 4. Ecological Systems and Agroecology, (3 credits)

This course seeks to train students with knowledge in ecological principles of farming and food systems. Current conventional agriculture goals and methods, consequences of conventional agriculture practices, heterotrophy and food chains importance in agriculture, integration importance in agriculture, sustainability of conventional agriculture. organic agriculture principles and fundamentals, organic agriculture types, methods, practices, and certification. Agricultural wastes and its applications in plant-soil systems. agroforestry, analog forestry and permaculture will be discussed in the course. Further, ecology in agriculture, ecology fundamentals, ecological interactions, local and global food systems, forms of energy and entropy, ecological principles of farming and food systems design, systems ecology, food distribution, consumer issues on food, and food security. Various agroecological zones and suitable agricultural practices for each zone will be taught. The agroecological approaches in sustainable cropping systems, the integrated farming system, and the agroforestry system. Description, analysis and redesign of farming and food systems. Plant-soil-water interactions in ecological and agroecological systems will also be discussed in the course.

In addition, students will be required to take one elective : either Farm Machinery and Mechanization or Integrated Livestock Production in the first semester

## Course 5. Farm Machinery and Mechanization, (elective / 3 credits)

The course will equip the students with knowledge and hands-on skills in the use of farm machinery and mechanisation principles for production under agroecological conditions. The course will cover, farm machinery, development and economic use; farm power sources - human, animal, mechanical, electrical and renewable energy; overview of internal combustion engine systems, engine components, two troke and four stroke engines - working principles and applications; different systems of internal combustion engine – cooling, lubricating, fuel, and injection systems; types of tractors, features and specifications, comparison of various tractor types; tillage operations and equipments (ploughs, harrows, rotary tillers, ridgers, etc.). Seed drills and planters; methods of seed establishment, functions of a seeder, seed metering devices, planters, fertiliser distribution/broadcasters; husbandry equipment: field sprayers/dusters: types of sprayers (hydro-pneumatic, mist blower etc.). Factors affecting sprayer performance; harvesting equipment: harvesting methods, combine harvesters (basic operations, working principles, combine losses). crops storage structures; farm machinery costing and records. selection, assembling and maintenance of farm machinery and irrigation systems.





# Course 6. Integrated Livestock Production, (elective / 3 credits)

This teaching will equip the students with knowledge and skills to practice integrated livestock production for sustainability. The course will be anchored on description and classification of livestock production systems, concept of Integrated Livestock production (ILP); role of livestock in mixed agro-ecosystems; sustainable livestock farming, agroecological livestock systems; livestock-poultry integration; ecological livestock production management; Integration of scientific, technological, and management approaches, as well as holistic analytical skills, for addressing biological, ecological, and socioeconomic constraints and opportunities in livestock production and development. Environmental physiology, animal welfare and agro-biodiversity. sustainable management of livestock feeds and genetic resources, and statistical tools for modelling livestock production systems; biomass utilization and renewable energy management; appropriate technologies, policies and regulations in mitigating negative environmental and social impacts of integrated livestock production systems.

# SECOND SEMESTER

In the second semester, the following courses will be taught.

**Course 7**. **Indigenous Food and Nutrition Practices, (3 credits)** will equip students with knowledge and skills Indigenous peoples' food, nutrition, and health issues. The course will discusss indigenous knowledge and experiences on food; traditional and indigenous food systems; using the concept of food and nutrition security – food availability, accessibility, utilisation, acceptability and adequacy will be discussed concerning current Indigenous food systems; colonization and reconciliation; indigenous worldviews; oral history and food traditional foods; the social determinants of health; emerging health trends; food policy, community nutrition, and indigenous food sovereignty; indigenous peoples' food, nutrition, and health issues; dynamics of changes in traditional or indigenous food systems due to global influence and their linkages to nutrition and health disparities.

**Course 8. Circular Economy and Sustainability, (3 credits)** will equip students with the knowledge of applying the principles of agroecology in food systems to ensure sustainability. Details of the course will include fundamentals of circular economy; circular economy in agroecology and food systems; waste management; international law and circular economy; importance of circular economy in sustainable food systems; circular economy approaches to sustainability; systems-based approach to circular economy; linkage of sustainability to over-consumption and over-production; multiple metrics for measuring sustainability - Triple Bottom Line (TBL); Environmental, Social and Governance (ESG); and the UN sustainable development goals (SDGs); enablers of sustainability; Application of the RESOLVE framework for sustainability in food systems;




Butterfly diagram and the Circularity diagram as strategic tools for circular design in agroecology and food systems.

**Course 9**. **Innovation and Agripreneurship in Food Systems, (3 credits)** aims to teach and students' knowledge and skills in food innovations and agripreneurship. Details of the course are; types of innovations - product innovation, process innovation; food product and process development; marketing, innovation and management; food preservation; innovations in food packaging; food authenticity and traceability; food management. Agripreneurship development process; enterprise development opportunities in food innovation, agroecology and food systems.

**Course 10. Applied Research Methodology and Statistics, (3 Credits)** will equip the students with knowledge and skills in applied research methodology and statistics. The course content will include formulating research topics and problems, setting research objectives, formulating quantitative hypotheses and experimental designs, designing research studies, selecting study areas, sampling techniques, sampling size determination, scaling, and questionnaire design. The course will provide students with knowledge of the qualitative research process: ontology and epistemology, major assumptions in qualitative research: subjectivism, interpretivism, social constructionism, and the role of theory in the research process – inductive vs. deductive research. Also, research approaches such as ethnography, phenomenology, case studies, grounded theory, naturalistic inquiry, and thematic synthesis will be studied. Brief hands-on statistical analysis relevant to research analysis, such as ANOVA, ANCOVA, MANOVA, Multiple Linear Regression, Logit and Probit Regressions, will be taught, too.

**Course 11. Applied GIS and Remote Sensing, (3 credits)** highlights the fundamental quantitative and spatial skills, focusing on GIS and Remote Sensing applications to agroecology and food systems. The course will train students on the introduction to Geographic Information Systems (GIS) – definitions, concepts and principles; components and modules of GIS; spatial data types, georeferencing; coordinate systems and map projections, data capturing techniques, spatial analysis – overlay, geoprocessing, data retrieval and classification. geographic data inputting, manipulation and storage, spatial analytic and modelling techniques, and error analysis through the use of GIS software like ArcGIS. Introduction to Remote Sensing - remote sensing process, electromagnetic radiation and spectrum, satellites, digital images, data collection; the processing of satellite images – image preprocessing and postprocessing; agroecology and food systems applications of remote sensing – crop health, biomass, moisture content, land surface temperature estimation; land use and land cover mapping. Lastly practical application of remote sensing in agroecology type mapping, crop monitoring, precision farming, suitability analysis / land evaluation, land mapping, burn mapping, flood





delineation, biomass mapping, degraded lands mapping, soil landscape analysis / dem and terrain analysis).

In the second semester of the first semester, Students will select a course between Agricultural Policy and Rural Development or Sustainable Value Chain Development and Marketing as an elective.

Course 12. Agricultural Policy and Rural Development, (elective / 3 credits) captures the theoretical foundations and practical methodologies involved in crafting effective agricultural policies for rural development. Overview of international, regional and national agricultural programmes, projects and policies – Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, The New Partnership for Africa's Development (NEPAD), Comprehensive African Agricultural Development Programme (CAADP), Alliance for a Green Revolution in Africa (AGRA), METASIP, FASDEP1, FASDEP II, Root & Tuber Improvement & Marketing Programme (RTIMP), Information On Export Marketing And Quality Awareness Project (EMOAP), Ghana Agriculture Sector Investment Programme (GASIP), West African Agricultural Productivity Programme (WAAPP); economic forces of agricultural policies change – globalization, technology and food safety and agricultural industrialization; theory of farm policy; import duties on agricultural products; farm policy options and consequences - free market, price supports. the concept of agricultural and rural development; theories, approaches and models of rural development; essentials of agricultural development; integrated rural development planning; principles of rural development, stages in rural development, leadership in rural development, rural development institutions and Non-Governmental Organisations (NGOs), communitybased organisations. Case studies on rural development in Ghana and other African Countries.

**Course 13. Sustainable Value Chain Development and Marketing, (elective / 3 credits)** aims at increasing students' knowledge and skills in different processing techniques, food innovation, and the marketing of agricultural products. The course delves into the concept and objectives of value chains and development, value chain mapping and development, gender and value chains, value chain upgrading. The course further examines pre- and post-harvest management for quality and shelf life of agricultural commodities and problems in their marketing; quality standards for domestic and international trade of agricultural commodities; setting of cocoa, cashew and other food quality standards and world food trade. HACCP, ISO 9000; auditing and certification; benchmarking and quality performance measurement. Additionally, the course will examine the type of losses occurring in various commodity value chains, analysis of the amount of money lost because of post-harvest losses, the impact of post-losses on value chain actors and solutions to post-harvest losses in Ghana. Also agribusiness marketing





courses such as sustainable marketing, social marketing, innovative marketing, packaging and other marketing functions relevant for sustainable marketing will be taught.

#### THIRD SEMESTER

#### Course 14. Masters Seminar 1 (Proposal Presentation), (3 credits)

This course will engage and facilitate presentations on students' chosen research area. They presentations will be reviewed and graded.

#### Course 15. Internship and Presentation, (3 credits)

This course will provide opportunities for students to gain practical knowledge and experience with relevant industries. Students will present learning experiences to the School of Agriculture and Technology for feedback and suggestions. The School has contacted organic farms and processing companies, such as Kofi Vinyo Company Limited, Grow West Africa, and Opoakpajor Youth and Development Center, to collaborate on student internships, thesis work, and practical training. Students will work with these companies and institutions as interns for two months. Company supervisors will evaluate the students' performance, and lecturers will visit to monitor their progress. After the internship, students will share their learning experiences and skills with the School of Agriculture and Technology, where they will receive grades.

#### FORTH SEMESTER

#### Course 16. Masters Seminar 2, (6 Credits)

This teaching instructs students on the appropriate data collection processes, data analysis, results and discussions preparing them for the research thesis.

#### Course 17. Agroecology and Food Systems Research Thesis (18 credits)

Students are expected to use knowledges and tools acquired from the courses to undertake a typical research project that addresses the challenges of agribusinesses sustainability in line with the sustainable development goals. The student's supervisors and Department head will approve the final thesis for onward submission to the School of Graduate Studies (UENR) for submission for external examination and defence.





#### E. Graphical representation of Master Programme











# 3.1.4 DR. HILLA LIMANN TECHNICAL UNIVERSITY, WA (DHLTU), Ghana

#### A. Title of the Master Programme: MSc in Agroecology and Food Systems

#### B. Length of the Master Programme: 2 years; Total credits: 70

#### C. Targeted public, level of studies and prerequisites

Audience	Level and field of	Prerequisites
	studies	
Students that want become:	BSc/BTech in the	- A good first degree, preferably
Horticulturist	following programmes:	second class lower or better (or
Farmer	Horticulture, Crop	a Final Grade Point Average of
Florist	Science/Agronomy,	at least 2.0) in a relevant field
Lawn care specialist	General Agriculture,	of study
Gardener	Natural Resources,	2
Forester	Agric. Mechanisation/	- A minimum of two to three
Landscape architect	Agric. Engineering,	years of working experience is
Biologist/Microbiologist	Ecological Agriculture,	required for a candidate with a
Agronomist	Soil & Water	pass or third class.
Ecologist	Engineering	F
Environmental engineer/		
specialist		
Plant geneticist/ pathologist		
Agricultural Engineer		
Teacher		
Water Resource Specialist		
Water/Wastewater Engineer		
Research Scientist		

#### D. Description of each semester as the following example

#### FIRST SEMESTER

Students will be introduced to theoretical knowledge and practical training on six courses in this semester as follows.

#### **Course 1. Sustainable Crop Production and Integrated Pest Management (3 credits)**

This course provides an in-depth exploration of sustainable crop production practices and integrated pest management (IPM) strategies. Emphasis is placed on ecological principles, sustainable practices, and the role of pests in agricultural systems to enhance productivity while minimizing environmental impact.

# Course 2. Soil Fertility and Organic Farming (3 credits)





This course explores the principles of soil fertility and the practices of organic farming systems. It focuses on understanding soil health, nutrient management, and sustainable agricultural practices that enhance productivity while preserving the environment.

# Course 3. Food Systems and Food Security (3 credits)

This course looks into the description of food systems, ecological impact of industrial food production and pillars of food security. The course also exposes the students to the Geopolitical influences on food and innovative methods of food systems.

# **Course 4. Digital Literacy and Information Management (3 credits)**

This course provides an in-depth exploration of the skills and knowledge necessary for navigating, evaluating, and utilizing digital tools and information in today's technologydriven world. Students will develop essential competencies in digital literacy, focusing on the ability to effectively use digital platforms, understand online security and privacy, and critically assess digital content. The course will also emphasize the principles of information management, equipping students with the strategies to organize, retrieve, and synthesize information across diverse digital environments.

### Course 5. Circular Economy and Sustainability (3 credits)

This course delves into the concept of the circular economy and its role in advancing sustainability. It examines the principles, strategies, and practical applications of the circular economy and its potential to transform linear models of production and consumption. The course explores how businesses, governments, and societies can transition to circular systems that minimize waste, optimize resource use, and promote sustainable development.

#### **Course 6. Integrated Livestock Production (3 credits)**

The Integrated Livestock Production course provides students with a comprehensive understanding of sustainable and efficient livestock production systems that integrate various animal species and their interactions with crop production, natural resources, and the environment. This course emphasizes the principles of integration to maximize productivity, resource use efficiency, and environmental sustainability

# SECOND SEMESTER

Students will be introduced to theoretical knowledge and practical training on six courses in this semester as follows.

# Course 7. Gender, Food Systems and Natural Resource Management (3 credits)

This course explores the intersection of gender, food systems, and natural resources. It will examine how gender roles, relations, and power dynamics shape access to and control over food and natural resources, and how these factors influence sustainability, equity, and food security. Through a multidisciplinary approach, students will critically





analyse the gendered dimensions of agriculture, food production, resource management, and policy interventions across diverse global contexts.

#### Course 8. Farm machinery and mechanization (3 credits)

This course is designed to provide students with the knowledge and skills needed to effectively operate, maintain, and manage agricultural machinery and equipment. The course typically covers the principles of machinery operation, safety, repair, and maintenance, as well as the economic and managerial aspects of farm machinery usage.

#### Course 9. Postharvest Technology (3 credits)

This course explores the biological causes of deterioration which include anaerobic respiration, ethylene production and action, rates of compositional changes associated with colour, texture, flavour, and nutritive value, mechanical injuries, water stress, sprouting and rooting, physiological disorders, and pathological breakdown. The course also provides relevant knowledge in technologies for maintaining food quality, methods of storage, postharvest processing, and innovative packaging for extended shelf life.

#### Course 10. Applied GIS and Remote Sensing (3 credits)

The Applied GIS and Remote Sensing course introduces students to the principles and practical applications of Geographic Information Systems (GIS) and remote sensing technologies in various fields, including agriculture, natural resource management, environmental monitoring, and urban planning. This course focuses on developing technical skills for spatial data analysis, mapping, and decision-making using real-world scenarios.

#### Course 11. Project Management (3credits)

The content of this course consists of concepts of agroecological projects, economic viability of agroecological projects, managing and evaluating agroecological projects. The course also provides relevant knowledge on Environmental Impact Assessment (EIA), methodologies and project management tools.

#### Course 12. Agroecology Participatory Research Methods (3 credits)

The agroecology participatory research methods course provides students with the knowledge and skills to engage in collaborative, community-driven research that supports sustainable agricultural practices. The course emphasizes participatory approaches to agroecological research, fostering inclusive partnerships between researchers, farmers, and other stakeholders to co-create solutions tailored to local contexts.

#### THIRD SEMESTER

Students will be introduced to theoretical knowledge and practical training on two courses, a seminar and an internship as follow.

#### Course 13. Biodiversity conservation and Agroecology (3 credits)





This course explores the interplay between agricultural practices and biodiversity, focusing on sustainable farming methods that support ecosystem health and resilience. Students will learn how agroecological principles can be applied to conserve biodiversity, enhance food security, and promote environmentally sustainable agricultural systems.

# Course 14. Ecological Systems and Agroecology (3 credits)

The ecological systems and agroecology course provides an in-depth understanding of the ecological principles underlying agricultural systems and their application to sustainable farming practices. This course integrates ecological theory with practical agroecological approaches to design, manage, and evaluate farming systems that promote biodiversity, resource efficiency, and environmental health.

### Course 15. Internship (4 credits)

Each student is required to undergo 1 to 2 months internship during the first year second semester vacation.

### Course 16. Seminar 1 (6 credits)

Students would have to attend all seminars specified by the Department. They are required to develop their own research proposals and to present it/them to the department.

### FORTH SEMESTER

Students will attend seminars and present progress of work on Thesis.

#### Course 17. Seminar 2 (3 credits)

Course description

Each student will make a presentation on the progress of his/her thesis. This presentation will be assessed for three (3) credits.

#### Course 18. Thesis (15 credits)

Students are required to undertake a compulsory thesis related to the programme.





#### E. Graphical representation of Master Programme





AGRECOFARM Academic courses outlines









# 3.1.5 CENTRAL UNIVERSITY LIMITED BY GUARANTEE (CU), Sierra Leone

# A. Title of the Master Programme: Master of Science in Agroecology

# B. Length of the Master Programme: two years; total credits: 99

The **Master of Science in Agroecology** at Central University is a two-year, thesis-based programme focused on sustainable agricultural practices tailored to African contexts. Through a mix of core courses and electives, the curriculum covers essential topics such as soil science, plant physiology, integrated pest management, and climate change's impact on African agriculture. With 60 credits of core courses and specialized electives in areas like indigenous agricultural knowledge, advanced pest management, and crop genetic resources, students gain a deep, interdisciplinary understanding of agroecology. This programme emphasizes ecological balance, resource management, and community-focused approaches, preparing students to lead impactful change in agriculture by fostering resilient food systems that respect environmental and cultural dynamics.

### C. Targeted public, level of studies and prerequisites

Target audien	nce	Lev	el and Field of	studies	Prerequisites				
People	with	A bachelor's		degree	in	Advanced	know	/ledge	in
background	in	agri	agricultural sciences,			agroecology	to	contril	oute
agricultural		env	environmental sciences, biology,			meaningfully	to	sustaina	able
sciences,		soci	social sciences, or a related field.			agriculture, research, and policy			olicy
environmenta	al					development.			
sciences, b	oiology,					Basic knowle	dge of	f agricult	ural
and social sci	ences					practices	and	ecolog	gical
						principles.			

# D. Description of each semester

#### FIRST SEMESTER

In the first semester of the Master of Science in Agroecology, students are introduced to foundational concepts in agroecology, with a particular focus on African agricultural systems and environmental sustainability. This semester lays the groundwork for understanding agroecological principles, soil science, plant physiology, biodiversity, and research methods, enabling students to explore the fundamentals of sustainable agriculture from a scientific and practical perspective.

# Course 1. Principles of Agroecology (3 credits)

Courses commence with an introduction to agroecology principles and ecosystems within African contexts, emphasizing ecological balance and sustainable agricultural practices. In this course, students delve into the interactions between agriculture and ecosystems, examining ways to apply agroecology for resilience in diverse African landscapes.





# Course 2. Soil Science and Management in Africa (3 credits)

The course enables students to assess soil properties and their management, focusing on soil fertility and conservation techniques relevant to African soils. By studying various soil management practices, students will gain a deep understanding of how to sustain soil health in agricultural systems unique to the African continent.

#### Course 3. Plant Physiology and Nutrition (3 credits)

The course provides an in-depth look at plant growth and nutrient management in African climates, including how different environmental factors impact plant development. This course helps students to analyse plant behaviour and optimize nutrient usage for sustainable crop production.

### Course 4. Agricultural Biodiversity in Africa, (3 credits)

Students will explore biodiversity's critical role in ecosystem services and agricultural resilience. The course covers the importance of diverse species in agricultural landscapes and how biodiversity contributes to sustainable food systems and ecological health.

### Course 5. Research Methods in Agroecology (3 credits)

Students will receive practical training in research design, data collection, and analysis specifically tailored to agroecological studies. This course equips students with essential research skills, laying a foundation for evidence-based agroecology practice and research.

### Course 6: Advanced Organic Pest Management (3 credits)

This course provides an in-depth exploration of organic pest management strategies, focusing on integrated pest management (IPM) as a holistic approach to pest control. Students will analyse various biological control methods, including the use of natural predators and parasitoids, as well as cultural practices that mitigate pest populations. The course will examine the efficacy and ecological implications of organic pesticides, emphasizing their role within an IPM framework.

#### Course 7: Agroecology and Public Health, (3credits)

This course examines the interconnectedness of agroecology and public health, highlighting the influence of agricultural practices on human health and well-being. Students will explore topics such as food safety, nutrition, and the impact of pesticide use on health outcomes. The course will address the role of agroecological practices in promoting healthy food systems that enhance public health.

#### SECOND SEMESTER

The second semester of the MSc Agroecology programme builds on the foundational knowledge from the first semester by emphasizing applied agroecological practices and examining specific agricultural systems in African contexts. This semester guides





students in integrating ecological principles into sustainable crop and pest management, while considering climate and policy impacts on agriculture in Africa.

### Course 8 Integrated Pest Management (3 credits)

Students will learn strategies to control pests through ecological principles and minimal chemical input. The focus is on creating sustainable pest management plans that align with ecological and economic realities in African farming systems.

### Course 9. Sustainable Crop Production (3 credits)

This course introduces students to both traditional and modern farming methods that promote sustainability. The course covers practices such as crop rotation, agroforestry, and polyculture, with the aim of maximizing productivity while preserving environmental health.

### Course 10 Agroforestry Systems (3 credits)

The course explores the integration of trees and crops within the same landscape, offering students a unique perspective on sustainable land use practices. Students gain applied knowledge in designing and managing agroforestry systems suited to African ecological and socio-economic conditions.

### Course 11. Climate Change and Agriculture in Africa (3 credits)

Students will analyse the impact of climate variability on agricultural productivity and resilience. They explore adaptive strategies that support agricultural sustainability amidst changing climate patterns.

#### Course 12. Agricultural Policy and Economics in Africa (3 credits),

Students will examine agricultural policies and economic frameworks that influence agroecology. This course addresses the broader socio-economic aspects of agriculture, including policy-making, subsidies, and international trade dynamics impacting African agriculture.

#### Course 13. Crop Genetic Resources (3 credits)

This course focuses on the conservation and utilization of crop genetic resources and their significance for sustainable agriculture. Students will learn about the diversity of crop species and varieties, the processes of domestication, and the importance of genetic diversity for food security and climate resilience.

#### Course 14. Policy Advocacy for Agroecology (3 credits)

This course aims to empower students with the skills and knowledge necessary for effective advocacy in support of agroecological practices. Students will explore the principles of policy advocacy, including how to identify stakeholders, frame issues, and develop strategic messaging that resonates with policymakers and the public.





#### THIRD SEMESTER

# Course 15. Advanced Agroecology (credits 3)

Students will have to engage with current research and developments in the field, emphasizing issues unique to African agricultural ecosystems. The course covers innovative approaches to ecological farming, including adaptive crop management and ecosystem-based approaches to resilience and productivity.

#### Course 16. Water Management in Agriculture (credits 3)

This course focuses on sustainable water use strategies within agricultural systems, addressing critical issues of water scarcity and efficient irrigation practices specific to African contexts. Students learn about rainwater harvesting, drip irrigation, and soil moisture management, equipping them with the skills to manage water resources sustainably.

### Course 17. Organic Farming Systems (credits 3)

This course covers the principles and practices of organic farming, including certification processes, soil fertility management, and pest control. Students study organic systems in the African context, exploring methods to maintain productivity without synthetic inputs while meeting market demands for organic products.

### **Course 18. GIS and Remote Sensing in Agriculture (credits 3)**

This course introduces students to the application of Geographic Information Systems (GIS) and remote sensing technologies in agricultural planning and management. They learn to utilize spatial data for crop monitoring, land assessment, and precision agriculture, providing them with the technical skills needed for modern, data-driven farming practices.

#### Course 19. Agroecological Design and Planning (credits 3)

Students will learn to design sustainable agricultural landscapes. The course emphasizes planning techniques that enhance ecosystem services, soil health, and crop diversity, preparing students to develop agroecological models that support sustainable land use and biodiversity conservation.

#### Course 20. Indigenous Knowledge Systems in Agriculture (credits 3)

This course introduces students to the agricultural practices rooted in indigenous knowledge systems and explores their significance in promoting sustainability and resilience in farming. Indigenous agricultural knowledge encompasses centuries-old techniques adapted to local environments, including crop rotation, soil preservation, and traditional pest management. These practices often offer effective, low-cost alternatives that have a minimal environmental impact.

#### Course 21: Post-Harvest Technology (credits 3)





Courses on post-harvest technology focus on the processes that take place after harvesting to reduce losses, maintain quality, and extend shelf life. This course covers key principles and techniques of post-harvest handling, including harvesting methods, storage, preservation, and transportation practices. Students will examine the physical and biochemical factors affecting post-harvest quality and the importance of controlled environments in preserving freshness.

# FORTH SEMESTER

The second semester of Year 2 delves into the socio-economic and environmental aspects of agroecology, with a focus on food systems, renewable energy, and conservation. Students also begin to design their capstone projects, where they apply their acquired knowledge to real-world agroecological challenges in African communities.

### Course 22. Food Systems and Food Security (3 credits)

**The course** introduces students to the structure and challenges of global and African food systems, with an emphasis on strategies for achieving food security. Students analyse the components of resilient food systems, sustainable food distribution, and the socio-economic drivers of food insecurity.

### Course 23. Renewable Energy in Agriculture (3 credits)

Students will examine renewable energy technologies that can support sustainable agricultural practices, such as solar-powered irrigation, biogas production, and energy-efficient farm equipment. They explore energy alternatives suitable for African agricultural settings, which reduce reliance on fossil fuels and promote environmental health.

#### Course 24. Conservation Biology and Agroecology (3 credits)

The course focuses on the interplay between conservation biology and agricultural practices. Students learn about biodiversity conservation within agricultural landscapes, sustainable resource use, and ecological restoration, preparing them to develop conservation-focused agroecological strategies.

#### Course 25. Urban Agriculture (3 credits)

This course examines the role of agriculture in urban environments, with a particular emphasis on African cities. It explores the benefits of urban farming, including food security, community resilience, and waste recycling, and encourages students to innovate sustainable urban agricultural systems.

#### Course 26. Social Dimensions of Agroecology (3 credits)

Teaching will address the social and cultural factors that influence agroecology in Africa. Students study community-based agriculture, gender roles, and indigenous knowledge





systems, learning how social dynamics shape agricultural practices and the success of agroecological initiatives.

#### Course 27. Agroecology Capstone Project I (3credits)

Students will have to initiate a comprehensive research project related to agroecological issues. They begin by developing a proposal, conducting a literature review, and designing their methodology, setting the stage for practical implementation and data collection in the following semester.

#### Course 28. Thesis Research and Dissertation (18 credits)

The aim of the Thesis Research and Dissertation is to ensure that, the student has developed a final research project, a component of the MasterAgroecology, which equips the candidate with skills to apply cumulative knowledge and skills gained in the programme. Students are expected to use the tools acquired from the courses to undertake a typical research project that addresses the challenges of agribusinesses sustainability in line with the SDGs.





#### E. Graphical representation of Master Programme













# 3.1.6NJALA UNIVERSITY (NJALA), Sierra Leone

# A. Title of the Master Programme: MSc In Agroecology Systems

**B. Length of the Master Programme:** for 1.5 years (18 months) of three semesters; total credits: 73

### C. Targeted public, level of studies and prerequisites

This MSc programme is designed for individuals who are passionate about sustainable agriculture and eager to contribute to resilient agricultural systems in West Africa. The target audience includes:

Targeted Public	Level of Studies	Prerequisites
Graduates holding a BSc degree in agricultural sciences, environmental sciences, biology, or related fields. Professionals in agriculture and rural development, including extension workers, agronomists, environmental consultants, policymakers, and NGO staff. Community leaders and project coordinators involved in agricultural development, food security, and environmental sustainability projects.	Applicants must hold at least a bachelor's degree in relevant fields of study.	A foundational knowledge of agriculture, biology, or environmental sciences is required. Since the programme will be conducted in English, candidates should be proficient in English. Non-native English speakers may need to provide proof of English language proficiency.
People with practical experience in crop or livestock production, aquaculture or in processing or marketing of agricultural products will be encouraged.		

#### D. Description of each semester

#### FIRST SEMESTER

The first semester of the MSc in Agroecology at Njala University will introduce students to foundational concepts in sustainable agriculture, soil science, climate interactions, farming systems, and health management. These courses provide a comprehensive





understanding of ecological and agricultural practices essential for addressing West Africa's agricultural challenges.

# Course 1: Introduction to Agroecology and Sustainable Agriculture (3 credits)

This course explores the FAO's vision of agroecology, emphasizing the 10 fundamental elements that underpin sustainable agricultural systems. Students will gain insight into agroecology's principles, including diversity, resilience, co-creation of knowledge, and responsible governance, as tools to foster food security and environmental sustainability.

### Course 2: Soil Science and Management (3 credits)

Focusing on soil as a critical resource, this course examines soil health assessment techniques and major challenges like soil erosion, salinization, leaching, pollution, and drainage issues. The course delves into the principles of nutrient cycling, offering practical strategies to enhance soil fertility and support sustainable crop production.

#### Course 3: Climate and Agriculture (3 credits)

This course discusses the interplay between weather and climate, with particular focus on the challenges of predicting the West African Monsoon rainfalls and climate conditions. Students will explore strategies for selecting appropriate cultivars and species that are resilient to climate variability, preparing them to address climatic impacts on agricultural productivity.

#### Course 4: Farming Systems (3 credits)

A comparative analysis of modern and traditional farming systems forms the core of this course. It covers the benefits and limitations of systems like agroforestry, silvopastoral systems, organic agriculture, aquaculture, and irrigation. Students will gain knowledge about designing diversified farming systems that align with ecological principles.

#### Course 5: Plant and Animal Health (3 credits)

This course introduces students to the concept of One Health and the importance of integrated pest management for maintaining the health of plants and animals. It emphasizes sustainable approaches to pest control and disease prevention, ensuring the vitality of agricultural systems while minimizing environmental harm.

#### SECOND SEMESTER

The second semester builds on the foundations of agroecology, focusing on applied topics like value addition, agricultural policy, waste management, agribusiness, and research methods. This combination equips students with advanced knowledge and practical skills necessary for driving sustainable agricultural innovation and socio-economic development in West Africa.





# Course 6: Processing and Agricultural Engineering (3 credits)

This course highlights techniques and technologies for value addition to agroecological products, emphasizing their role in enhancing market competitiveness and sustainability. Students will explore engineering solutions to optimize productivity and efficiency in agricultural systems, bridging the gap between ecological practices and technological advancements.

### Course 7: Agricultural Policy and Social Inclusion (3 credits)

Students will analyse agricultural policies and their implications for rural development, focusing on gender equity, rural sociology, and social inclusion. This course fosters a critical understanding of policy-making processes and their role in supporting sustainable and inclusive agricultural systems.

### Course 8: Circular Economy in Agriculture: Waste Management (3 credits)

This course introduces principles of the circular economy in agriculture, focusing on sustainable waste management practices such as composting and waste-to-value systems, including the use of Black Soldier Fly for organic waste recycling. Practical applications aim to reduce waste and promote resource efficiency.

### Course 9: Agribusiness Management and Value Chains (3 credits)

Students will study the economics of sustainable agriculture, focusing on value chain analysis, marketing strategies, and agribusiness management. The course emphasizes creating economically viable and environmentally sustainable agricultural enterprises.

#### Course 10: Research Methods in Agroecology (3 credits)

This course equips students with essential research skills, including statistical techniques (regression, ANOVA), literature reviews, and survey design. Students will also learn to construct and evaluate scientific literature, preparing them for advanced research in agroecology.

#### Course 11: Guest Lectures (3 credits)

This course provides students with the opportunity to interact with guest speakers from various sectors, including policy, academia, industry, and NGOs, enriching their understanding of real-world challenges and innovative solutions in agroecology.

# THIRD SEMESTER

The third semester focuses on applying knowledge gained in the programme through practical experiences and independent research. These courses provide students with opportunities to bridge the gap between theory and practice while contributing to the field of agroecology through original research.

#### Course 12: Internship (10 credits)





This course offers students the chance to engage in an internship with relevant organizations such as research institutions, NGOs, government agencies, or agribusinesses. The goal is to bridge the gap between theoretical knowledge and practical application, allowing students to gain hands-on experience in addressing real-world challenges in agroecology. Internships will focus on sustainable farming practices, policy implementation, or value chain development, depending on the student's area of interest and career aspirations.

### Course 13: Thesis Writing (30 credits)

The thesis course requires students to conduct independent research addressing a specific agroecological issue, with a particular emphasis on its application to Sierra Leone's context. Students will undertake a comprehensive practical and theoretical assessment of a chosen topic, integrating knowledge from previous semesters. The course develops critical thinking, research, and academic writing skills, culminating in a thesis that contributes to the growing body of knowledge in sustainable agriculture and agroecology.





#### E. Graphical representation of Master Programme













# 4. Conclusion

This report shows the design of six master programmes in agroecology of six West African universities in Ghana, Sierra Leone and Nigeria. They are providing different options that could be used by other universities, not only in West Africa, to build new master programmes in agroecology for future implementation, or for adaptation of existing programmes in agriculture or agronomy in including more agroecology-related courses.

The six designed master programmes include courses for four semesters, with the last semester either a combination of courses, an internship and the master thesis, or mainly covered by a master thesis. Courses in semesters 1-3 of the different universities cover different more classical aspects of study programmes in agriculture such as crop and animal production, crop protection, pest management, machinery use and mechanisation, post-harvest technologies, and geographical information systems.

More specific courses covering the systems approach of agroecology, and also the food systems dimension include for example ecological systems and agroecology, food systems and food security, and sustainable value chains. Potentional missing are courses on seed systems, participatory research, and farmer-to-farmer knowledge sharing, which are fundamental to agroecology and sustainable farming. The curricula could also include: - The role of bioinputs in agroecology, including production, commercialization, and quality control. - Circular biomass management and fertility strategies at the territorial level to improve nutrient cycles and reduce waste. - Territorial approaches to agroecology, linking local businesses, research institutions, and farmers. - Agroecological economic development, moving beyond farm-level sustainability to regionally embedded economies.

Moreover, other courses related or covering the 13 principles of agroecology (HLPE 2019) include biodiversity conservation, soil heath, animal health, indigenous knowledge, participation, gender issues, or circular economy. Some courses refer more specifically to FAO's 10 elements of agroecology (FAO 2025).

Other important elements such as courses in policies, circular economy, agribusiness, entrepreneurship are included at some universities. In addition, different teaching courses for statistics, research methods, agroecological research approaches, seminars, and internships are integrated in the programmes at different universities. Some universities include also a combination of compulsory and elective courses.

Number of credits vary form course to course with smaller and larger courses, and in relation to the universities. In some countries they are called units in other credits. Their value and respective work load for student is different in the different countries and





university, and consequently not fully comparable, but indicate well the weighing of course within each university.

With a critical reflection in looking at all programmes it can be stated that potentional missing are courses on seed systems, participatory research, and farmer-to-farmer knowledge sharing, which are fundamental to agroecology and sustainable farming. The curricula could also include more on the role of bioinputs in agroecology, including production, commercialization, and quality control. Moreover, territorial approaches, linking local businesses, research institutions, and farmers, as well as agroecological economic development, moving beyond farm-level sustainability to regionally embedded economies, are topics that are not yet well identified or integrated in different courses and curricula.

# 5. Bibliography

Branch, R. M. (2009). Instructional design: The ADDIE approach. <u>https://obsidianlearning.com/projects/addie-model/</u>

FAO (2025). The 10 elements of Agroecology. https://www.fao.org/agroecology/overview/overview10elements/en/

HLPE (2019). Agroecological approaches and other innovations for sustainable agriculture and food systems that enhance food security and nutrition. Committee on World Food Security, High Level Panel of Experts on Food Security and Nutrition, FAO Rome.





# 6. ANNEXES.

### Annex 1. Tables filled in by part in the Analyze step of the ADDIE Approach

**Table x**. Audience, Level and field of studies, and Prerequisites

Audience	Level and	Prerequisites
	field of studies	

**Table x.** Job and competences template

Jobs	Competences link				
	to the job				





#### Annex 2. Syllabus of the master programme for each African University

# Annex 2.1 Syllabus of the UNIVERSITY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES UMUAGWO, IMO STATE (UAES), Nigeria

#### Semester 1

Total of Credits	Contact ho	Contact hours							
Credits: 16	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work		
	75.00 h	-	270.00h	225.00 h	15.00 h	16.00 h	0.00 h		

Personal work = Contact hours x2

Course 1: Agricultural Production Systems	Prof. E.U Onwerenmadu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		15.00 h	-	45.00 h	45.00 h	-	3.00 h	-

#### **OBJECTIVE:**

The course aims to equip students with the knowledge and skills needed to design, manage and improve agricultural production system to meet the growing food demands

#### PROGRAMME:

It covers advanced agricultural production systems, principles and practices in soil resource and fertility management, principles and practices in crop production and animal production in relation to agroecology and environmental sustainability, agricultural economics

#### TEACHING METHODS:

- Seminars
- field visits
- lectures
- practicals

#### PREREQUISITES:

Basic knowledge in agricultural production systems and environmental sustainability

#### EVALUATIONS DETAILS:

Assignments will be given to the students 15% of 100% Presentations of reports on field visits and field works 15% of 100% Examination 70% of 100%





Course 2 :								
Statistics and						Cupopuland		Draiact
Research						Supervised		Project
Methodology in	Dr. C.T.	Lectures	Tutorials	Practicals	Field	WOFK	Evaluation	WOLK
Agroecology	Amanze				trips			
Credits: 4		15.00 h	-	90.00 h	45.00 h	-	4.00 h	-

#### OBJECTIVE:

To equip students with statistical knowledge and skills to collect, analyze and interpret biological data

# PROGRAMME:

The course covers Advanced statistics, experimental designs, hypothesis testing and confidence intervals, regression model, biometrical techniques, statistical software applications, research development and writing of research proposals.

#### TEACHING METHODS:

- Seminars
- Field trips
- lectures

### PREREQUISITES:

Basic knowledge in biometrics and general statistics

#### EVALUATIONS DETAILS:

Assignments will be given to the students 15% of 100% Test 15% of 100% Examination 70% of 100%

Course 3: Agroecology and						Supervised work		Project work
Sustainable Environmental	Prof. E.U. Onwerenmadu	Lectures	Tutorials	Practicals	Field trins		Evaluation	
Management								
Credits: 3		15.00 h	-	45.00 h	45.00	-	3.00 h	-
					h			

#### OBJECTIVE:

To promote environmentally friendly and socially responsible farming practices that conserve natural resources, maintain ecosystem services and ensure sustainable agricultural production.

# PROGRAMME:





The course covers Agroecology systems, principles of soil and water management and conservation, biodiversity and ecosystems, sustainable agricultural practices, climate change and agriculture.

#### TEACHING METHODS:

- Seminars
- practicals
- lectures
- field trips

# PREREQUISITES:

Basic knowledge in sustainable agricultural practices, environmental studies and biology

### EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field visits and practicals 15% of 100% Examination 70% of 100%

Course 4 Agroecology systems and knowledge Transfer	Dr. C.O. Osuagwu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		15.00 h	-	45.00 h	45.00 h	-	3.00 h	-

#### OBJECTIVE:

To develop and disseminate sustainable agroecological practices and knowledge to farmers, communities and other stakeholders to promote environmentally and socially responsible agriculture

# PROGRAMME:

Systems thinking in agroecology, knowledge transfer systems, community participation and outreach, innovation and scalability in agroecology, policy and governance in agroecology, communication outreach and advocacy, field trips and farm visit.

# TEACHING METHODS:

- Seminars / workshops
- lectures
- field trips

#### PREREQUISITES:

Basic knowledge in agricultural extension and agricultural economics

# EVALUATIONS DETAILS:



AGRECOFARM Academic courses outlines



Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips 15% of 100% Examination 70% of 100%

Course 5:								
Postharvest						Supervised		Draiact
Handling of						Supervised		work
Agroecological	Dr. P.	Lectures	Tutorials	Practicals	Field	WUIK	Evaluation	WUIK
Produce	Ohwofadjeke				trips			
Credits: 3		15.00 h	-	45.00 h	45.00	-	3.00 h	-
					h			

#### **OBJECTIVE:**

To minimize losses, maintain quality and ensure safety of agroecological produce from harvest to consumption, while promoting sustainable and environmentally friendly practices

#### PROGRAMME:

Post-harvest handling, isolation, identification and control of post-harvest pests and diseases, handling and storage techniques, quality and safety standards of agroecology produce, postharvest management systems, sustainable post-harvest practices, value addition and processing of agroecology produce, policy in post-harvest handling.

#### TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

#### PREREQUISITES:

Basic knowledge in agricultural engineering, crop and animal production

#### EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips and practicals15% of 100% Examination 70% of 100%





#### Semester 2

Total of Credits	Contact h	Project work					
Credits: 15	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	60.00 h	0.00 h	180.00 h	270.00 h	15.00 h	15.00 h	.00 h

Personal work = Contact hours x2

Course 6:								
Plants and						<b>C</b>		
Animal Health						Supervised		Project
Management in	Dr.	l ectures	Tutorials	Practicals	Field	work	Fvaluation	work
Agroecological	(Mrs.)				trins			
Systems	см				trip5			
Credits: 3	C.M.	15.00 h	-	45.00 h	45.00 h	-	3.00 h	-
	inwogu							

#### **OBJECTIVE:**

To prevent and manage plant and animal diseases and pests in a sustainable and environmentally friendly manner, minimizing harm to humans and the environment

### PROGRAMME:

Agroecology and health management, management of pests and diseases in crops and animals, weed management, biological control, bio pesticides and comprehensive health management.

#### TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

#### PREREQUISITES:

Basic knowledge in plant and animal health management

#### EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips and practicals15% of 100% Examination 70% of 100%





Course	7:							
Horticulture a	ind					Cupopuland		Draiget
Landscape						Supervised		Project
Management	Dr.	Lectures	Tutorials	Practicals	Field	WOFK	Evaluation	WOLK
	L.U.				trips			
Credits: 3	—Amulu	15.00 h	-	45.00 h	45.00 h	-	3.00 h	-

#### OBJECTIVE:

To cultivate and maintain plants, gardens and landscapes in a sustainable and aesthetically pleasing manner, while promoting environmental conservation and human well-being

# PROGRAMME:

Advanced horticulture, plant biology and identification landscape design and management, plant propagation and production, lawn and ornamental management, urban agriculture and landscape maintenance.

# TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

### PREREQUISITES:

Basic knowledge in general agriculture and horticulture

# EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips and practicals15% of 100% Examination 70% of 100%

Course 8 Circular economy in agroecology	Prof. C.A. Emenyonu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		15.00 h	-	45.00 h	45.00 h	-	3.00 h	-

# OBJECTIVE:

To design and implement regenerative agricultural systems that promote resource efficiency, reduce waste and regenerate natural resources, mimicking the cyclical patterns of nature

# PROGRAMME:





Circular economy, agroecological concepts and principles, circular agroecology systems, waste management strategies, circular business models in agroecology, policy and regulation.

#### TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

#### PREREQUISITES:

Basic knowledge in plant and animal health management

#### EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips and practicals15% of 100% Examination 70% of 100%

Course 9: Agribusiness et Management	Prof. C.C.	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
ECTS: 3	EZe	15.00 h	-	-	90.00 h	-	3.00 h	-

#### **OBJECTIVE:**

To optimize the efficiency, productivity, and profitability of agricultural enterprises, while ensuring sustainability and minimizing environmental impact

#### PROGRAMME:

Advanced agribusiness, farm management, agricultural marketing, agricultural finance, agricultural finance, agricultural policy and regulation, entrepreneurship and leadership.

#### TEACHING METHODS:

- Seminars
- lectures and tutorials
- field trips
- practicals

#### PREREQUISITES:

Basic knowledge in general agriculture, agricultural economics and agricultural extension

#### EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100%





Reports on field trips and practicals15% of 100% Examination 70% of 100%

Course 10 Internship	Dr. V.A. Enwerem	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		-	-	45.00 h	45.00 h	15.00 h	3.00 h	-

#### **OBJECTIVE:**

To provide hand-on practical experience and training in agroecological principles and practices, enabling students professionals develop skills and knowledge for sustainable agriculture and environmental management

#### PROGRAMME:

Internship in partner University

#### TEACHING METHODS:

- Seminars
- field trips
- practicals

#### PREREQUISITES:

Basic knowledge in general agriculture, agricultural economics and agricultural extension

#### EVALUATIONS DETAILS:

Presentation of seminar on skills gained 30% of 100% Reports on field trips and practicals70% of 100%




#### Semester 3

Total of Credits	Contact ho	Project work					
Credits: 15	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	75.00 h	0.00 h	225.00 h	225.00 h	.00 h	12.00 h	.00 h

Personal work = Contact hours x2

Course 11 -								
Identification and						Supervised		Draiact
Production of						Superviseu		Project
Neglected/Endangered	Dr.	Lectures	Tutorials	Practicals	Field	WUIK	Evaluation	WUIK
plant and Animal spp.	L.U.				trips			
	Δmulu							
Credits: 3	πιιατα	15.00 h		45.00 h	45.00	-	3.00 h	-
					h			

# OBJECTIVE:

To conserve, promote, and utilize underutilized and neglected plant and animal species for food, income and sustainable livelihoods while maintaining biodiversity and ecosystem

# PROGRAMME:

Neglected / endangered species, plant identification and conservation, animal identification and conservation, sustainable production strategies, market survey and economic viability, agroecological restoration, community participation and outreach

# TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

# PREREQUISITES:

Basic knowledge in general agriculture and biology

# EVALUATIONS DETAILS:





Course 12:								
Land and						Curanicad		Droiset
Soil						Supervised		Project
Resource	Prof .E.U.	Lectures	Tutorials	Practicals	Field	work	Evaluation	WOLK
Management	Onwerenmadu				trips			
Credits: 3		15.00 h	-	45.00 h	45.00	-	3.00 h	-
					h			

To conserve, protect and utilize land and soil resources sustainably, maintaining their health, fertility and productivity, while minimizing degradation and environmental impact

# PROGRAMME:

Land and soil resources, fundamentals of soil science, soil degradation and conservation, land use planning and policy, watershed management, climate change and land and soil management

# TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

#### PREREQUISITES:

Basic knowledge in soil science and environmental studies

# EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips and practicals15% of 100% Examination 70% of 100%

Course 13: Remote Sensing and Geographic Information System	Dr. F. Madu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		15.00 h	-	45.00 h	45.00 h	-	3.00 h	-

# OBJECTIVE:

To acquire, analyze and interpret spatial data and information using GPS and GIS technologies to support informed decision-making in agriculture, natural resource management and environmental monitoring

# PROGRAMME:





Remote sensing and GIS, fundamentals of remote sensing, fundamentals of GIS, satellite and aerial imagery, precision agriculture and monitoring, GIS Data analysis and mapping.

# TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

# PREREQUISITES:

Basic knowledge in Geography environmental studies

# EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100% Reports on field trips and practicals15% of 100% Examination 70% of 100%

Course 14:								
Agroforestry and Climatology	Dr. F. Madu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		15.00 h	-	45.00 h	45.00 h	-	0 h	-

# **OBJECTIVES:**

To design, implement, and manage integrated agricultural systems that combines trees and crops and or livestock, while understanding and mitigating the impacts of climate on these systems, to promote sustainable land use, biodiversity and climate resilience

# PROGRAMME:

Advanced agroforestry, fundamentals of climatology, agroforestry and climate change, carbon sequestration and mitigation, agro climatology and weather patterns.

# TEACHING METHODS:

- Seminars
- lectures
- field trips
- practicals

# PREREQUISITES:

Basic knowledge in Agriculture, agroforestry and forestry

# EVALUATIONS DETAILS:

Presentation of seminar related to the topics taught in the course 15% of 100%





Reports on field trips and practicals15% of 100% Examination 70% of 100%

Course 15 Gender, Entrepreneurship and Innovation	Dr. V.A. Enwerem.	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		15.00 h	-	45.00h	45.00 h	-	3.00 h	-

#### **OBJECTIVE:**

To promote gender equality and empower women and other marginalized groups to participate in entrepreneurial and innovative activities, fostering economic growth, social inclusion and sustainable development

# PROGRAMME:

Gender and agroecology, entrepreneurship in agroecology, innovation in agroecology, gender and entrepreneurship, innovative business models, policy and regulatory frameworks.

#### TEACHING METHODS:

- Seminars / workshops
- lectures
- Field trips
- practicals

# PREREQUISITES:

Basic knowledge in climatology studies and agricultural engineering

#### EVALUATIONS DETAILS:





#### Semester 4

Total of Credits	Contact ho	ours					Project work
Credits: 20	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	45.00 h	0.00 h	45.00 h	45.00 h	30.00 h	15.00 h	225.00 h

Personal work = Contact hours x2

Course 16:								
Agroecology						Supervised		Droject
Policy,						work		work
Planning and	Prof. C.A.	Lectures	Tutorials	Practicals	Field	WUIK	Evaluation	WUIK
Development	Emenyonu				trips			
Credits: 3		15.00 h	-	45.00 h	45.00 h	-	3.00 h	-

# OBJECTIVE

To design, implement and evaluate policies, plans, and programmes that promote sustainable agroecological practices, support small scale farmers and ensure equitable and environmentally conscious food systems, contributing to rural development, food security and climate resilience:

# PROGRAMME:

Agroecology policy, policy framework and governance, agroecological planning, development theories and practice, agroecological project development and communication

# TEACHING METHODS:

- Seminars
- Lectures
- Field trips
- tutorials

#### PREREQUISITES:

Basic knowledge in agriculture, environmental studies and biology

#### EVALUATIONS DETAILS:





Course 17								
Agroecology, Food						Supervised		Project
Security and Systems	Dr. P. Ohwofadjeke.	Lectures	Tutorials	Practicals	Field trips	work	Evaluation	work
Credits: 3		15.00 h		45.00h	45.00 h	-	3.00 h	-

To design, implement and manage sustainable agricultural systems that prioritize social equity, environmental conservation and economic viability, ensuring access to nutritious food for all, while promoting resilient and thriving agro ecosystems

#### PROGRAMME:

Definition and scope of agroecology and food security, food security frameworks and indicators, sustainable agriculture practices, food system analysis, nutrition and public health, policy and governance.

#### TEACHING METHODS:

- Seminars
- lectures
- Field trips
- practicals

# PREREQUISITES:

Basic knowledge in agriculture, biology, food processing and engineering

# EVALUATIONS DETAILS:





Course 18								
Advanced						Supervised		Droject
Irrigation						Supervised		Project
Practices in	Prof. E.	Lectures	Tutorials	Practicals	Field	WOIK	Evaluation	WOIK
Agroecology	Onwerenmadu.				trips			
Cradits: 7		15.00 h		45.00h	45.00		7 00 h	
Cleans. 5		15.00 11	-	45.0011	45.00 h	-	5.00 11	-
					11			

To develop and implement agro climatology and irrigation practices that enhance crop production, conserve water resources and promote sustainable agriculture in agroecological systems

# PROGRAMME:

This course explores the principles and practices of advanced irrigation systems in agroecology, focusing on sustainable water management, crop water productivity, and ecosystem services. Students will learn about innovative irrigation technologies, water saving strategies and precision irrigation methods.

#### TEACHING METHODS:

- Seminars
- lectures
- Field trips
- practicals

# PREREQUISITES:

Basic knowledge in climatology studies and agricultural engineering

# EVALUATIONS DETAILS:

Course 19 Special Seminar	Dr. V.A. Enwerem	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 1		-	-		-	15.00 h	2.00 h	90.00 h





To share knowledge, experiences and research findings on agroecological principles

# PROGRAMME:

Each student is expected to come up with a seminar paper that states one or more challenges in food production in Africa and proffer solution to these problems using agroecological principles

# TEACHING METHODS:

• Seminars

# PREREQUISITES:

Basic knowledge in agriculture, environmental studies and biology

#### EVALUATIONS DETAILS:

Presentation of seminar on relevant topic related to agroecology 40% of 100% Examination of seminar paper 60% of 100% Examination 70% of 100%

Course	20							
Thesis								
Research						Supervised		Project
Thesis	(Mrs.) C.O.	Lectures	Tutorials	Practicals	Field	work	Evaluation	work
	Osuagwu				trips			
Crodits: 10		_	_	_	_	15	4.00 h	135 00 h
		_	-	-	_	1.7	т.00 П	100.0011

# OBJECTIVE:

To conduct research in agroecology, demonstrating a comprehensive understanding of the subject matter and contributing to the advancement of knowledge in the field

# PROGRAMME:

Each student is expected to carry out an experiment on Agroecology depending on his or her core area or area of specialization and a well written thesis will be produced from the field experiment. The thesis will be vetted and examined by an external examiner from any of the partner University in West Africa.

# TEACHING METHODS:

- Seminars
- practicals

# PREREQUISITES:

Basic knowledge in general agriculture, biology, experimental design and biometrics

# EVALUATIONS DETAILS:

Seminar presentation of thesis 20% of 100% Oral defense of thesis 50 of 100%





Examination of thesis 30 of 100%





# Annex 2.2 Syllabus of the FEDERAL UNIVERSITY OF AGRICULTURE ABEOKUTA (FUNAAB), Nigeria

Semester 1

Total of Credits	Contact h	ontact hours								
Credits: 17	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work			
	210.00 h	45.00 h	90.00 h	-	45.00 h	31.00 h	480.00 h			

#### Detailed courses and Credits Compulsory Agroecology Courses

Course 1:	Adewale							
Agroecology Systems and Practices 1	Dipeolu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		30.00h	15.00 h	30.00hr	-	15.00 h	5.00 h	90.00 h

#### **OBJECTIVE**:

To identify and understand the fundamental processes that underpin agroecological systems and their relevance to the pursuit of food sustainability

# **PROGRAMME**: - Agroecology Systems and Practices 1

This course is concerned with identifying and understanding the fundamental processes that underpin agroecological systems and their relevance to the pursuit of food sustainability. Students will study various agricultural systems involving interactions between crops, livestock, agroforestry, aquatic organisms, and technological equipment in multiple combinations with the ecological, economic, cultural norms, marketing, and social dimensions that characterize the agroecological approach. An overview of agroecological principles and techniques, elements of agroecology, historical development, and global perspectives. Diversified agroecological systems - Introduction into different disciplinary aspects of the production and function of agroecosystems. Evaluation of interactions between farming practices and the social-ecological conditions in a holistic food system context and interaction of other formal or informal institutions that influence decision-making in production systems.

#### TEACHING METHODS:

- Classroom lectures - Group work projects/ Literature study

Tutorials/Instruction

- Field trips / Fieldwork

# PREREQUISITES:

Basic knowledge of agriculture, agricultural policies, and ecology.

# EVALUATIONS DETAILS:





The evaluation will be by continuous assessments (including a series of individual & group assignments, projects/term papers, and class presentations / debate that would be graded as well as a written mid-semester test) and final examination.

Course 2:	Osunsina							
Climate	Israel					Cupandaad		Ducient
Change and						Supervised		Project
Global Food		Lectures	Tutorials	Practicals	Field	WOIK	Evaluation	WUIK
Systems					trips			
Credits: 3	-	30.00h	15.00 h	30.00h	-	15.00 h	5.00 h	90.00 h

**OBJECTIVE: 1.** To learn about the concept of climate change, food security, their interlinkages, and impacts on food and farming systems.

1. To prepare and present a poster about a selected topic related to climate change

**PROGRAMME:** Climate Change and Global Food Systems

This course will deal with an overview of the concept of climate change, food security, and their interlinkages. Impacts of climate change on food and farming systems. Promotion of agroecology for climate resilient agriculture. Adaptation of farming practices to climate change impacts. Clean energy and carbon sequestration techniques in agriculture. Students will study the assessment and minimization of environmental impacts of climate change on production systems; climate change adaptation and mitigation initiatives and, sustainability relationships between agriculture and ecosystems. Weather events and their effects on food systems. Analyzing the impacts of climate change on agricultural systems. Role of cover crops in climate resilience. Enhanced ecosystem resilience and stability, biodiversity, and genetic resources preservation. Integrated farming systems and biodiversity conservation. Students will be trained on natural resource management, climate-smart agricultural practices implementation, minimizing waste and reducing environmental impacts, promoting biodiversity, and developing action plans for implementing climate resilience strategies.

# TEACHING METHODS:

- Classroom lectures
- Class debates and group project work
- Tutorials/Instruction / Fieldwork

**PREREQUISITES:** Basic knowledge of agriculture, agricultural policies, and ecology.





Course 3:	Ozoje							
Statistics and	Michaol				Field	Supervised		Project
Research	MICHAEL	-				Superviseu		Project
Methodology		Lectures	Tutorials	Practicals	trips	WOLK	Evaluation	WOFK
Credits: 3		30.00h	15.00 h	30.00h	-	15.00 h	5.00 h	90.00 h

1. To provide key statistical measures used to explain and draw inferences on the outcome of agroecological research.

2. To enhance decision-making and interpret results effectively in agriculture based on statistical data

3. Promote Efficiency and Productivity in Agriculture Through Research and Statistics

#### **PROGRAMME -** Statistics and Research Methodology

This course serves as a cornerstone for understanding the application of scientific principles in agricultural practices. It gives the groundwork for students to apply scientific methodologies in agricultural experimentation. Students will delve into the fundamental concepts that underpin agricultural experiments and statistical analysis in the field of agricultural science. This course deals with the ability to design data collection and perform statistical analysis to a modern standard in scientific disciplines spanning ecology, agriculture, and environmental science. Students will develop the ability to match evidence generated by statistical analysis to research objectives. The course delves into the interpretation of experimental results, emphasizing the computation of simple measures of central tendency and drawing meaningful conclusions. By fostering a deep understanding of research principles and statistical techniques, this course empowers students to contribute meaningfully to the advancement of agricultural science and innovation.

#### TEACHING METHODS:

- Classroom lectures
- Group work projects/ Literature study
- Debates / Tutorials/Instruction

**PREREQUISITES:** Basic knowledge of agriculture and statistics

#### EVALUATIONS DETAILS:-





# **Option compulsory courses**

#### a. Crop and Mechanization

Course a.1:								
Cropping Systems and Plant Health Management	Olowe Victor	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 2		30 h	-	-	-	-	4 h	60 h

**OBJECTIVE: 1**. To produce innovative, and well-equipped graduates capable of addressing food insecurity from agroecological perspectives and solving field problems in agriculture.

2. To demonstrate that it is possible to maintain the integrity of the environment and biodiversity while protecting the plants against pests and diseases.

Course a.1: Cropping Systems and Plant Health Management

The course gives an overview of the historical development of agroecology, terms and definitions of concepts, agroecological practices, plant interactions, types of cropping systems, agronomic considerations, mixture productivity measurements, scaling up agroecology for food sovereignty and resilience, seed systems conservation, management and regeneration of diverse species, research methods in agroecological cropping systems, ten elements of the agroecological framework, system analysis, innovation in agroecology. Definition of pests; pests of major local crops; effects of diseases caused by: viruses, bacteria, fungi, and nematodes. Control of the diseases; advantages and limitations of different pest assessment and control methods. Students are expected to learn the principles and practices of Organic pest management; companion planting; Organic pesticides; beneficial organisms; ecosystem processes and biological functioning; and preventive measures to keep off pests and diseases.

# TEACHING METHODS: - Classroom lectures

Class debates and group project work

Tutorials/ case studies/ Instruction /Field visits to farms with crops and livestock.

Interview with a farmer developing food self-sufficiency for the herd and food crops.

**PREREQUISITES:** Basic knowledge of Crop Science and general agriculture, agricultural policies, and ecology.





Course a.2: Agrometeorological Modelling and Crop Akee Yield Prediction	kinde eem I	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 2	-	30 h	-	-	-	-	4 h	60 h

**OBJECTIVE:** 1. To study crop weather relationships in all important crops and forecast crop yields based on agro-climatic and spectral indices using remote sensing.

2. To learn how the crop growth model simulates physical crop growth processes and finally estimates the resulting yield.

**Programme:** Agrometeorological Modelling and Crop Yield Prediction

The course provides a critical evaluation of crop and agro-meteorological models developed for the prediction of crop production and agricultural operations, methods for climatological analysis and classification, and physiological and correlative approaches to modelling the impact of meteorological variability on crop yield. The layout of the Agrometeorological station and installation for on-farm research. Yield predictions under conditions of uncertainty. The course will give an overview of the climatic resources of a given area for effective crop planning. How to evolve weather-based effective farm operations. Importance of crop weather relationships in all vital crops and forecast crop yields based on agroclimatic and spectral indices using remote sensing. Students will learn the influence of weather on the soil environment on which the crop is grown and the influence of weather in a protected environment to improve their design and increase crop production.

# TEACHING METHODS:

Classroom lectures, Class debates, and group project work

Tutorials/ case studies/ Instruction

practical work, group work,

class debates, field trips, literature review, and presentations.

**PREREQUISITES:** Basic knowledge in Crop Science and general agriculture, agricultural policies, and ecology.





#### b. Livestock Systems Agroecology

Course b.1	Sowande							
Agroecology	Olusiji,				Field	Supervised		Proiect work
and	Fasae				trips	work		
Livestock	Oladapo	Lectures	Tutorials	Practicals			Evaluation	
Production	oludupo							
Systems								
Credits: 2		30 h	-	-	-	-	4 h	60 h

**OBJECTIVE:** To understand the principles and application of agroecology to livestock production.

2. To explore sustainable practices that support food security, local economies, and biodiversity.

3. To innovate recycling and waste management methods while incorporating human, social, and cultural values in farming practices.

**PROGRAMME:** Agroecology and Livestock Production Systems

This course introduces students to agroecological principles as they relate to livestock production in Nigeria. It explores the integration of ecological, social, and cultural aspects in developing sustainable and resilient livestock systems that support biodiversity, local economies, and community health. The course combines theoretical learning with practical case studies to foster a comprehensive understanding of agroecology's role in livestock production. Overview of livestock production in agroecosystems and its socio-economic impacts. Importance of genetic, species, and functional diversity. Integrating livestock with crop systems to maximize land and resource use for sustainable ecosystem. Students are introduced to efficient feeding, water use, and energy management in livestock systems with minimal environmental impact. Waste recycling strategies: manure composting, biogas, nutrient cycling and reintegration of waste into production. Resilient livestock systems that withstand climate change and economic fluctuations. Risk management and adaptive practices in Nigerian livestock systems. Case studies on cooperative models and fair trade in livestock markets.

**TEACHING METHODS:** - Classroom lectures

Class debates and group project work

Tutorials/ case studies/ Instruction

Field trips / Guest speakers

**PREREQUISITES:** Basic knowledge in animal Science, general agriculture, and ecology.





Course b.2: Environmental Physiology and Health	Abioja, Monsuru	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Management in Farm Animals	Adubi Olubukola							
Credits: 2		30 h	-	-	-	-	4 h	60 h

**OBJECTIVE:** 1. To understand the physiological responses of farm animals to varying environmental factors.

2. To explore the role of agroecology in promoting sustainable health management practices, animal welfare, farm efficiency, and resilience.

3. To develop strategies that leverage local knowledge, cultural practices, and community participation in animal health management.

**PROGRAMME** - Environmental Physiology and Health Management in Farm Animals. This course examines the principles of environmental physiology and its application to health management in farm animals, emphasizing agroecological practices suited to Nigeria's unique agricultural and environmental context. Students will learn how to foster sustainable livestock systems that align with environmental, social, and economic values. The course focuses on livestock physiological adaptations to various environmental conditions. Impacts of climate change on animal physiology. Physiological and behavioural responses. Resilient health management strategies to safeguard livestock in the face of environmental stressors. Efficient resource use (water, feed, and energy) to maximize animal health outcomes with minimal ecological footprint. Integrating animal welfare standards and ethical treatment of animals to promote social values within livestock management systems. Traditional and ethnoveterinary practices that enhance animal health. Discussion on policies that support sustainable livestock production and animal welfare regulations.

**TEACHING METHODS:** - Classroom lectures

- Class debates and group project work

- Tutorials/Instruction/ Case studies / Field work

**PREREQUISITES:** Basic knowledge in animal Science and general agriculture, agricultural policies, and ecology.





#### c. Agribusiness and Sustainable Food Systems

Course c.1: Sustainable Agrifood System	Adewale Dipeolu				Field trips	Supervised work		Project work
Development and Policy	- <b>F</b>	Lectures	Tutorials	Practicals			Evaluation	
2 Credits (NG)		30 h	-	-	-	-	4 h	60 h

**OBJECTIVE:** To equip students with the knowledge and tools required to apply systems thinking to analysis of complex agriculture and food (agrifood) system challenges in an integrated manner, and to designing appropriate policy and strategies to promote sustainable agrifood system development.

#### PROGRAMME:

This course focuses on economic principles and tools needed to apply systems thinking to analysis of complex agriculture and food (agrifood) system challenges in an integrated manner, and the use in designing appropriate policy and strategies to promote sustainable development of agrifood systems. Topics include introduction to sustainable agrifood system; concepts and analytical framework for a sustainable agrifood system; Systems thinking in sustainable agrifood systems development; Operational approaches to sustainable agrifood systems development. The economics of sustainable agrifood system policies for producers, consumers, and taxpayers. Policy interventions for promoting sustainable agrifood system development, including their motivations, policy instruments and consequences for factor owners and related commodity markets.

**TEACHING METHODS**: Class Lectures / Oral Presentations in Class Seminars

Assigned readings and literature review

Individual and Group Assignments / Project Work

# PREREQUISITES:

Basic knowledge of agriculture and food system in Africa, and familiarity with the development challenges in the Agriculture, Forestry, and Other Land Use sector

# EVALUATIONS DETAILS:





Course c.2: Ecological Economics	Adebayo Shittu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
2 Credits (NG)		30 h	-	-	-	-	4 h	60 h

**OBJECTIVE:** To introduce students to the core concepts and tools of ecological economics, aiming to prepare them to understand, analyze, and manage the environmental and social dimensions of economic activity particularly in agriculture.

# PROGRAMME:

This course focuses on the core concepts and tools of ecological economics, aiming to prepare students to understand, analyse, and manage the environmental and social dimensions of economic activities within agriculture & food systems. The course is structured under three key courses/sections. The first, "Introduction to Ecological Economics," covers key economic concepts, principles, and tools and their applications; the history of economic thoughts and contemporary perspectives; and Development Challenges in a globalizing World. The second course, "The sustaining and containing ecosystem" presents the ecosystem as a whole, including ecosystem goods and services, the biotic and abiotic resources; and the circular flow model from ecological economics," perspectives. The third course, "microeconomic foundations of ecological economics," presents key microeconomic analytical tools for market-based decision analysis, highlighting their uses and limitations. Key topics include the basic market equation, supply and demand analysis, market failure, non-market valuation techniques, Social Cost – Cost-benefit analysis; and market & non-market policy instruments for addressing market failure.

# TEACHING METHODS:

Class Lectures/Oral Presentations in Class Seminars

Assigned readings and literature review

Individual and Group Assignments

**PREREQUISITES**: Background knowledge of microeconomics.

# EVALUATIONS DETAILS:





#### d. Natural Resources and Environment

Course d.1								
Agroforestry Component	Ojekunle Olusevi				Field trips	Supervised work		Project work
Interactions	Oyebamiji	Lectures	Tutorials	Practicals			Evaluation	
Credits: 2	Noah,	30 h	-	-	-	-	4 h	60 h

#### **OBJECTIVE:**

1. To understand the role of trees in the farming system.

2. To explore the ten elements of agroecology and their applications in agroforestry environment.

#### PROGRAMME: Agroforestry Component Interactions

This course introduces students to Agroforestry principles within the agroecology framework, emphasizing sustainability, environmental stability, food production, and ethical, and locally adapted value systems. Students will learn how agroforestry concepts help in adaptation, biodiversity management, and farming system stability with man, animals, and the environment as the main focus. Through theoretical and practical approaches, the course examines the role of agroforestry in shaping resilient and sustainable agroecological systems. It introduces students to the definition, productive and service roles, biological characterization, and genetic evaluation of Multipurpose trees. It gives an overview of the selection of tree/crop/fodder combinations, factors to be considered, tree crops, crops, animal classes, and types of pastures. Students will learn different systems to optimize positive interactions between biological components like trees, shrubs, and crops. Students will learn the component interaction in different ecological zones, trees/crops/pastures/animals, and positive and negative interactions. Nutrient cycling in component systems dynamics of crop residues, animal waste, coppicing nitrogen fixation, etc. The course covers case studies of tree/crop/pasture/animal component combinations

#### TEACHING METHODS:

Lectures, case studies, group discussions, field visits, and guest lectures experts.

# PREREQUISITES:

Basic knowledge in general agriculture, Agroforestry, agricultural policies, and ecology.

# EVALUATIONS DETAILS:





Course d.2:	Abdulraheem							
Aquatic	Ikililu				Field	Supervised		Project
Ecology	Ojelade	Lectures	Tutorials	Practicals	trips	work	Evaluation	work
	Oluwaseun							
Credits: 2		30 h	-	-	-	-	4 h	60 h

1. Ability to characterize aquatic production system requirements for optimum production

- 2. Determine the best physical and chemical requirements for different production cycles
- 3. Be able to identify aquatic biodiversity present in a production system and their uses.

#### PROGRAMME: Aquatic Ecology

This course intends to acquaint students with the knowledge of aquatic environment biology as it affects the welfare, growth, and performance of Fish and other aquacultures. It explores the production processes and procedures of aquatic organisms in a sustainable and resilient ecosystem that supports biodiversity. The course outlines the biodiversity, quality, and quantity of freshwater. It deals with the concepts of aquatic ecology - life cycles, habitat needs of fish, habitat components, and seasonal movements. Efforts to mitigate pollution and improve aquatic ecosystems classification and characteristics of aquatic ecosystems. Management approaches and technologies are also covered to restore and sustainably develop aquatic environments. The Physio-Chemical parameters of different aquatic environments, plankton, and benthos in various Aquatic ecosystems. Primary and Secondary Production, Energy budget, limiting factors controlling fish production in various Ecological systems. Fish husbandry. Inland and Marine fisheries resources migration and resource distribution.

# TEACHING METHODS:

Lectures, case studies, group discussions, field visits, and guest lectures from.

# PREREQUISITES:

Basic knowledge in general agriculture, aquaculture, and ecology.

# EVALUATIONS DETAILS:





#### Semester 2

Total of Credits	Contact ho	ours					Project work
Credits: 17	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	210.00 h	45.00 h	90.00h	-	45.00 h	31.00 h	480.00 h

Course 4:	Petra							
Gender Equality	Saahir				Field	Supervised		Project work
and Social	Sayını				tring	work		
Inclusion in		Lectures	Tutorials	Practicals	uips	WUIK	Evaluation	
Agrifood								
Systems								
Cradits: 3	-	30 h	_	_	_		4 h	60 h
Cieuits. J		100	-				т II	00 11

# OBJECTIVE:

1. To equip students with an understanding of the theoretical concepts of gender equality and social inclusion in agrifood systems.

2. Enable students to analyze the roles and contributions of different genders and marginalized groups within agricultural value chains.

Develop skills to apply gender-responsive and socially inclusive frameworks in the design and implementation of agricultural policies and programmes.

# **PROGRAMME:** Gender Equality and Social Inclusion in Agrifood Systems

The course provides an in-depth exploration of Gender Equality and Social Inclusion (GESI) in agrifood systems. It focuses on equal access to resources and inclusionary formal and informal institutional norms and agribusiness practices. The agrifood system, which involves the production, processing, distribution, and consumption of food, presents many gender-based and social inequalities that can impact sustainable agricultural practices and rural development. This course focuses on understanding and addressing these inequalities through gender-responsive and inclusive approaches to policy, practice, and development interventions. An overview on introduction to gender equality and social inclusion, gender roles and social dynamics, access to resources and gender-based inequalities, policy and programmematic approaches to GESI, tools for gender equality and social inclusion with case studies and application in agrifood systems. Students will learn to develop solutions and strategies to promote gender equality and inclusion in agrifood systems through case study analysis.

# TEACHING METHODS:

Classroom lectures

- Class debates and group project work





- Tutorials/Instruction/ Field work

**PREREQUISITES:** Basic knowledge of agriculture, agricultural policies, and ecology.

# EVALUATIONS DETAILS:

Course 5:	Aiyelaagbe							
Agroecology and Organic Agriculture	Isaac Fasae Oladapo	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		30.00h	15.00 h	30.00h	-	15.00 h	5.00 h	90.00 h





**OBJECTIVE:** To learn about agroecology and organic agriculture strategies and principles

To present an organic farming system and discuss it with other students.

# **PROGRAMME:** Organic Agriculture

An overview of agroecology and organic agriculture strategies. Role and principles of organic agriculture within agroecology. Strengths and limitations of agroecology and organic agriculture in food systems, production resilience, and socio-environmental governance. Integration of organic management practices with conservation agriculture techniques. Biodiversity benefits of organic farming and agroecology as a holistic approach to promote the use of diverse crop and animal species in an environmentally sensitive manner while maintaining profitability. Crop diversification and soil management to reduce the use of external inputs. Ecosystem services - biological pest control, nutrient cycling, and hydrological services. Role of pollinators and other beneficial organisms in managing pests and diseases in crop and livestock using agroecological principles. Regulation of feeding standards in livestock, characteristics of feed resources, grazing management, manure management, and ethnoveterinary measures. Organic and Agroecology transitioning, conversion, and certification. organic waste utilization, organic products, marketing, and recordkeeping.

# TEACHING METHODS:

- Classroom lectures

Group work projects/ Literature study

Tutorials/Instruction

Field trips /Fieldwork

**PREREQUISITES:** Basic knowledge of agriculture, organic agriculture, and ecology.

Course 6:								
Circular	Chi++				Field	Supervised		Droject
Bioeconomic and	Shittu				trips	Supervised		Project
Sustainable	Adebayo	Lectures	Tutorials	Practicals	uips	WOIK	Evaluation	WOIK
Livelihoods								
Credits: 3		30.00h	15.00 h	30.00h	-	15.00 h	5.00 h	90.00 h





**OBJECTIVE:** 1. To implement Sustainable Strategies and Understand the Circular Bioeconomy and energy management.

2. To learn to develop core managerial skills and sustainable development goals  $\cdot$ 

**PROGRAMME:** AGY 806: Circular Bioeconomic and Sustainable Livelihoods

Concept of circular bioeconomy; Ethics, drivers, and opportunities of a circular bioeconomy. Bioeconomy for sustainable food and agriculture. An overview of biomass as the basis of the food system and future bioeconomy. Ecological principles to guide biomass use towards a circular bioeconomy. Innovative processes to produce biomaterials and bioenergy, consumption minimization of virgin and waste resources in improving livelihoods. Bio circular economy concept and industrial and restorative or regenerative ecology. Bioeconomy products. Overview of a nature-powered economy. Economic model on the use of renewable natural capital, replacement mode of non-renewable, fossil-based products currently in use. Traditional and Indigenous knowledge, knowledge co-creation, issues of governance; social behaviour, and markets. Students will be taught the basic implementation of sustainable strategies and understand circular bioeconomy as well as the socio-economic considerations and policy frameworks supporting sustainable agriculture and advocacy skills for promoting agroecology at various levels.

# TEACHING METHODS:

Classroom lectures

Class debates and group project work

Tutorials/Instruction

**PREREQUISITES:** Basic knowledge of agriculture, agricultural policies, and ecology.





#### **Option compulsory courses**

#### a. Crop and Mechanization

Course a.3:	Senjobi,							
Tropical Soil	Polarinua				Field	Supervised		Droject
Conservation and	DULAI II IWA				rielu	Supervised		Project
Mechanized	Olayanju	Lectures	Tutorials	Practicals	uips	WUIK	Evaluation	WOIK
Agroecosystems	Adeniyi							
Credits: 2		30.00 h	-	-	-	_	4 .00h	60.00 h

#### **OBJECTIVE:**

1. To understand soil-plant-machine interaction

2. To explore cropping systems about soil moisture and soil moisture determination and their effects on soil conservation.

3. To equip students with knowledge for the selection of machinery, their operations, and their uses on tropical farmland.

**PROGRAMME** Tropical Soil Conservation and Mechanized Agroecosystems

This course introduces students to soil water movement, soil aeration drainage, and plant growth. It focuses on drainage systems and selection; cropping systems about soil moisture and soil moisture determination. Students will learn about water erosion, wind erosion, sediments, and control. As well as evapotranspiration losses and control and its impact on crop yield. The objectives, methods, and equipment for land clearing and development will be examined and the selection of machinery, mechanics of operation and vegetation types, and land reclamation including earthmoving machinery and earthmoving mechanics will be carried out.

# TEACHING METHODS:

- Classroom lectures, Class debates and group project work

- Tutorials/ case studies/ Instruction
- Field visit and machinery training
- Interview with a farmer and Guest lectures from soil conservation experts.

# PREREQUISITES:

Basic knowledge in Crop Science and general agriculture, agricultural policies, and ecology.

# EVALUATIONS DETAILS:





Course a.4:	Makinde							
Horticultural	<b>Evitovo</b>				Field	Cupandicad		Draigst
Produce and Post-	Eyilayo,				rielu	Supervised		Project
Harvest	Odeyemi		Tutorials	Practicals	unps	WUIK	Evaluation	WOIK
Management	Olubukola	Lectures						
Credits: 2		30.00 h	-	-	-	-	4.00 h	60.00 h

- 1. To equip students with the knowledge of diverse characteristics of crop produce.
- 2. To prepare students to acquire skills in managing farm produce effectively for ultimate use.

**PROGRAMME:** Horticultural Produce and Post-Harvest Management

Ecological consideration for the cultivation of Organic Horticultural Crops, Agroecology and land preparation, crop establishment and management, Agroecology and Crop Protection – weeding, pests and diseases management, Soil fertility management and agroecology, Harvesting and Postharvest Management of horticultural crops. Record keeping. Definition of Produce, Scope of Horticultural produce; Environmental factors affecting produce cultivation, Definition of Postharvest; Importance of postharvest management; post-harvest management activities; Postharvest handling structures; Produce for Industrial Utilization. Students will be trained to establish farm plots of major classes of horticultural crops based on organic farm practices in the agro-ecology. Students to manage various produce of diverse farm plots from harvesting to utilization.

# TEACHING METHODS:

- Classroom lectures, Class debates and group project work
- Tutorials/ case studies/ Instruction
- practical work, group work,
- class debates, field trips, Literature reviews, and Presentations.

# PREREQUISITES:

Basic knowledge of Crop Science and general agriculture, agricultural policies, and ecology.

# EVALUATIONS DETAILS:





#### b. Livestock Systems Agroecology

Juc							
ladapo				Field	Supervised		Project
owande lusiji	Lectures	Tutorials	Practicals	trips	work	Evaluation	work
-	30 h	-	-	-	-	4 h	60 h
ไส วา ไเ	adapo wande usiji	adapo wande usiji 30 h	adapo wande Jsiji Lectures Tutorials 30 h -	adapo wande Jsiji Lectures Tutorials Practicals 30 h	adapo wande Jsiji Lectures Tutorials Practicals 30 h	adapoLecturesTutorialsPracticalsFieldSupervisedusiji30 h	adapoLecturesTutorialsPracticalsFieldSupervisedEvaluation30 h4 h

#### **OBJECTIVE:**

1. To understand the ecological role of livestock within agroecosystems.

2. To explore the ten elements of agroecology and their applications in livestock ecology.

3. To equip students with strategies for improving farm animal productivity, welfare, and environmental sustainability.

# PROGRAMME: Farm Animals Ecology.

This course focuses on the interaction between animal populations and their wider environment, the ecosystem. It emphasizes the principles of farm animal ecology within the concept of sustainable, ethical, and locally adapted livestock management in Nigeria. Students will learn concepts that apply to the interconnectedness of animals and their environment including their behaviour, distribution, abundance, and adaptation strategies. Relationship between animals, landscapes, and human communities. Species and breed diversity in livestock. Integrated agrosilvopastoral systems to maximize land and resource use for a sustainable ecosystem. Benefits of diverse ecosystems for disease resistance, productivity, and adaptability. An overview of livestock breed development that has characteristics to cope with sustainable resources. Animal welfare and behaviour management for enhanced ecological stability. Preservation of traditional practices. Discussion on policies impacting livestock production, environmental protection, and community-based governance.

# TEACHING METHODS:

-Classroom lectures

- Class debates and group project work
- Tutorials/Instruction/ Case studies
- Field work / Guest speakers

# PREREQUISITES:

Basic knowledge of Animal Science and general agriculture, agricultural policies, and ecology.

# EVALUATIONS DETAILS:





Course b.4	Dele							
Ecological Pasture	Peter,				Field	Supervised		Draiact
and Forage	0.1				Field	Supervised		Project
Management	Ojo Victoria	Lectures	Tutorials	Practicals	trips	WOrk	Evaluation	work
Credits: 2		30 h	-	-	-	-	4 h	60 h

1. To develop ecological principles in pasture and forage management and explore methods that harness pasture diversity for livestock health and ecological balance.

2. To learn the role of synergies in pasture ecosystems to maximize productivity

3. To understand how to build resilience into pasture systems, enabling adaptation to climate change and economic fluctuations.

**PROGRAMME:** Ecological Pasture and Forage Management

This course delves into the sustainable management of pastures and forage. Students will explore the interplay between diverse plant species and livestock. By focusing on the efficient use of resources and innovative recycling techniques. The delves into the importance of ecological pasture systems for livestock productivity and environmental sustainability. Strategies for enhancing plant diversity in pastures. Integrated livestock-forage systems that optimize ecosystem functions. Strategies and efficient practices for maximizing forage yield and quality with minimal external inputs. Nutrient cycling in pasture systems. Climate-adaptive strategies for maintaining pasture productivity under stress. Students will be trained on traditional knowledge and cultural practices in pasture management. Pastoralism and its role in promoting food sovereignty and cultural identity. Discussion on policies supporting sustainable pasture management and access to land. Value addition, local markets, and economic solidarity in pastoral communities.

# TEACHING METHODS:

-Classroom lectures

Class debates and group project work

Tutorials/Instruction/ Case studies

Field work, Guest speakers

**PREREQUISITES:** Basic knowledge in Animal Science and general agriculture, agricultural policies, and ecology.

# EVALUATIONS DETAILS:





#### c. Agribusiness and Sustainable Food Systems

Course c.3: Production and					<b>F</b>	<b>C</b>		Destaut
Operations					Field	Supervised		Project
Management in	Adebayo	Lectures	Tutorials	Practicals	trips	WOLK	Evaluation	WOLK
Agroecology	Shittu							
2 Credits		30 h	-	-	-	-	4 h	60 h

#### **OBJECTIVE:**

To introduces students to concepts, processes, and tools of production and operations management with focus on agroecology-based production systems.

#### PROGRAMME:

This course focuses on the application of production and operations management principles, methods, and tools in agroecology-based production systems and value-chains. Topics include introduction to production and operations management (concepts, processes, agroecology production system characteristics, and operations strategy development); agroecology product design and process development; agroecology farm site location and layout planning; improving production processes; quality management in operations; lean thinking; and supply chain management.

#### TEACHING METHODS:

Class Lectures Assigned readings and literature review Individual and Group Assignments / Project Work Oral Presentations in Class Seminars

#### PREREQUISITES:

Familiarity with agriculture and food systems.

#### EVALUATIONS DETAILS:





Course c.4: Agribusiness Management	R.A. Sanusi	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
2 Credits		30 h	-	-	-	-	4 h	60 h

**OBJECTIVE:** To introduce students to applying economic and management principles to the agribusiness firm with a specific focus on agroecology-based production systems.

# PROGRAMME: Agribusiness Management

This course exposes students to fundamental management principles, tools and techniques and their practical applications to agribusiness enterprises embracing agroecology. Topics shall include the concepts and scope of agribusiness management; decision environment & evaluation criteria; data gathering & record keeping for effective agribusiness management; agribusiness planning & budgeting; agroecology project appraisal & investment analysis; raising and managing financial capital; product marketing; and leadership & personnel management, among others. Students shall undertake a case study of selected farms practising agroecology and their business model.

# TEACHING METHODS:

Class Lectures Assigned readings and literature review Individual and Group Assignments Oral Presentations in Class Seminars

# PREREQUISITES:

Background knowledge of microeconomics.

# EVALUATIONS DETAILS:





#### d. Natural Resources and Environment

Course d.3:	Jaiyeola							
Control and	Omotolo				Field	Cupandicad		Draiact
Management of	Omotota				Field	Supervised		Project
Ecological	Oguntobe	Lectures	Tutorials	Practicals	unps	WOIK	Evaluation	WOIK
Disasters	Olusegun,							
Credits: 2		30 h	-	-	-	-	4 h	60 h

#### **OBJECTIVE:**

1. To Identify various ecological disasters, their implications, management, and prevention on Agroecological productivity.

2. To explore sustainable practices with ecological disaster control and mitigation measures that support food security, local economies, and biodiversity conservation.

3. To innovate integrated farm practices exemplifying recycling and waste management methods while incorporating human, social, and cultural values Agricultural value chain 4. Examine and support policy frameworks that promote Prevention, control and management of ecological disasters in agroecological practices

# **PROGRAMME:** Control and Management of Ecological Disasters

The course gives an overview of types of ecological disasters, their prevention and mitigations, and control when they occur It focuses on the implications of different ecological disasters to agroecological projects. Students will learn about engineering design and landscape management principles to prevent disasters as well as identification of man-made features that can prevent disasters from being avoided. Students will learn about ecological concepts, their application to disaster management, and strategies that disaster management professionals implement to protect vulnerable communities and limit hazards. Identification of ecological problems in the Niger Delta Area. (b) Soil erosion areas of Southern Nigeria (c) Desertification areas of Northern Nigeria. The course gives strategies for mitigation and prevention mechanisms and efforts to reduce the potential damage and suffering that disasters can cause, as well as plans to minimize the agricultural community's vulnerability to disasters. Management of ecological disaster in Nigeria: the role of Individual, government, non-governmental organizations and multi-national companies.

# TEACHING METHODS:

Lectures, case studies, group discussions, field visits, and guest lectures.

# PREREQUISITES:

Knowledge in general agriculture, Environmental management, and ecology.

# EVALUATIONS DETAILS:





The evaluation will be by continuous assessments (including a series of individual & group assignments, projects/term papers, and class presentations / debates that would be graded as well as a written mid-semester test) and final examination.

Course d.4:	Adeofun							
Environmental	Clement				Field	Supervised		Droject
Impact Assessment					Field	Supervised		Project
and Auditing	Jaiyeola	Lectures	Tutorials	Practicals	trips	work	Evaluation	work
	Omotola							
Credits: 2		30 h	-	-	-	-	4 h	60 h

#### **OBJECTIVE**:

1. Equip the students with the required skill to carry out surveys to determine the fitness and suitability of an agroecological system project in a particular environment.

2. It intends to follow the international environmental assessment template for

agroecological projects, taking into consideration the peculiarity of different landscapes.

#### PROGRAMME: Environmental Impact Assessment and Auditing

This course introduces students to the principles of analyzing scenarios around agroecological projects to determine how eco-friendly, suitable, and sustainable they will be within the context of social, economic, cultural, and anthropological values, emphasizing, ethical, and locally adapted management principles in different ecosystems. Students will learn how to carry out surveys that will lead to making informed decisions about the project's necessity focusing on the interconnectedness of Man, environment, and Production. Students are taught to interpret and communicate information about the impact, analyze site and process alternatives, and provide solutions to sift out or abate/mitigate the negative consequences on man and the environment. Through theoretical and practical approaches, the course will examine different agroecological concepts and their suitability for establishment at a time. The course deals with impact prediction, evaluation and mitigation, monitoring, and auditing. Students are exposed to environmental Impact Assessments of other Development Projects - New Farm Settlements, tourism projects; Road Networks, Electricity Generation, etc. Improving the effectiveness of project assessment. Strategic Environmental Assessment.

#### TEACHING METHODS:

Lectures, case studies, group discussions, field visits, and guest lectures.

# PREREQUISITES:

Knowledge in general agriculture, Environmental management, and ecology.

#### EVALUATIONS DETAILS:









#### Semester 3

Total of Credits	Contact ho	Project work					
Credits: 14	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	-	45.00 h	-	-	145.00 h	16.00 h	300.00 h

Course 7: Group	,All Faculty							
Project	Members				Field	Supervised		Project
		Lectures	Tutorials	Practicals	trips	work	Evaluation	work
Credits: 6		-	30.00 h	-	-	30.00 h	4.00 h	60.00 h

#### OBJECTIVE:

To deal with a topic in a real-life project and to respond to the demands of an external client or a research project. To organise a group work

To self-reflect on student's on role and work in the group work.

PROGRAMME: Group work Project (2 Credits)

The group work offers students the opportunity to be involved in real-life projects, group work during the whole semester, responding to a demand from an external client, and using different methodological and project management tools (defining leadership, schedule, and deliverables). Students will have the opportunity to discuss and write a group report containing descriptions, analyses, and suggestions for improving agroecological situations for their clients. The students will also write an individual learner document containing a description and reflection on the experiences from the casework and their links to relevant theory.

# TEACHING METHODS:

Case studies, group discussions, field visits.

# PREREQUISITES:

No particular pre-requisites as topics of group work vary considerably.

#### EVALUATIONS DETAILS:-





Course 8	All Faculty							
Seminar I	Members				Field	Supervised		Project
		Lectures	Tutorials	Practicals	trips	work	Evaluation	work
Credits: 2		-	15.00h	-	-	15.00 h	4 .00h	30.00
								h

To enable candidates to present a formal half-hour seminar on their work plan and state of scientific knowledge in the chosen area of research

#### **PROGRAMME:** Seminar I (1 Unit)

Students will present a seminar before embarking on their research work, candidates shall be expected to present a formal half-hour seminar on their work plan and state of scientific knowledge in the chosen area of research. The research work should normally start after certification of the soundness and practicability of the project by the programme-domiciled center and should be guided by suggestions raised at the seminar.

# TEACHING METHODS:

Case studies, group discussions, field visits.

#### PREREQUISITES:

Basic knowledge in general agriculture and ecology.

# EVALUATIONS DETAILS:

The evaluation will be by continuous assessments (including a series of individual & group assignments, projects/term papers, and class presentations/debates that would be graded as well as a written mid-semester test) and final examination.

Course 9 Internship	All Faculty Members	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 6		-	-	-	-	100.00 h	8.00 h	120.00 h

# OBJECTIVE:

- 1. To allow students to gain work experience in a company related to Agroecology.
- 2. Skilled to understand the notion of applied research supporting individual farms or a certain farming sector.

**PROGRAMME:** Internship (3 Credits)





The internship offers the student a unique opportunity to gain work experience in a company related to Agroecology. Training on how to demonstrate cooperation, understanding, and practical benefit of the daily operations in the company. Involvement in a mutually useful work relationship of learning opportunities. Demonstrate the importance of responsibility and personal interactions to the success of a career. Skilled to understand the notion of applied research supporting individual farms or a certain farming sector. Knowledge and skills related to research methodologies and the analysis of farming systems.

#### TEACHING METHODS:

Case studies, group discussions, field visits.

#### PREREQUISITES:

Basic knowledge in general agriculture and ecology.

#### EVALUATIONS DETAILS:

The evaluation will include a series of individual and group assignments, projects/term papers, and presentations/debates that would be graded.




### Semester 4

Total of Credits	Contact	hours					Project work
Credits: 14	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	-	15.00 h	-	-	45.00 h	12.00 h	900.00 h

Course 10:	All Faculty							
Seminar II	Members				Field	Supervised		Project
		Lectures	Tutorials	Practicals	trips	work	Evaluation	work
Credits: 2		-	15.00h	-	-	15.00 h	4 .00h	60.00 b

### **OBJECTIVE:**

To enable the students to deliver an hour-long seminar on the results obtained.

## PROGRAMME:Seminar II (1 Unit)

At the end of the research project, the candidate shall deliver another one-hour seminar on the result obtained. The departmental board of Examiners will certify the seminar as satisfactory before a student can proceed to write up his/her thesis. This seminar shall be based on the outcome of the undertaken research project related to agroecology under the guidance of the Supervisor(s).

## TEACHING METHODS:

Case studies, group discussions, field visits.

## PREREQUISITES:

Basic knowledge in general agriculture and ecology.

## EVALUATIONS DETAILS:

The evaluation will be by continuous assessments (including a series of individual & group assignments, projects/term papers, and class presentations / debates that would be graded as well as a written mid-semester test) and final examination.

Course 11	Project work							
Master Thesis	supervisors				Field	Supervised		Project
		Lectures	Tutorials	Practicals	trips	work	Evaluation	work





Credits: 6	-	-	-	-	30.00 h	8.00 h	840.00
							h

**OBJECTIVE:** Ability of the student to conduct rigorous research, analyze data, and present their findings coherently and structured concerning agroecology.

## **PROGRAMME:** Master Thesis (6 Credits)

The primary objective of this course is to assess students' depth of understanding, knowledge, and competence in agroecology. A student is intended to demonstrate the ability to conduct rigorous research, analyze data, and present their findings coherently and structured concerning agroecology. The dissertation will study the impact of a participatory agroecological intervention in a sustainable farming system. The student's outcome on a detailed understanding of basic and applied agroecology and the issues associated

### TEACHING METHODS:

Case studies, group discussions, field visits.

## PREREQUISITES:

Basic knowledge in general agriculture and ecology.

### EVALUATIONS DETAILS:

The evaluation will include a series of individual group assignments, projects/term papers, and presentations/debates that will be graded.





# Annex 2.3 Syllabus of the UNIVERSITY OF ENERGY AND NATURAL RESOURCES (UENR), Ghana

Semester 1

Total of credits	Contact h	ontact hours							
credits: 18	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work		
	156.00 h	-	48.00 h	30.00 h	-	-	-		

Course 1: Sustainable Crop Production	Dr. Kwadwo Gyasi Santo	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	8h00 h	5.00 h	.00 h	.00 h	.00 h

## **OBJECTIVE:**

To equip students with knowledge and skills in sustainable crop production.

## PROGRAMME:

Common principles and practices associated with sustainable crop production from ecological, economic, social, and ethical perspectives; Sustainable crop production practices (mulching, safe use of mineral and organic fertilisers, cover cropping, crop residue management, provision of windbreaks. The concept of agroecology as an integrated approach to sustainability; soils, nutrients and their management; climate, weather and water. Establishing of an agroecology farm; integrated rice and fish sytems, integrated crop-livestock production. Integrated farming; mixed farming (e.g., crop-livestock), long crop rotation (minimum four different crops), spatial crop diversity, minimum soil cultivation, use of cultivars resistant to abiotic and abiotic stresses, modifications to sowing times, targeted application of nutrients; application of organic manures, rational use of pesticides, IPM, managing of field margins, and setting up ecological infrastructure (3–5% of cropping area for nonagricultural vegetation). Impacts of climate change on crops; sustainable cropping, systems (fallows systems, strip cropping, multiple cropping, contour strip cropping, crop rotations, alley farming, intercropping, afforestation, re-afforestation, agroforestry systems, organic farming etc) and their impacts on biogeochemical cycles; sustainable management of agricultural wastes (compost-making); climate smart agriculture.

## TEACHING METHODS:

Lectures, case studies, seminars, practical field work in agroecology farm, group work and field trips.

# PREREQUISITES:





No particular pre-requisites for this course.

## EVALUATIONS DETAILS:

-End of course 1: Written examination and oral presentations for grading.

Course 2: Integrated Pest Management	Dr. Abdulai Muntala	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	13:00 h	.00 h	.00 h	.00 h	.00 h

### **OBJECTIVE:**

To train students on the application of integrated pest management principles under agroecology and food systems.

### PROGRAMME:

Overview of pest management principles; exploration of natural pest control agents; analysis of pesticide resistance; cultural practices affecting pest populations and plant health; utilization of biological control methods; assessment of chemical control impacts on the environment; exploration of host plant resistance; regulatory frameworks; economic decision models in pest management; ecological strategies for pest control; biotechnological advancements in pest management; addressing global challenges in pest management practices. Concept of Integrated Pest Management (IPM); role of ipm in sustainable agriculture; pest identification; setting an action threshold; monitoring; prevention; control. IPM benefits and case studies on IPM.

### TEACHING METHODS:

Lectures, seminars, case studies on IPM, practical work, group work, and field trip.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 2: Written examination and oral presentations for grading.





Course 3: Soil								
Fertility and Sustainable Land	Dr. Samuel					Supervised		Project
Management	Kwesi Asomaning	Lectures	Tutorials	Practica	Field	work	Evaluatio	work
	5			ls	trips		n	
credits: 3		26.00 h	.00 h	8:00 h	5.00 h	.00 h	.00 h	.00 h

To equip students with knowledge and skills in soil fertility and sustainable land management practices.

## PROGRAMME:

General concept of soil fertility and productivity; fertility of tropical soils; soil organic matter, its properties and maintenance, liming and its soil-plant relationships; factors affecting the ability of the soil to supply nutrients in available forms; essential nutrients: source of supply, physiological roles, relative quantitative requirements, availability categories, forms and amounts in soil and plant; fertiliser production and fertiliser management, types and sources of fertilizer, application methods, rates and timing, handling and storage; crop growth and responses to soil nutrients, nutrient absorption, maintenance and loss in soil fertility in extensive and intensive agriculture; Manures and organic wastes; Composition, general properties, use of manure, and management, use of sewage sludge and waste water; soil sampling and analysis; The fate of applied nutrients as commercial fertilisers and manure; Techniques for soil fertility evaluation and the development of suitable fertiliser recommendations and nutrient management plans.

Concept of Sustainable Land Management (SLM); cropland, grassland, woodland and forest areas use and degradation effect on productivity, ecosystem functions, biodiversity and water resources, and vulnerability to climate change. Principles of SLM; land-user-driven and participatory approaches; integrated use of natural resources at ecosystem and farming systems levels; multilevel and multistakeholder involvement; and targeted policy and institutional support, including development of incentive mechanisms for SLM adoption and income generation at the local level.

## TEACHING METHODS:

Lectures, seminars, practical work, group work, field trip, and laboratory work

## PREREQUISITES:

No particular pre-requisites for this course.

## EVALUATIONS DETAILS:

-End of course 3: Written examination and oral presentations for grading.





Course 4: Ecological Systems and Agroecology	Dr. Yaw Boakye Agyeman	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	8:00 h	5.00 h	.00 h	.00 h	.00 h

To train students with knowledge in ecological principles of farming and food systems.

## PROGRAMME:

Current conventional agriculture goals and methods, consequences of conventional agriculture practices, heterotrophy and food chains importance in agriculture, integration importance in agriculture, sustainability of conventional agriculture. organic agriculture principles and fundamentals, organic agriculture types, methods, practices, and certification. Agricultural wastes and its applications in plant-soil systems. agroforestry, analog forestry and permaculture. Ecology in agriculture, ecology fundamentals, ecological interactions, local and global food systems, forms of energy and entropy, ecological principles of farming and food systems design, systems ecology, food distribution, consumer issues on food, and food security. Various agroecological zones and suitable agricultural practices for each zone. The agroecological approaches in sustainable cropping systems, the integrated farming system, and the agroforestry system. Description, analysis and redesign of farming and food systems. Plant-soil-water interactions in ecological and agroecological systems.

## TEACHING METHODS:

Lectures, seminars, practical work, group work, field trip.

## PREREQUISITES:

No particular pre-requisites for this course.

## EVALUATIONS DETAILS:

-End of course 4: Written examination and oral presentations for grading.





Course 5: Farm Machinery and Mechanisation	Dr. Felix Amenyo Eyahanyo	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	8:00 h	5.00 h	.00 h	.00 h	.00 h

To equip students with knowledge and hands-on skills in the use of farm machinery and mechanisation principles for production under agroecological conditions.

## PROGRAMME:

Farm machinery, development and economic use; Farm power sources - Human, Animal, mechanical, electrical and renewable energy; overview of internal combustion engine systems, engine components, two troke and four stroke engines - working principles and applications; different systems of internal combustion engine – cooling, lubricating, fuel, and injection systems; types of tractors, features and specifications, comparison of various tractor types; Tillage operations and equipments (ploughs, harrows, rotary tillers, ridgers, etc.). Seed drills and planters; methods of seed establishment, functions of a seeder, seed metering devices, planters, fertiliser distribution/broadcasters; husbandry equipment: field sprayers/dusters: types of sprayers (hydropneumatic, mist blower etc.). Factors affecting sprayer performance; harvesting equipment: harvesting methods, combine harvesters (basic operations, working principles, combine losses). crops storage structures; farm machinery costing and records. selection, assembling and maintenance of farm machinery and irrigation systems.

## TEACHING METHODS:

Lectures, seminars, practical assembling of farm machinery and operations various types of machinery, group work and field trips.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 5: Written examination and oral presentations for grading.





Course 6: Integrated Livestock Production	Dr. Bernard Ato Hagan	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	8:00 h	5.00 h	.00 h	.00 h	.00 h

To equip students with knowledge and skills to practice integrated livestock production for sustainability.

## PROGRAMME:

Description and classification of livestock production systems, concept of Integrated Livestock production (ILP); role of livestock in mixed agro-ecosystems; sustainable livestock farming, agroecological livestock systems; livestock-poultry integration; ecological livestock production management; Integration of scientific, technological, and management approaches, as well as holistic analytical skills, for addressing biological, ecological, and socioeconomic constraints and opportunities in livestock production and development. Environmental physiology, animal welfare and agro-biodiversity, sustainable management of livestock feeds and genetic resources, and statistical tools for modelling livestock production systems; biomass utilization and renewable energy management; appropriate technologies, policies and regulations in mitigating negative environmental and social impacts of integrated livestock production systems.

## TEACHING METHODS:

Lectures, seminars, practical field work, group work, field trips and Internship

### PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 6: Written examination and oral presentations for grading.





## Semester 2

Total of credits	Contact h	ontact hours								
Credits: 21	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project v	vork		
	182.00 h	-	76.00 h	15.00 h	-	-	-			

Course 7: Indigenous Food and Nutrition Practices	Prof. James Owusu Kwarteng	Lectures	Tutorials	Practical s	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	8:00 h	5.00 h	.00 h	.00 h	.00 h

### **OBJECTIVE:**

This course aims to equip students with knowledge and skills Indigenous peoples' food, nutrition, and health issues.

### PROGRAMME:

Indigenous knowledge and experiences on food; traditional and indigenous food systems; using the concept of food and nutrition security – food availability, accessibility, utilisation, acceptability and adequacy will be discussed concerning current Indigenous food systems; colonization and reconciliation; indigenous worldviews; oral history and food traditional foods; the social determinants of health; emerging health trends; food policy, community nutrition, and Indigenous food sovereignty; indigenous peoples' food, nutrition, and health issues; dynamics of changes in traditional or indigenous food systems due to global influence and their linkages to nutrition and health disparities.

### TEACHING METHODS:

Lectures, seminars, group work and field trip

### PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 1: Written examination and oral presentations for grading.





Course 8:								
Circular	Dr					Suparvised		Draiact
Economy and						Supervised		Project
Sustainability	Maanikuu	lectures	Tutorials	Practicals	Field	work	Evaluation	work
Sastamaonity	Patrick	Lectures		indefieldes	tring		Lvataation	
	Muotono				uips			
Credits: 3	Izideen	26.00 h	.00 h	8:00 h	5.00 h	.00 h	.00 h	.00 h

This course aims to equip students with the knowledge of applying the principles of agroecology in agroecology in agroecology and food systems to ensure sustainability.

## PROGRAMME:

Fundamentals of circular economy; circular economy in agroecology and food systems; waste management; international law and circular economy; importance of circular economy in sustainable food systems; circular economy approaches to sustainability; systems-based approach to circular economy; linkage of sustainability to over-consumption and over-production; multiple metrics for measuring sustainability - Triple Bottom Line (TBL); Environmental, Social And Governance (ESG); and the UN sustainable development goals (SDGs); enablers of sustainability; Application of the RESOLVE framework for sustainability in food systems; Butterfly diagram and the Circularity diagram as strategic tools for circular design in agroecology and food systems.

## TEACHING METHODS:

Lectures, case studies, seminars, practical work, group work and field trip

## PREREQUISITES:

No particular pre-requisites for this course.

## EVALUATIONS DETAILS:

-End of course 2: Written examination and oral presentations for grading.

Course 9:								
Innovation and Agripreneurship in Food System	Prof Richard Kwasi Bannor	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	8.00 h	5.00 h	.00 h	.00 h	.00 h

## OBJECTIVE:

This course aims to equip students with knowledge and skills in food innovations and agripreneurship.

# PROGRAMME:





Types of innovations - Product innovation, process innovation; food product and process development; marketing, innovation and management; food preservation; innovations in food packaging; food authenticity and traceability; food management. Agripreneurship development process; enterprise development opportunities in food innovation, agroecology and food systems.

## TEACHING METHODS:

Lectures, case studies, seminars, practical training and works on food innovation in agricultural value chains, group work and field trips.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 3: Written examination and oral presentations for grading.

Course 10: Applied		Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Research and Methodology and Statistic	Prof. John K. M. Kuwornu				trips	work		work
Credits: 3		26.00 h	.00 h	13:00 h	.00	.00 h	.00 h	.00 h

### **OBJECTIVE:**

To equip students with deep knowledge and skills in social science and field research

## PROGRAMME:

The course content will include formulating research topics and problems, setting research objectives, formulating quantitative hypotheses and experimental designs, designing research studies, selecting study areas, sampling techniques, sampling size determination, scaling, and questionnaire design. The course will provide students with knowledge of the qualitative research process: ontology and epistemology, major assumptions in qualitative research: subjectivism, interpretivism, social constructionism, and the role of theory in the research process – inductive vs. deductive research. Also, research approaches such as ethnography, phenomenology, case studies, grounded theory, naturalistic inquiry, and thematic synthesis will be studied. Brief hands-on statistical analysis relevant to research analysis, such as ANOVA, ANCOVA, MANOVA, Multiple Linear Regression, Logit and Probit Regressions, will be taught, too

## TEACHING METHODS:

Lectures, tutorials, seminars, group work, oral presentations, and extensive practical assignments.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:





-End of course 4: Written examination and oral presentations for grading.

Course 11: Applied GIS and Remote Sensing	Peter Damoah- Afari	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	13.00 h	.00 h	.00 h	.00 h	.00 h

### **OBJECTIVE:**

This course aims to develop students' fundamental quantitative and spatial skills, focusing on GIS and Remote Sensing applications to agroecology and food systems.

### PROGRAMME:

The course will train students on the introduction to Geographic Information Systems (GIS) – definitions, concepts and principles; components and courses of GIS; spatial data types, georeferencing; coordinate systems and map projections, data capturing techniques, spatial analysis – overlay, geoprocessing, data retrieval and classification. geographic data inputting, manipulation and storage, spatial analytic and modelling techniques, and error analysis through the use of GIS software like ArcGIS. Introduction to Remote Sensing - remote sensing process, electromagnetic radiation and spectrum, satellites, digital images, data collection; the processing of satellite images – image preprocessing and postprocessing; agroecology and food systems applications of remote sensing – crop health, biomass, moisture content, land surface temperature estimation; land use and land cover mapping. Lastly practical application of remote sensing / land evaluation, land mapping, burn mapping, flood delineation, biomass mapping, degraded lands mapping, soil landscape analysis / dem and terrain analysis).

### TEACHING METHODS:

Lectures, case studies, practical work and group work.

### PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 5: Written examination and oral presentations for grading.





Course 12: Agricultural Policy and Rural Development	Prof. John K. M. Kuwornu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	13.00 h	.00 h	.00 h	.00 h	.00 h

To equip students with the knowledge to grasp the theoretical foundations and practical methodologies in crafting effective agricultural policies for rural development.

## PROGRAMME:

Overview of international, regional and national agricultural programmes, projects and policies Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, The New Partnership for Africa's Development (NEPAD), Comprehensive African Agricultural Development Programme (CAADP), Alliance for a Green Revolution in Africa (AGRA), METASIP, FASDEP1, FASDEP II, Root & Tuber Improvement & Marketing Programme (RTIMP), Information On Export Marketing And Quality Awareness Project (EMOAP), Ghana Agriculture Sector Investment Programme (GASIP), West African Agricultural Productivity Programme (WAAPP); economic forces of agricultural policies change globalization, technology and food safety and agricultural industrialization; theory of farm policy; import duties on agricultural products; farm policy options and consequences - free market, price supports. the concept of agricultural and rural development; theories, approaches and models of rural development; essentials of agricultural development; integrated rural development planning; principles of rural development, stages in rural development, leadership in rural development, rural development institutions and Non-Governmental Organisations (NGOs), community-based organisations. Case studies on rural development in Ghana and other African Countries.

## TEACHING METHODS:

Lectures, case studies, seminars, practical work and group work.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 6: Written examination and oral presentations for grading.





Course 13:								
Sustainable Value Chain Development and Marketing	Prof Richard Kwasi Bannor	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		26.00 h	.00 h	13.00 h	.00 h	.00 h	.00 h	.00 h

This course aims to equip students with knowledge and skills in different processing techniques, food innovation, and the marketing of agricultural products.

### PROGRAMME:

The course delves into the concept and objectives of value chains and development, value chain mapping and development, gender and value chains, value chain upgrading. The course further examines pre- and post-harvest management for quality and shelf life of agricultural commodities and problems in their marketing; quality standards for domestic and international trade of agricultural commodities; setting of cocoa, cashew and other food quality standards and world food trade. HACCP, ISO 9000; auditing and certification; benchmarking and quality performance measurement. Additionally, the course will examine the type of losses occurring in various commodity value chains, analysis of the amount of money lost because of post-harvest losses, the impact of post-losses on value chain actors and solutions to post-harvest losses in Ghana. Also agribusiness marketing courses such as sustainable marketing, social marketing, innovative marketing, packaging and other marketing functions relevant for sustainable marketing will be taught.

### TEACHING METHODS:

Lectures, tutorials, interactive discussions, case studies and practical assignments.

## PREREQUISITES:

No particular pre-requisites for this course.

## EVALUATIONS DETAILS:

-End of course 7: Written examination and oral presentations for grading.





## Semester 3

Total of credits	Contact	ontact hours							
Credits: 6	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work		
	.00 h	-	30.00 h	.00 h	70.00 h	50.00 h	40.00 h		

Course 14: Masters Seminar 1 Kv Ba	rof Richard wasi annor	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3	·	.00 h	.00 h	30.00 h	.00 h	30.00 h	20.00 h	30.00 h

### **OBJECTIVE:**

The aim is to ensure students have knowledge of the chosen research area and receive reviews from the Department.

### PROGRAMME:

Students will present their research proposal to the Department of Agribusiness Management and Consumer Studies for suggestions and possible reviews of their chosen research area.

### TEACHING METHODS:

Oral presentation at the Department.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 1: Written examination and oral presentations for grading.

Course 15:	Dr. Helena							
Agroecology and Food Systems Internship	Oppong- Kyeremeh	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		.00 h	.00 h	.00 h	.00 h	40.00 h	30.00 h	10.00 h

## OBJECTIVE:

The aim is to ensure students imbue hands-on skills at the different nodes of agroecology and food systems.

## PROGRAMME:





Students will present learning experiences to the School of Agriculture and Technology for feedback and suggestions. The School has contacted organic farms and processing companies, such as Kofi Vinyo Company Limited, Grow West Africa, and Opoakpajor Youth and Development Center, to collaborate on student internships, thesis work, and practical training. Students will work with these companies and institutions as interns for two months. Company supervisors will evaluate the students' performance, and lecturers will visit to monitor their progress. After the internship, students will share their learning experiences and skills with the School of Agriculture and Technology, where they will receive grades.

## TEACHING METHODS:

Internship at agroecology institutions and food systems and oral presentation at the School of Agriculture and Technology.

# PREREQUISITES:

No <u>particular</u> pre-requisites for this course.

## EVALUATIONS DETAILS:

-End of course 2: Internship reports and Presentations for grading.

Semester 4

Total of credits	Contact	P						
Credits: 24	Lectures	ectures Tutorials Practicals Field trips Supervised work Evaluation Pr						
	.00 h	15.00 h	60.00 h	.00 h	60.00 h	60.00 h	60.00 h	

Course 16: Masters Seminar II	Prof. John K. M. Kuwornu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 6		.00 h	.00 h	30.00 h	.00 h	30.00 h	30.00 h	30.00 h

# OBJECTIVE:

The aim is to ensure students have followed the right data collection processes, have the correct data, and have conducted the right data analysis, results, and discussions.

# PROGRAMME:

Students will present their findings to the School of Agriculture and Technology for suggestions and possible results reviews.

## TEACHING METHODS:





Oral presentation at the Department

# PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 1: Presentations for grading.





Course 17:								
Agroecology and Food Systems Research Thesis	Prof. John K. M. Kuwornu	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 18		.00 h	15.00 h	30.00 h	.00 h	30.00 h	30.00 h	30.00 h

The aim is to ensure that, the student has developed a final research project, a component of the MPhil Agroecology and Food Systems programme, which equips the candidate with skills to apply cumulative knowledge and skills gained in the programme.

## PROGRAMME:

Students are expected to use the tools acquired from the courses to undertake a typical research project that addresses the challenges of agribusinesses sustainability in line with the SDGs. This will be a continuation of the supervised project, culminating in the presentation and defence of the thesis. The student's supervisors and Department head will approve the final thesis for onward submission to the School of Graduate Studies, UENR for submission for external examination and defence.

### TEACHING METHODS:

Independent research work will be bounded into three copies, as the candidate's MPhil Thesis is to be vetted and examined by experts in the field. One external examiner and an internal examiner will review the research independently. Afterwards, the independent external examiners, one internal examiner, and the candidate's supervisors will be present at the defence of the thesis.

## PREREQUISITES:

No particular pre-requisites for this course.

### EVALUATIONS DETAILS:

-End of course 2: Presentations for grading.





# Annex 2.4 Syllabus of the DR. HILLA LIMANN TECHNICAL UNIVERSITY, WA (DHLTU), Ghana

Semester 1

Total of Credits	Contact l	nours					Project work
Credits 18	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	153.00 h	43.00 h	53.00h	46.00 h	42.00 h	27.00 h	14.00 h

Personal work = Contact hours x2

Dr. Ibrahim	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Denka				trips	work		work
Kariyama							
	16.00 h	4.00 h	10.00 h	8.00 h	6.00 h	6.00 h	8 h
	Dr. Ibrahim Denka Kariyama	Dr. Ibrahim Lectures Denka Kariyama 16.00 h	Dr. Ibrahim Lectures Tutorials Denka Kariyama 16.00 h 4.00 h	Dr. Ibrahim Lectures Tutorials Practicals Denka Kariyama 16.00 h 4.00 h 10.00 h	Dr. Ibrahim Lectures Tutorials Practicals Field Denka Kariyama 16.00 h 4.00 h 10.00 h 8.00 h	Dr. Ibrahim Lectures Tutorials Practicals Field Supervised Denka Kariyama 16.00 h 4.00 h 10.00 h 8.00 h 6.00 h	Dr. Ibrahim Lectures Tutorials Practicals Field Supervised Evaluation Denka Kariyama 16.00 h 4.00 h 10.00 h 8.00 h 6.00 h 6.00 h

## **OBJECTIVES:**

At the end of the course, students would;

- 1. Understand the principles of sustainable agriculture and its significance.
- 2. Evaluate the impact of various crop production practices on the environment.
- 3. Identify common pests and diseases affecting crops and their life cycles.
- 4. Develop and implement integrated pest management strategies.
- 5. Analyze case studies on sustainable practices and pest management.

## PROGRAMME:

This course provides an in-depth exploration of sustainable crop production practices and integrated pest management (IPM) strategies. Emphasis is placed on ecological principles, sustainable practices, and the role of pests in agricultural systems to enhance productivity while minimizing environmental impact. This course is based on lectures, practical lessons, field visit and a seminar. Various lectures will deal more specifically on the principles of sustainable agriculture, soil and crop management and integrated approach to pest management. To deepen the knowledge gained in these lectures, a field visit and fieldwork will be carried out through soil quality assessments and the identification of beneficial soil, insect or plant biota. The field experience will be linked to different lectures about sustainable practices such as intercropping, cover cropping, conservation agriculture (no tillage and permanent cover), sustainable crop rotations and biological pest control. Students will understand the role and benefits of sustainable practices and learn integrated pest management approaches. For the seminar, students will conduct a literature study/case studies on topics related to the course and present





their findings to colleagues and staffs.

### TEACHING METHODS:

Classroom lectures

Practical lessons

Literature study/ case studies

Tutorials/Instruction

Field trips (two times)

Field work (meetings and interviews with stakeholder during excursion and transect work) Presentations

## PREREQUISITES:

Basic knowledge of sustainable crop production, pest control and management

## EVALUATIONS DETAILS:

- Course work/case studies, assignments (continuous assessment) = 40 marks
- End of course examination = 60 marks

Course 2:	Dr.	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
Soil Fertility	Ibrahim					work		work
and Organic	Denka							
Farming	Kariyama							
Systems								
Credit hours: 3		18.00 h	4.00 h	8.00 h	12.00 h	6.00 h	6.00 h	6.00 h

## **OBJECTIVES:**

By the end of the course students would;

- 1. Understand the fundamentals of soil science and its importance in agriculture.
- 2. Analyze soil fertility parameters and their effects on crop production.
- 3. Evaluate organic farming practices and their implications for soil health.
- 4. Develop sustainable nutrient management plans for organic farming systems.
- 5. Assess the role of cover crops, composting, and crop rotation in enhancing soil fertility.

# PROGRAMME:

This course explores the principles of soil fertility and the practices of organic farming systems. It focuses on understanding soil health, nutrient management, and sustainable agricultural practices that enhance productivity while preserving the environment. The course consists of lectures, practical lessons, field visit and seminars. The various lectures will include basic soil science that will deal with soil composition, properties, formation and classification. In addition, soil fertility will be discussed taking into account the major soil nutrients and its cycles. Soil assessments will be conducted to assess the soil health using soil health indicators such as biological, chemical, and physical. Organic Farming Principles will consider the standards, benefits and challenges, nutrient management with emphasis on cover crops and green manures and it benefits in controlling soil erosion and improving soil nutrient. For the seminar, students will conduct a literature study on topics related to the course and present their findings to colleagues and lecturers.





## TEACHING METHODS:

Classroom lectures Practical lessons Literature study/case studies Tutorials/Instruction Field work Field trip

## PREREQUISITES:

Basic knowledge of soil composition and fertility to support plants growth.

## EVALUATIONS DETAILS:

- Course work/case studies, assignments (continuous assessment) = 40 marks

- End of course examination = 60 marks

Course 3:	Dr.	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project work
Food systems and food security	Adams Abdul- Rahaman				trips	work		
Credit hours: 3		20.00 h	2.00 h	8.00h	12.00 h	10.00 h	6.00 h	-

## **OBJECTIVES:**

By the end the course students should be able to:

1. Appreciate the concepts of sustainable food systems and food security.

Evaluate the ecological impact of food production, processing, and distribution techniques on the environment.

3. Appreciate the application of the main pillars of food security towards meeting food security targets.

4. Understand the concept of geopolitics in relation to food security and nutrition.

5. Develop innovative methods of meeting sustainable food systems and food security targets.

## PROGRAMME:

This course will deal with all the key aspects of food systems and food security. The structure of the course will include lectures, group work, visits to farms and local industries involved in indigenous farming systems. The introductory lecture will expose the learners to the description of food systems, production resources and supply of food in the bioeconomy. The course will also discuss the ecological impact of industrial food production. A broader explanation of the pillars of food security, geo-political influences and factors affecting food supply will be





provided. Students will learn specific details of the innovative methods of food systems in relation to indigenous knowledge and modern insight. A visit to local farms and industries will be organised to intensify the practical aspects of the knowledge gained during the course work.

# TEACHING METHODS:

Classroom lectures

Literature study

Tutorials/Instruction

Field trips (local farms and industries)

# PREREQUISITES:

Basic knowledge of food systems and food security

# EVALUATIONS DETAILS:

Course work/case studies, assignments (continuous assessment) = 40 marks

End of course examination = 60 marks

Course: 4	Dr. Nasiru	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Digital	Alhassan				trips	work		work
Literacy and								
Information								
Management								
Credit hours: 3		36.00 h	6.00h	6.00h	0.00 h	8.00 h	3.00 h	0.00 h

## **OBJECTIVES:**

By the end of this course, students will be able to:

1. Demonstrate proficiency in using digital tools and platforms.

2. Understand the concepts of digital literacy and information management.

3. Apply strategies for searching, organizing, and managing digital information.

4. Navigate online security and privacy concerns.

5. Critically evaluate digital content for relevance, accuracy, and credibility.

6. Implement ethical standards in the digital realm. Students will be proficient in managing digital information.

## PROGRAMME:

Introduction to digital literacy: understanding digital tools and technologies: Online communication and collaboration: leveraging digital platforms for professional and academic





success: This course dwells on Information retrieval: searching, evaluating, and verifying digital information; Digital privacy and security: safeguarding personal and professional data; Data management and organization: techniques for managing large volumes of information; Ethical considerations in digital environments: respecting intellectual property, avoiding plagiarism, and navigating online ethics and Social media literacy and its impact on communication and information dissemination.

## TEACHING METHODS:

Classroom lectures

Literature study/case studies

Tutorials/Instruction

Practical lessons

Seminar

## GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection reports on assigned readings and class discussions.

Case study analysis on gender and natural resource management.

A research project or proposal for gender-responsive solutions in food systems or natural resource management, presented to the class.

# PREREQUISITES:

Requires Information Communication platforms, Computers and Internet and Digital Platforms.

## EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):





Course 5:	Prof.	Lectures	Tutorials	Practicals	Field	Supervis	edEvaluation	Project
Circular Economy and Sustainability	Hamidatu S. Darimani				trips	work		work
Credit hours: 3	_	21:00h	6:00h	21:00	8:00h	6:00h	3:00h	0:00h

Students will be able to understand the core concepts of the circular economy and sustainability, analyze the limitations of the traditional linear economy and its impact on natural resources, identify key principles and strategies for designing and implementing circular economy models, examine case studies of circular economy initiatives across industries and regions and develop practical skills to create sustainable, circular solutions for businesses and communities.

## PROGRAMME:

Students will be introduced to Circular Economy and Sustainability by defining the Circular Economy, sustainability and resource efficiency, key principles of the Circular Economy, Circular Economy Strategies and Models: Waste Management and Resource Recovery, Circular Design and Product Life Extension, Circular Business Models, Bioeconomy and Renewable Resources; Sectoral Applications of the Circular: Economy, Circular Economy in the Built Environment, Circular Economy in Food Systems, Circular Economy in Manufacturing and Industry, Circular Economy in Textiles and Fashion; Circular Economy Policy and Regulation: Government Policies Supporting Circular Economy, Circular Economy and Corporate Responsibility, Standards and Certifications for the Circular Economy; Challenges and Opportunities for Circular Transitions: Barriers to the Circular Economy. The Future of the Circular Economy.

## TEACHING METHODS:

Classroom lectures

Literature study

Tutorials/Instruction

Field work

Field trip

## **GROUP WORK:**

Active participation in discussions on readings, case studies, and current issues.

Short reflection papers on assigned readings and class discussions.

Case study analysis on Circular Economy and Sustainability.

A research project or proposal on Circular Economy and Sustainability presented to the class.





## PREREQUISITES:

Basic knowledge in Circular Economy and Sustainability.

# EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):

Course 6:	Mr. John	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Integrated	Beloved				trips	work		work
Livestock	Vog-Enga							
Production								
Credit hours: 3		42.00 h	21.00 h	-	6.00 h	6.00 h	3.00 h	0.00 h
Credit hours: 3	-	42.00 h	21.00 h	-	6.00 h	6.00 h	3.00 h	0.00 h

# **OBJECTIVES:**

By the end of the course, students will be able to:

1. Identify physical and production traits of indigenous breeds of livestock and some exotic breeds.

2. Understand the principle of integrated livestock production

3. Analyse the interactions between livestock, environment and human societies

4. Design and manage sustainable livestock production systems.

5. Evaluate the economic, social, and environmental impact of livestock production.

6. Develop skills in livestock production planning, implementation and monitoring.

7. Identify career opportunities and requirements for successful employment.

8. Compare different livestock enterprises and to integrate scientific knowledge into production systems while considering market demands.

Apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science,

10. Analyse various integrated farming systems (integration with agriculture, plantation, forestry, especially for tropical regions)

11. Apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability.

# PROGRAMME:

Introduction to Integrated Livestock Production. Students will be introduced to the principles of livestock production for ruminants, non-ruminants and Bee keeping. Livestock Health and Disease Management. Aquaculture production systems design, production and Management. Feed formulation and evaluation; These will include production and processing. Fodder crop production.

# TEACHING METHODS:





Classroom lectures Literature study Tutorials/Instruction Field work Field trip

### GROUP WORK:

- Active participation in discussions on readings, case studies, and current issues.
- Short reflection reports on assigned readings and class discussions.
- Case study analysis on Integrated Livestock Production.
- A research project or proposal on Integrated Livestock Production presented to the class.

## PREREQUISITES:

Basic knowledge in Integrated Livestock Production.

## EVALUATIONS DETAILS:

- Class Participation and Discussion (10%):
- Weekly Reflection Reports (10%):
- Mid Semester Exams (20%):
- End of Semester Exams (60%):

### Semester 2

Total of credits	Contact	nours					Project work
Credits: 18	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	186.00 h	51.00 h	48.00h	16.00 h	66.00 h	18.00 h	18.00 h

= Course 7: Gender,	Prof.	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Food Systems, and	Hamidatu				trips	work		work
Natural Resources	S.							
	Darimani							
Credit hours: 3		36.00 h	21.00 h	6	0.00 h	12.00 h	3.00 h	0.00 h

### **OBJECTIVES:**

By the end of the course, students would:

 Be equipped with the knowledge, skills, and tools to analyze and address the intersectionality of gender, food systems, and natural resources, promoting gender equality and sustainable development.





2. Examine how gender roles, relations, and power dynamics shape access to and control over food and natural resources, and how these factors influence sustainability, equity, and food security. Through a multidisciplinary approach, students will critically analyze the gendered dimensions of agriculture, food production, resource management, and policy interventions across diverse global contexts.

# PROGRAMME:

Students will be taught the Introduction to Gender and Food Systems: Gender Concepts and Theories, Overview of Food Systems; Gender Roles in Food Systems, Gender and Natural Resource Management: Introduction to Natural Resources and Gender, Gender and Land Rights, Gender and Water Resource Management, Forests, Fisheries, and Gender, Gender, Food Security, and Climate Change: Gender and Food Security, Climate Change and Gendered Impacts on Food Systems, Gender, Migration, and Livelihoods, Policy and Advocacy for Gender-Responsive Food Systems: Gender and Agricultural Policies, Gender in International Development, Advocacy for Gender-Responsive Food Systems, Case Studies and Practical Applications: Global Case Studies of Gender in Food Systems, Developing Gender-Responsive Solutions, Final Presentations

### TEACHING METHODS:

Classroom lectures

Literature study

Tutorials/Instruction

Field work

Field trip

### GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection reports on assigned readings and class discussions.

Case study analysis on gender and natural resource management.

A research project or proposal for gender-responsive solutions in food systems or natural resource management, presented to the class.

## PREREQUISITES:

No particular pre-requisites as topics of group work vary considerably.

### EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):



AGRECOFARM Academic courses outlines



Course: 8 Farm	Mr.	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
Management	Abdul-					work		work
and	Wahab							
Mechanization	Salifu							
Credit hours: 3		21.00 h	6.00 h	21:00h	8.00 h	6.00 h	3.00 h	.00 h
						<u> </u>		

At the end of the course, students should be able to:

Understand how to increase Productivity (reduce the time and labour required for agricultural tasks)

Understand how to ensure uniformity in operations such as planting, harvesting, and irrigation (Minimize wastage of seeds, fertilizers, and water)

Explain how to reduce labor dependency (address labor shortages by substituting manual labor with machines)

Explain how to lower the overall cost of agricultural operations over time and optimize resource usage.

Understand how to enable completion of critical agricultural activities (e.g., sowing, harvesting) within optimal timeframes.

Explain how to ensure precision in planting, weeding, and harvesting to improve crop yield and quality.

Understand how to conserve and support sustainable farming practices by reducing resource wastage. (Promote efficient use of water, energy, and fertilizers).

Understand how to adapt to technological advancements such as GPS, automation, and sensors for precision agriculture and integrate advanced machinery to cater to specific agricultural needs.

Explain how to reduce post-harvest losses through proper harvesting, threshing, and storage.

Understand how the mechanization for livestock farming, aquaculture, and horticulture

## PROGRAMME:

This course covers Advanced Farm Power and Machinery, Design of Agricultural Machinery, Precision Agriculture and Automation, Soil-Machine Dynamics. Post-Harvest Technology and Machinery, Farm Mechanization Planning and Management, Renewable Energy Applications in Agriculture, Testing and Evaluation of Farm Machinery, Ergonomics and Safety in Farm Machinery, Advanced Irrigation Mechanization, Sustainable Agricultural Mechanization and Practical and Hands-On Training.

# TEACHING METHODS:





### Classroom lectures

Literature study

Tutorials/Instruction

Field work

Field trip

## GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection reports on assigned readings and class discussions.

Case study analysis on Farm Management and Mechanization.

A research project or proposal on Farm Management and Mechanization.

# PREREQUISITES:

Basic knowledge in Farm Management and Mechanization.

## EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):

Course: 9	Dr. Nasiru	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Postharvest Technology	Alhassan				trips	work		work
Credit hours: 3		36.00 h	6.00 h	0.00h	0.00	14.00 h	3.00 h	6.00 h
					h			

## OBJECTIVE:

On successful completion of this course, students would:

1. Understand the postharvest physiology of perishables and durables produce.

2. Appreciate the need for cleaning, processing, and proper storage of harvested produce.

3. Apply concepts and techniques for effective packing and packaging in postharvest management.





4. Understand temperature requirements for perishable produce.

- 5. Using safety and quality assurance standards in managing harvested products.
- 6. Understanding the issues in postharvest facilities management.

## PROGRAMME:

This course would introduce student to the importance of postharvest management of food; Postharvest technology procedures; Postharvest management procedures; Postharvest handling practices; Treatment of agricultural produce; On farm storage practices of fresh produce; Methods of packing and packaging; Types of storage structure/methods for perishables and durable produce

## TEACHING METHODS:

Classroom lectures

Literature study/case studies

Tutorials/Instruction

Practical lessons

Seminar

## GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection papers on assigned readings and class discussions.

Case study analysis on Postharvest Technology.

A research project or proposal on Postharvest Technology.

## PREREQUISITES:

Basic knowledge in postharvest technology.

## EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):





Dr. Nana	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Twumasi				trips	work		work
Yaw							
	21.00 h	6.00 h	21:00 h	8.00 h	6.00 h	3.00 h	0.00 h
	Dr. Nana Twumasi Yaw	Dr. Nana Lectures Twumasi Yaw 21.00 h	Dr. Nana Twumasi Yaw 21.00 h 6.00 h	Dr. Nana Twumasi Yaw 21.00 h 6.00 h 21:00 h	Dr. Nana Twumasi Yaw 21.00 h 6.00 h 21:00 h 8.00 h	Dr. Nana Twumasi YawLecturesTutorialsPracticalsFieldSupervised work21.00 h6.00 h21:00 h8.00 h6.00 h	Dr. Nana Twumasi Yaw 21.00 h 6.00 h 21:00 h 8.00 h 6.00 h 3.00 h

At the end of this course students should be able to:

Comprehend the concept of GIS and remote sensing in irrigation and water management.

Apply GIS and remote sensing techniques for effective and efficient water conservation, irrigation planning and management.

Model crop yield and crop water productivity using GIS and remote sensing techniques.

## PROGRAMME:

Introduction, definition of GIS, benefits of GIS over other information systems, major tasks in GIS, applications of GIS in agriculture and natural resources management, techniques used in GIS, implementation of GIS, data and databases for GIS, sources of spatial data, data input, GIS-based modeling or spatial modeling of ET, irrigation scheduling, crop yield, water yield, agroecological zoning, remote sensing techniques.

## TEACHING METHODS:

Classroom lectures,

Literature study/case studies,

Tutorials/Instruction,

Practical lessons,

Seminar

## GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection reports on assigned readings and class discussions.

Case study analysis on Applied GIS and Remote Sensing.

A research project or proposal on Applied GIS and Remote Sensing presented to the class.

## PREREQUISITES:

Basic knowledge in Applied GIS and Remote Sensing.

## EVALUATIONS DETAILS:

Class Participation and Discussion (10%):





Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):

Course: 11	Dr. Adams	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Project	Abdul-				trips	work		work
Management	Rahaman							
Credit : 3		36.00 h	6.00 h	0.00h	0.00 h	14.00 h	3.00 h	6.00 h

### **OBJECTIVE:**

By the end of this course, the student should be able to:

1. Understand the concept, planning and effective implementation of agroecological projects.

2. Conduct feasibility of conservation techniques and different agroecological systems.

3. Develop deeper skills in managing and evaluating agroecological projects.

4. Appreciate the environmental impact assessment of agroecological systems.

5. Apply different methodologies and tools of project management.

## PROGRAMME:

Concepts of agroecological projects: Project description, project cycle, appraisal and evaluation techniques, ecological, and social aspects of agroecological projects. Planning and implementation strategies. Feasibility: Economic viability of agroecological projects, evaluation of investment, SWOT analysis, Returns on investments and product-marketing. Managing and evaluating agroecological projects: real-life agroecological projects, analysis of a research project, field work or surveys for qualitative and quantitative analysis and functions of teams to project implementation. Design and implementation of innovative agroecological projects. Environmental Impact Assessment (EIA): Methods of impact analysis, implications of impact analysis, benefits of EIA in relation to agroecological projects. Methodologies and project management tools: Measuring the performance of agroecology. Tools: Tool for Agroecology Performance Evaluation (TAPE), Agroecology Criteria Tool (ACT), Agroecological Assessment and Planning Tool (AE-APT), Framework for measuring agroecology, and characterization of agroecology Criteria Tool (F-ACT). Framework for measuring agroecology, and characterization of agroecological transitions.

## TEACHING METHODS:

Classroom lectures

Literature study/case studies





Tutorials/Instruction

Practical lessons

Seminar

# GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection reports on assigned readings and class discussions.

Case study analysis on Project Management.

A research project or proposal on Project Management, presented to the class.

# PREREQUISITES:

Basic knowledge in Project Management.

## EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):

Mid Semester Exams (20%):

End of Semester Exams (60%):

Course: 12	Dr. Abdul-	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Agroecology	Rahaman				trips	work		work
Participatory	Abdul-							
Research	Basit							
Methods								
Credits: 3		36.00 h	6.00 h	0.00h	0.00 h	14.00 h	3.00 h	6.00 h

# OBJECTIVE:

By the end of the course, students should be able to:

Foster students' understanding of key techniques for collecting and analyzing qualitative and quantitative data.

Apply more advanced skills in support of other courses and thesis research involving quantitative and qualitative analysis.

Establish linkages between theory, data, analysis and interpretation in the research process

Apply participatory research methodologies in a community setting, engage with community partners and keep field notes.





Identify the principles of participatory research and its theoretical underpinnings.

Design, implement a participatory research and present research findings.

Be able to undertake postgraduate research project for their thesis.

## PROGRAMME:

The course is structured to be delivered using lectures, community participation and field research. The introductory part focuses on research principles of participatory research methods, paying particular attention to the role of transdisciplinary and ethics. Subsequently, a broad explanation of different participatory research methods will be discussed. The full research process is addressed from participatory process design, the approach and involvement of participants, the organization and facilitation of participatory activities, to the analysis, integration and presentation of the outcomes. Course learning objectives will be met through a combination of lectures, discussions, analysis of directed exercises, data collection, data analysis, writing and community engagement. The emphasis in the classroom is on shared learning. Students will also be actively participating in a community-based group action-research project. Research design and approach, population and sampling, data collection methods and techniques. Data analysis such as Chi- square, correlations, linear regression and analysis of variance (ANOVA) following commonly used computer packages (SPSS etc.)

# TEACHING METHODS:

Classroom lectures

Literature study/case studies

Tutorials/Instruction

Practical lessons

Seminar

## GROUP WORK:

Active participation in discussions on readings, case studies, and current issues.

Short reflection reports on assigned readings and class discussions.

Case study analysis on Agroecology Participatory Research Methods

A research project or proposal Agroecology Participatory Research Methods, presented to the class.

## PREREQUISITES:

Basic knowledge in Research Methods.

## EVALUATIONS DETAILS:

Class Participation and Discussion (10%):

Weekly Reflection Reports (10%):





## Mid Semester Exams (20%):

End of Semester Exams (60%):

### Semester 3

Total of credits	Contact	Project work					
Credits: 16	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	86.00 h	24.00 h	56.00h	30.00 h	32.00 h	27.00 h	36.00 h

Course 13:	Dr. Ibrahim	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Biodiversity	Denka				trips	work		work
conservation	Kariyama							
and								
agroecology								
*								
Credits: 3	-	14.00 h	6 00 h	14.00	6.00	4 00 h	8 00 h	6 00 h
		17.00 II	0.00 11	17.00	0.00	T.00 II	0.00 11	0.00 11

### **OBJECTIVE:**

At the end of the course students;

1. To understand the concepts of biodiversity and agroecology.

2. To explore the relationship between agricultural practices and biodiversity conservation.

3. To analyze ecosystem services and their role in sustainable farming.

4. To develop skills to design and implement biodiversity-friendly agricultural systems.

5. To evaluate case studies from different agroecological contexts.

## PROGRAMME:

This course provides an interdisciplinary understanding of biodiversity conservation and its integration into agroecological practices. It emphasizes the role of biodiversity in ecosystem services, sustainable agriculture, and the resilience of farming systems. Students will explore principles, case studies, and practical strategies to foster biodiversity in agricultural landscapes. Series of lectures will highlight biodiversity and agroecology focusing on the principles of biodiversity, the importance and challenges. Ecosystem services in agriculture such as pollination, pest control, nutrient cycling and soil health. Agroecological practices for biodiversity conservation concentrating on crop diversification, agroforestry, cover cropping. Policies and frameworks for biodiversity conservation which includes national and international agreements and community-based conservation initiatives. Field visits to agroecological farms





and conservation sites. Seminars in the form of presentations of case studies on the success and challenges of biodiversity and lessons learned.

## TEACHING METHODS:

Classroom lectures

Literature study/case studies

Tutorials/Instruction

Practical lessons

Seminar

## PREREQUISITES:

Basic knowledge about the interactions of the different actors in an ecosystem.

## EVALUATION DETAILS:

- Course work/case studies, assignments (continuous assessment) = 40 marks

End of course examination = 60 marks

Course 14:	Prof.	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
Ecological	Hamidatu					work		work
System and	S. Darimani							
Agroecology								
Credits: 3	-	36.00 h	6.00 h	21.00	12.00	4.00 h	8.00 h	6.00 h

## OBJECTIVE:

By the end of the course students should;

Understand the principles of ecological systems and their relevance to agroecosystems.

Explore the application of ecological principles to sustainable agriculture.

Develop skills to design and manage agroecological systems.

Analyze case studies of agroecological practices and their impact on food systems and the environment.

## PROGRAMME:

The Ecological Systems and Agroecology course provides an in-depth understanding of the ecological principles underlying agricultural systems and their application to sustainable farming practices. This course integrates ecological theory with practical agroecological approaches to design, manage, and evaluate farming systems that promote biodiversity, resource efficiency, and environmental health.




#### TEACHING METHODS:

Classroom lectures

Literature study/case studies

Tutorials/Instruction

Practical lessons

Seminar

# PREREQUISITES:

Basic knowledge about the interactions of the different actors in an ecosystem.

# EVALUATION DETAILS:

- Course work/case studies, assignments (continuous assessment) = 40 marks

End of course examination = 60 marks

Course 15:	All	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
Internship	Lecturers at					work		work
	the							
Credits: 3	Department	36.00 h	6.00 h	21.00	12.00	4.00 h	8.00 h	6.00 h

# OBJECTIVE:

At the end of the semester students should;

1. Acquire hands-on experience and the practical application of their knowledge in agroecology.

2. Build professional and industrial networks.

3. Develop soft skills such as problem-solving, project management, teamwork, and effective communication.

4. Obtain feedback from industry for improvement of academic programmes.

5. Establish a platform for knowledge and technology transfer between industry and academia.

# PROGRAMME:

Students that would enroll into the MSc programme will have to participate in 1-2 months long internships in local agricultural business, just before starting their thesis. This internship is designed to provide hands-on experience and the practical application of their acquired knowledge. The programme would allow students to confront real-world agroecological practices, enhancing their professional skills, and preparing them for successful careers in the agroecology sector.

# TEACHING METHODS:





Tutorials/Instructions/Orientation

# PREREQUISITES:

After students have presented their thesis' proposal

## EVALUATION DETAILS:

- Students assessment by host organization = 30 marks

Student assessment by Supervisor = 30 marks

Internship report = 40 marks

Course: 16	All	Lectures	<b>T</b> utorials	Practicals	Field	Supervised	Evaluation	Project
Cominer 1	Lecturers at				trips	work		work
Seminar 1	The							
	Department							
Credits: 3		0.00 h	6.00 h	0.00h	0.00 h	20.00 h	3.00 h	18.00 h

# **OBJECTIVES:**

Develop and present their Thesis.

# PROGRAMME:

Students would have to attend all seminars specified by the Department. They are required to develop and make departmental presentation of their research proposals.

# TEACHING METHODS:

Tutorials/Instructions

Seminar

#### PREREQUISITES:

Basic knowledge in research methods.

# EVALUATIONS DETAILS:

Presentation of proposal (30%):

Proposals score by the Supervisor (70%):

Semester 4

Total of Credits	Contact	hours					Project work
Credits: 18	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	.00 h	6.00 h	.00h	.00 h	36.00 h	6.00 h	130.00 h





# Personal work = Contact hours x2

Course: 17	All Lecturers	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Seminar II	at The				trips	work		work
Seminar II	Department							
	_							
Credit hours: 3		0.00 h	6.00 h	0.00h	0.00	20.00 h	3.00 h	18.00 h
					h			
					]			

# **OBJECTIVE**:

Develop and present progress of Thesis.

# PROGRAMME:

Each student will make a presentation on the progress of his/her thesis. This presentation will be assessed for three (3) credits.

# TEACHING METHODS:

#### Seminars

Tutorials/Instructions

# PREREQUISITES:

Basic research methods and data analysis.

# EVALUATIONS DETAILS:

Presentation of progress of work including;

Introduction = 20%





Course: 18	All Lecturers	Lectures	Tutorials	Practicals	Field	Supervised	Evaluation	Project
Thesis	at The				trips	work		work
Thesis	Department							
Credits: 16		0.00 h	6.00 h	0.00h	0.00	16.00 h	3.00 h	112.00
					h			h

Develop and present final Thesis under supervision.

# PROGRAMME:

Students are required to undertake a compulsory thesis related to the programme. The thesis is to be assessed for sixteen (16) credits.

#### TEACHING METHODS:

Supervision

Seminar

#### EVALUATIONS DETAILS:

Presentation of Thesis (30%):

Thesis score by the Supervisor (70%):

Literature review = 10%

Materials and Methods = 30%

Results and discussion = 30%

Conclusion and Recommendation = 10%





# Annex 2.5 Syllabus of the CENTRAL UNIVERSITY LIMITED BY GUARANTEE (CU), Sierra Leone

#### Semester 1

Total of Credits	Contact	ontact hours						
Credits: 21	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work	
	196.00 h	64.00 h	120.00h	98.00 h	36.00 h	36.50 h	90.00 h	

<b>Course 1</b> : Principles of Agroecology	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3	16.00 hrs	4.00 hrs	-	8.00 hours	6.00 hours	6.50 hours	

#### OBJECTIVE:

This course introduces students to the core principles of agroecology, with an emphasis on understanding ecosystems and sustainable agricultural practices, particularly in African contexts.

# PROGRAMME:

This course introduces students to the fundamental principles and practices of agroecology, focusing on the interrelationship between ecological processes and sustainable agriculture. Topics include agroecosystem design, biodiversity, soil health, and sustainable resource management. Students will examine how ecological principles can be applied to agricultural systems to enhance productivity, resilience, and environmental health. Core agroecological concepts such as nutrient cycling, pest management through biodiversity, and crop-soil interactions will be explored.

Through practical workshops, students will gain hands-on experience in agroecological practices like crop rotation, intercropping, and cover cropping. Field visits will allow students to observe these practices in real-world settings, providing insight into how agroecological approaches support sustainable farming and contribute to local food systems. The course also addresses the socio-political dimensions of agroecology, highlighting how it intersects with food sovereignty, rural livelihoods, and community resilience.

By the end of this course, students will understand agroecology's role in addressing key agricultural and environmental challenges and be prepared to apply agroecological principles in diverse contexts, from small-scale farms to larger food systems.





#### TEACHING METHODS:

**Lectures:** Focus on the core principles of agroecology and ecological processes within agricultural systems.

**Practical Workshops:** Engage students in hands-on learning of agroecological techniques.

Field Visits: Offer real-world exposure to agroecological practices in local agricultural settings.

**Group Discussions:** Facilitate collaborative learning on topics like biodiversity and food sovereignty.

# PREREQUISITES:

Basic knowledge of environmental science or agriculture is recommended.

#### EVALUATIONS DETAILS:

**Field Visit Report (30%)**: Analyze and reflect on agroecological practices observed during field visits.

**Workshop Participation (20%)**: Demonstrate practical skills and engagement in agroecological techniques.

Final Exam (30%): Test understanding of core principles and concepts.

**Reflection Essay (20%)**: Personal reflection on the role of agroecology in sustainable agriculture and food systems.

Course 2: Soil	To be							
Science and	filled					Supervised		Drojact
Management in						Supervised		Project
Africa		Lectures	Tutorials	Practicals	Field	WUIK	Evaluation	WUIK
					trips			
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

#### **OBJECTIVE**:

To understand soil properties, management practices, and their implications for sustainable agriculture in Africa.

# PROGRAMME:

This course covers the foundational concepts of soil science, focusing specifically on the unique challenges and opportunities presented in the African context. Students will delve into soil formation processes, exploring the geological, climatic, and biological factors that contribute to soil diversity across the continent. Emphasis will be placed on understanding soil properties, including texture, structure, and nutrient content, and their critical roles in agricultural productivity.





The course will also address the socio-economic implications of soil management practices in Africa, such as land tenure issues and the impact of local farming practices on soil health. Students will engage in discussions around indigenous knowledge systems and their integration with modern scientific approaches to enhance soil management.

Practical sessions will allow students to perform soil tests and analyze results to understand soil fertility levels and assess management needs. Field trips to various agricultural settings will provide real-world insights into the application of sustainable soil management practices, such as conservation tillage and agroforestry, helping students appreciate the importance of soil health for food security and environmental sustainability.

#### TEACHING METHODS:

Classroom lectures Laboratory practical Fieldwork on soil sampling and analysis

# EVALUATIONS DETAILS:

Written Exam: 50% of the final grade

**Oral Presentation:** Group Component: 25%

Individual Component: 25%

Course 3:	To be							
Plant Physiology and Nutrition	filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To examine plant physiological processes and nutritional requirements necessary for optimal growth and productivity.

# PROGRAMME:

This course explores the intricate physiological processes that govern plant growth and development, emphasizing the critical role of nutrition. Students will learn about photosynthesis, transpiration, and respiration, examining how these processes interact to support plant health and productivity. The course will cover essential plant nutrients, their functions, and how deficiencies or excesses can impact plant physiology.





Students will investigate the mechanisms of nutrient uptake and transport within plants, focusing on root architecture and mycorrhizal associations that enhance nutrient availability. The course will also explore environmental factors affecting plant physiology, such as soil moisture, temperature, and light intensity, and how these factors influence plant responses to stress conditions.

Practical sessions will involve hands-on experiments to measure physiological parameters, such as photosynthetic rates and stomatal conductance, providing students with the skills to assess plant health effectively. Field trips to local farms will facilitate observations of plant responses to varying nutritional and environmental conditions, helping students connect theoretical knowledge with practical applications in agroecological systems.

#### TEACHING METHODS:

Classroom lectures Laboratory practicals Fieldwork on soil sampling and analysis

#### EVALUATIONS DETAILS:

Written Exam: 50% of the final grade

#### Oral Presentation:

Group Component: 25% Individual Component: 25%

Course 4:	To be							
Agricultural Biodiversity in Africa	filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

#### **OBJECTIVE:**

To explore the importance of agricultural biodiversity for food security, ecosystem resilience, and sustainable practices in Africa.

# PROGRAMME:

This course investigates the significance of agricultural biodiversity in enhancing food security, promoting sustainable farming practices, and conserving ecosystems in Africa. Students will study the diversity of crops and livestock species, understanding their ecological roles and contributions to agroecosystem resilience. The course will highlight the importance of traditional farming practices that foster biodiversity, examining case studies of indigenous agricultural systems.





Students will explore the threats to agricultural biodiversity, including habitat loss, climate change, and industrial agriculture practices, and discuss strategies for biodiversity conservation and restoration. The course will emphasize the role of participatory approaches in conserving and utilizing biodiversity, engaging students in discussions on community-based conservation efforts.

Practical sessions will involve conducting biodiversity assessments in various agricultural settings, enabling students to learn how to evaluate the richness and abundance of different species. Field trips will expose students to successful biodiversity-friendly farming systems, allowing them to observe and analyze the practices that support agricultural diversity and its benefits for farmers and ecosystems alike.

#### TEACHING METHODS:

Classroom lectures Field biodiversity assessments Group discussions

#### EVALUATIONS DETAILS:

Written Exam: 50% of the final grade

**Oral Presentation:** Group Component: 25% Individual Component: 25%

Course 5:								
Research								
Methods in								
Agroecology	To be	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
	filled					work		work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

#### **OBJECTIVE:**

To equip students with research skills and methodologies specific to agroecology.

# PROGRAMME:

This course equips students with the necessary skills and methodologies to conduct research in agroecology. Emphasizing both qualitative and quantitative approaches, the course begins with an introduction to research design, including formulating research questions, hypothesis development, and selecting appropriate methodologies. Students will learn how to collect and analyze data using statistical tools and software relevant to agroecological research.





The course will cover participatory research techniques, emphasizing the importance of engaging communities in research processes to address local agricultural challenges. Ethical considerations in conducting research, particularly in rural settings, will also be discussed to ensure responsible practices.

Practical sessions will allow students to design and present research proposals, receive feedback, and refine their methodologies. Field research activities will enable students to gather real-world data, applying their theoretical knowledge in practical settings. By the end of the course, students will have developed a comprehensive understanding of how to conduct rigorous and impactful research that contributes to the field of agroecology.

#### TEACHING METHODS:

Classroom lectures Workshops on research design Field research activities

#### EVALUATIONS DETAILS:

Research Proposal: 50% Oral Presentation: Group (25%), Individual (25%)

<b>Course 6</b> : Advanced Organic Pest Management	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

#### **OBJECTIVE:**

To analyze advanced strategies for managing pests in organic farming systems.

#### PROGRAMME:

This course provides an in-depth exploration of organic pest management strategies, focusing on integrated pest management (IPM) as a holistic approach to pest control. Students will analyze various biological control methods, including the use of natural predators and parasitoids, as well as cultural practices that mitigate pest populations. The course will examine the efficacy and ecological implications of organic pesticides, emphasizing their role within an IPM framework.

Through case studies, students will evaluate real-world applications of advanced pest management strategies, considering factors such as economic viability and environmental





sustainability. The course will also cover the identification and management of common pests and beneficial organisms, enabling students to develop their diagnostic skills.

Practical sessions will involve hands-on activities, such as field scouting for pests, conducting efficacy trials of organic treatments, and analyzing pest management data. Field trips will provide opportunities to observe organic farming operations and learn from farmers implementing successful pest management practices. By the end of the course, students will be equipped to develop and recommend effective pest management plans for diverse agroecosystems.

# TEACHING METHODS:

Classroom lectures Field identification exercises Case studies

# EVALUATIONS DETAILS:

Written Exam: 50% Pest Management Plan Presentation: Group (25%), Individual (25%)

<b>Course 7</b> : Agroecology and Public Health	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To explore the connections between agroecology and public health, particularly in the context of sustainable food systems.

# PROGRAMME:

This course examines the interconnectedness of agroecology and public health, highlighting the influence of agricultural practices on human health and well-being. Students will explore topics such as food safety, nutrition, and the impact of pesticide use on health outcomes. The course will address the role of agroecological practices in promoting healthy food systems that enhance public health.

Students will analyze case studies on the relationship between agricultural biodiversity, food security, and nutrition, emphasizing the importance of diverse diets for health. The course will also cover the environmental determinants of health, such as air and water quality, and their links to agricultural practices.





Practical sessions will involve discussions and workshops on designing public health interventions related to agroecology. Field trips will enable students to engage with communities affected by agricultural practices, providing insights into local health challenges and solutions. By the end of the course, students will have a comprehensive understanding of how agroecological approaches can contribute to improved public health outcomes and the importance of integrating health considerations into agricultural policies.

#### TEACHING METHODS:

Classroom lectures Community assessments Group discussions

#### EVALUATIONS DETAILS:

Written Exam: 50% Health Impact Assessment Presentation: Group (25%), Individual (25%)





# Semester 2

Total of Credits	Contact	hours					Project work
Credits: 21	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	196.00 h	64.00 h	120.00h	98.00 h	36.00 h	36.50 h	90.00 h

Personal work = Contact hours x2

Course 8:								
Integrated								
Pest								
Management	To be	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
	filled					work		work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To equip students with knowledge and practical skills in Integrated Pest Management (IPM) strategies to enhance sustainable agricultural practices.

# PROGRAMME:

This course provides an in-depth exploration of Integrated Pest Management (IPM) principles, focusing on reducing agricultural pest populations while minimizing environmental impacts. Students will engage with the ecological foundations of IPM, including pest life cycles, behavior, and the roles of natural predators. The course will delve into the various components of IPM, such as cultural practices that prevent pest infestations (e.g., crop rotation, cover cropping, and sanitation).

Students will analyze the economic threshold concept, which helps determine when pest control measures are necessary. Emphasis will be placed on understanding the risks and benefits associated with different pest control strategies, including biological control agents, such as beneficial insects and microbial pesticides, as well as chemical control options that are less harmful to non-target organisms.

Additionally, the course will cover the importance of monitoring pest populations through sampling techniques, scouting methods, and the use of decision-support tools. Field trips will provide students with real-world examples of IPM in practice, where they will observe pest management strategies on farms and engage with practitioners about the effectiveness of various methods.

Students will also conduct practical laboratory sessions to identify pests and beneficial organisms and develop integrated control strategies tailored to specific crops and





environmental conditions. By the end of this course, students will possess the skills to create and implement effective IPM plans, making them valuable contributors to sustainable agricultural practices.

# TEACHING METHODS:

- 1. **Classroom Lectures**: Interactive lectures will introduce key concepts of Integrated Pest Management (IPM), including pest biology, the ecology of pest control, and the principles of sustainable agriculture. Students will engage in discussions, ask questions, and apply theoretical concepts to practical scenarios.
- 2. **Laboratory Practicals**: Students will participate in laboratory sessions where they will learn and practice various pest identification techniques, monitoring methods, and biological control strategies. These sessions will help students develop practical skills in assessing pest populations and determining appropriate management options.
- 3. **Fieldwork**: Field trips to local farms or research stations will provide hands-on experience with IPM practices in real-world settings. Students will observe and analyze pest management strategies being implemented and conduct pest surveys to assess population dynamics.
- 4. **Group Discussions**: Facilitated discussions will allow students to critically analyze case studies and current research in IPM. This method encourages collaborative learning and the exchange of ideas among peers.
- 5. **Guest Lectures**: Industry experts and researchers in the field of pest management will be invited to share their experiences and insights, providing students with diverse perspectives and networking opportunities.

# PREREQUISITES:

Students are expected to have completed an introductory course in agriculture or biology, providing foundational knowledge of ecological principles, crop production, and pest management concepts. Familiarity with basic scientific methodologies and research techniques will be beneficial.

# EVALUATION DETAILS:

- **Lab Report**: 50% of the final grade (students will submit a detailed report on their practical findings, methodologies, and analyses).
- Oral Presentation:
  - **Group Component**: 25% (students will work in teams to present a case study on successful IPM strategies).
  - **Individual Component**: 25% (each student will individually present a pest management plan for a specific crop).





Course 9:								
Sustainable								
Crop								
Production	To be	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
	filled					work		work
Credits:		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h
3.00								

To understand sustainable practices in crop production, emphasizing productivity while conserving natural resources.

# PROGRAMME:

In this course, students will examine sustainable crop production methods that promote environmental stewardship and long-term productivity. The course will cover key principles of sustainable agriculture, including soil health, biodiversity, and agroecosystem resilience. Students will study the interrelationship between soil quality and crop performance, emphasizing practices such as reduced tillage, organic farming, and the use of cover crops to enhance soil structure and fertility.

The course will also explore crop selection and rotation strategies that optimize resource use and minimize pest and disease pressure. Students will learn about integrated weed management practices that combine cultural, mechanical, and chemical approaches to control invasive species while maintaining ecological balance.

Laboratory practicals will provide hands-on experiences in assessing soil health indicators and evaluating the impacts of different cropping systems on soil properties. Field trips will allow students to visit sustainable farms and research stations, where they can observe and discuss various sustainable practices in action.

Additionally, the course will introduce students to agroecological concepts that prioritize local knowledge and community engagement in developing sustainable farming practices. Case studies of successful sustainable crop production initiatives will help students understand the social and economic dimensions of sustainability, including the role of farmers' cooperatives and direct marketing strategies.

By the end of this course, students will be equipped with the knowledge and skills to implement sustainable crop production practices, contribute to local food systems, and advocate for environmentally responsible agricultural policies.

# TEACHING METHODS:

1. **Classroom Lectures**: Engaging lectures will cover topics such as agroecological practices, sustainable farming techniques, and the relationship between crop production





and environmental health. Students will participate in interactive discussions to deepen their understanding.

- 2. **Workshops**: Hands-on workshops will provide practical skills in sustainable practices, such as soil fertility management, crop rotation planning, and organic pest control methods. Students will work in groups to develop their own sustainable production plans.
- 3. **Field Trips**: Visits to organic farms and agroecological research sites will allow students to observe and evaluate real-life applications of sustainable crop production techniques. Students will engage with farmers and researchers to gain insights into their practices and challenges.
- 4. **Case Studies**: Analysis of case studies from diverse agricultural settings will encourage critical thinking about the effectiveness of different sustainable practices and their adaptability to local conditions.
- 5. **Online Learning Courses**: Supplementary online resources and forums will facilitate independent learning and discussion of relevant topics, allowing students to explore concepts at their own pace.

# PREREQUISITES:

Completion of an introductory course in agriculture or environmental science is required, with an emphasis on understanding basic agricultural systems and environmental interactions.

# EVALUATION DETAILS:

- **Project Report**: 50% of the final grade (students will develop a comprehensive sustainable crop production plan for a chosen crop or system).
- Oral Presentation:
  - **Group Component**: 25% (teams will present their project plans, emphasizing the sustainability aspects).
  - **Individual Component**: 25% (individual presentations on a specific sustainable practice).

<b>Course 10</b> : Agroforestry Systems								
5,500	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credit: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h





To explore the principles and practices of agroforestry as a sustainable land-use system.

# PROGRAMME:

This course provides a comprehensive overview of agroforestry systems and their role in sustainable land management. Students will learn about the principles of agroforestry, which integrates trees, crops, and livestock in a way that enhances biodiversity, improves soil health, and increases resilience against climate change. The course will cover various agroforestry practices, including alley cropping, silvopasture, and forest gardening.

Students will explore the ecological benefits of agroforestry, such as improved carbon sequestration, enhanced nutrient cycling, and reduced soil erosion. They will study case studies that highlight successful agroforestry systems in diverse contexts, including tropical, temperate, and arid regions. The course will also discuss the socio-economic benefits of agroforestry, including increased farm income, enhanced food security, and improved livelihoods for rural communities.

Laboratory sessions will focus on identifying tree species suitable for agroforestry systems, understanding their growth requirements, and assessing their ecological functions. Students will participate in field trips to observe agroforestry practices in real-world settings, allowing them to engage with farmers and experts about the challenges and opportunities of implementing such systems.

Additionally, students will investigate policy frameworks that support agroforestry development, including land tenure security, financial incentives, and community-based management approaches. By the end of the course, students will have a solid understanding of how to design and implement agroforestry systems that promote sustainable agriculture and enhance ecosystem services, preparing them to work effectively in agroecological and environmental conservation fields.

# TEACHING METHODS:

- 1. **Lectures**: Classroom lectures will cover the principles and benefits of agroforestry, including ecological and economic aspects. Students will engage in discussions about the role of trees in agricultural landscapes.
- 2. **Field Studies**: Students will participate in field studies to observe various agroforestry systems in practice. They will assess the ecological benefits and challenges of integrating trees into farming systems.
- 3. **Hands-on Activities**: Practical sessions will involve activities such as tree planting, soil assessment, and biodiversity evaluations. These activities will provide students with hands-on experience in implementing agroforestry practices.
- Group Projects: Students will collaborate on group projects to design and propose agroforestry systems for specific regions, considering local environmental conditions and socio-economic factors.





 Expert Seminars: Invited speakers from agroforestry research and practice will share their experiences, providing students with insights into current trends and challenges in the field.

# PREREQUISITES:

Students should have completed an introductory course in environmental science or agriculture. Familiarity with ecological concepts and agricultural practices will enhance their understanding of agroforestry systems.

# EVALUATION DETAILS:

**Field Report**: 50% of the final grade (students will submit a report detailing their field studies and analysis of agroforestry practices).

- Group Presentation:
  - **Group Component**: 25% (teams will present their agroforestry design projects).
  - **Individual Component**: 25% (students will individually reflect on their learning and experiences during the course).

Course 11:								
Climate								
Change and								
Agriculture in	To be	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
Africa	filled					work		work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To assess the impacts of climate change on agricultural practices in Africa and develop adaptation strategies.

# PROGRAMME:

This course investigates the complex interactions between climate change and agriculture in the African context. Students will learn about the scientific principles underlying climate change, including greenhouse gas emissions, climate models, and projected impacts on weather patterns and agricultural productivity. The course will emphasize how these changes affect crop yields, food security, and rural livelihoods in various regions of Africa.

Through lectures and discussions, students will explore the vulnerabilities of different agricultural systems to climate change, including smallholder farming, pastoralism, and agroforestry. They will analyze case studies that illustrate both the risks posed by climate





change and the adaptation strategies employed by farmers, such as crop diversification, water management techniques, and the use of climate-resilient crop varieties.

Field trips will provide students with opportunities to observe local farming practices and engage with communities actively implementing adaptation strategies. Practical sessions will include data analysis exercises, where students will assess the impacts of climate variability on agricultural systems using real data.

Additionally, the course will address policy responses to climate change, focusing on national and international frameworks that support climate-smart agriculture. Students will learn about the role of agriculture in climate mitigation efforts and the importance of integrating sustainable practices into climate policy.

By the end of this course, students will be equipped to assess the impacts of climate change on agriculture and develop strategies to enhance resilience in agricultural systems, making them effective advocates for sustainable agricultural practices in the face of climate challenges.

# TEACHING METHODS:

- 1. **Lectures**: Comprehensive lectures will discuss the impacts of climate change on agriculture, adaptation strategies, and resilience-building practices. Students will explore case studies from different regions in Africa.
- 2. **Interactive Workshops**: Workshops will provide students with tools for assessing climate vulnerability and developing climate-smart agricultural practices. Students will work in groups to create adaptation strategies for specific crops or farming systems.
- 3. **Field Trips**: Visits to agricultural sites affected by climate change will allow students to observe the impacts firsthand and engage with farmers and agricultural extension officers about their experiences.
- 4. **Research Projects**: Students will conduct independent research projects on specific aspects of climate change and agriculture, culminating in a presentation of their findings.
- 5. **Panel Discussions**: Expert panels will facilitate discussions on climate policy, agricultural innovations, and sustainable practices, allowing students to engage with leaders in the field.

# PREREQUISITES:

A foundational understanding of environmental science or agriculture is necessary. Students should have completed relevant introductory courses to fully engage with the complex interactions between climate and agriculture.

# EVALUATION DETAILS:

- **Research Paper**: 50% of the final grade (students will submit a research paper analyzing a specific climate change impact on agriculture).
- Oral Presentation:
  - **Group Component**: 25% (group presentations on climate adaptation strategies).





0	Individual Component	:: 25% (individual	presentations on	their research finding	ngs).
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Course 12:								
Agricultural								
Policy and								
Economics in	To be	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
Africa	filled					work		work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

To understand the agricultural policies and economic frameworks that influence agricultural practices in Africa.

#### PROGRAMME:

This course delves into the agricultural policies and economic principles that shape the agricultural landscape in Africa. Students will gain an understanding of the key policy frameworks affecting agricultural production, trade, and food security, including national agricultural strategies, regional trade agreements, and international trade policies.

The course will cover topics such as agricultural financing, market access, and the role of cooperatives in enhancing farmers' livelihoods. Students will analyze case studies that highlight successful policy interventions and their impacts on agricultural development and rural economies.

Additionally, the course will examine the economic concepts of supply and demand, market structures, and the role of government in regulating agricultural markets. Through lectures and discussions, students will explore the challenges facing African agriculture, including land tenure issues, access to credit, and the impact of globalization on local markets.

Field trips will provide practical insights into how policies are implemented at the community level, allowing students to interact with local farmers and agricultural extension officers. Students will also engage in simulations and role-playing exercises to understand the complexities of policy-making and advocacy.

By the end of this course, students will have a comprehensive understanding of the economic and policy dimensions of agriculture in Africa, enabling them to critically assess and contribute to agricultural policy formulation and implementation.

# TEACHING METHODS:





- 1. **Lectures**: Detailed lectures will cover agricultural policies, economic principles, and their implications for farming systems in Africa. Students will analyze different policy frameworks and their effects on agricultural development.
- 2. **Case Study Analysis**: Students will engage in case studies that examine specific agricultural policies in various African countries, allowing them to assess their effectiveness and challenges.
- 3. **Policy Simulation**: Role-playing exercises will simulate policy-making processes, giving students insight into the complexities of agricultural policy formulation and implementation.
- 4. **Guest Lectures**: Experts in agricultural economics and policy will provide insights into current challenges and trends, facilitating discussions with students.
- 5. **Group Projects**: Students will work in teams to propose policy recommendations for specific agricultural issues, promoting collaborative problem-solving.

# PREREQUISITES:

Completion of introductory courses in economics or agricultural sciences is required to ensure students have a foundational understanding of the economic principles relevant to agriculture.

# EVALUATION DETAILS:

- **Policy Brief**: 50% of the final grade (students will produce a policy brief on a specific agricultural issue).
- Oral Presentation:
  - **Group Component**: 25% (teams will present their policy recommendations).
  - **Individual Component**: 25% (individual presentations on the economic analysis of their chosen issue).

Course 13:								
Crop Genetic								
Resources								
	To be	Lectures	Tutorials	Practicals	Field trips	Supervised	Evaluation	Project
	filled					work		work
Credits: 3.00	-	30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To explore the importance of crop genetic diversity and its role in sustainable agriculture.

# PROGRAMME:





This course focuses on the conservation and utilization of crop genetic resources and their significance for sustainable agriculture. Students will learn about the diversity of crop species and varieties, the processes of domestication, and the importance of genetic diversity for food security and climate resilience.

The course will cover topics such as plant breeding techniques, including traditional breeding, biotechnology, and participatory breeding, emphasizing the role of local communities in conserving and utilizing genetic resources. Students will analyze the impacts of genetic erosion on crop diversity and the implications for agricultural productivity.

Practical sessions will involve laboratory work in plant identification and assessment of genetic traits, as well as field trips to seed banks and research institutions where students can observe conservation efforts and breeding programmes in action.

Additionally, the course will address the legal and ethical aspects of genetic resource management, including international agreements such as the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture. Students will explore case studies of successful conservation programmes and their impacts on local communities and agricultural systems.

By the end of this course, students will have a thorough understanding of the importance of crop genetic resources in sustainable agriculture, equipping them to advocate for and contribute to conservation efforts that enhance food security and resilience.

# TEACHING METHODS:

- 1. **Lectures**: Engaging lectures will cover the importance of crop genetic diversity, conservation strategies, and the role of genetic resources in sustainable agriculture.
- 2. **Laboratory Practicals**: Students will participate in laboratory sessions focused on the identification and evaluation of crop genetic resources. Techniques such as germination testing and morphological assessments will be taught.
- 3. **Field Surveys**: Field trips to farms and conservation sites will allow students to collect data on crop diversity and assess local practices for conserving genetic resources.
- 4. **Research Projects**: Students will conduct research on specific crops, exploring their genetic diversity and implications for food security and climate adaptation.
- 5. **Panel Discussions**: Experts in plant breeding and conservation will lead discussions on current challenges and innovations in managing crop genetic resources.

# PREREQUISITES:

Students should have completed courses in plant biology or agriculture to grasp the concepts of genetic diversity and its importance in agricultural practices.

# EVALUATION DETAILS:

• **Research Report**: 50% of the final grade (students will submit a report detailing their research on crop genetic resources).





#### • Oral Presentation:

- Group Component: 25% (team presentations on their research findings).
- Individual Component: 25% (individual reflections on the importance of genetic diversity).

Course 14: Policy								
Advocacy for						Cupandicad		Draiact
Agroecology						Supervised		Project
	To be	Lectures	Tutorials	Practicals	Field	WOLK	Evaluation	WOLK
	filled				trips			
Credits: 3		16.00	4.00 hrs	-	8.00	6.00 hours	6.50 hours	
		1115			nours			

# OBJECTIVE:

To equip students with skills to advocate for agroecological policies and practices.

# PROGRAMME:

This course aims to empower students with the skills and knowledge necessary for effective advocacy in support of agroecological practices. Students will explore the principles of policy advocacy, including how to identify stakeholders, frame issues, and develop strategic messaging that resonates with policymakers and the public.

The course will cover the role of evidence-based research in informing policy decisions and the importance of community engagement in the advocacy process. Students will analyze successful advocacy campaigns that have led to policy changes supporting agroecology, examining strategies used by various organizations and movements.

Practical workshops will provide students with hands-on experience in developing advocacy materials, such as policy briefs, position papers, and media releases. They will also participate in role-playing exercises that simulate advocacy scenarios, enabling them to practice their skills in real-time discussions and negotiations.

Field trips will offer opportunities to engage with local organizations involved in agroecological advocacy, allowing students to learn from practitioners about the challenges and successes of their efforts.

Additionally, the course will address the global context of agroecology, examining international movements and networks that support sustainable agriculture. Students will explore the connections between agroecology, social justice, and environmental sustainability.

# TEACHING METHODS:





- **Lectures**: Focus on advocacy strategies, policy landscapes, and stakeholder engagement.
- **Workshops**: Skills development workshops in communication, lobbying, and policy writing.
- Role-Playing Exercises: Simulate policy meetings and advocacy negotiations.
- **Guest Speakers**: Insights from agroecology advocates and policymakers.

# PREREQUISITES:

- Knowledge of agroecology or environmental policy.
- Basic communication and writing skills are recommended.

# EVALUATION DETAILS:

- **Policy Brief**: 40% Students draft a policy brief on an agroecological issue.
- **Role-Playing Assessment**: 30% Performance in a simulated policy advocacy exercise.
- **Reflection Essay**: 30% Personal reflection on learning experiences and advocacy skills.





#### Semester 3

Total of Credits	Contact I	nours					Project work
Credits: 21	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
	210.00 h	70.00 h	140.00h	105.00 h	35.00 h	35.00 h	105.00 h

Personal work = Contact hours x2

<b>Course 15</b> : Advanced Agroecology	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

#### **OBJECTIVE:**

To provide students with an advanced understanding of agroecology as both a scientific field and a set of practices that promote ecological balance, social equity, and economic sustainability in agriculture.

# PROGRAMME:

This course explores the complex relationships within agricultural ecosystems, emphasizing a holistic approach to managing natural resources in sustainable ways that consider environmental, social, and economic dimensions. The course begins by examining the core principles of agroecology, including nutrient cycling, ecological pest control, biodiversity preservation, and ecosystem resilience. Emphasis is placed on agroecology as a science that integrates ecological, sociological, and economic perspectives, aiming to address pressing challenges such as climate change, soil degradation, and resource scarcity.

Students will study how diverse farming practices—like crop rotation, agroforestry, and cover cropping—improve soil fertility, enhance water retention, and foster biodiversity. Through both classroom-based learning and field visits, students will analyze agroecological systems in various real-world settings, investigating how these methods can lead to more resilient farming systems. By exploring case studies from different regions, students will understand how agroecological practices adapt to local environmental conditions, cultural values, and social needs. Topics like





polyculture, sustainable livestock integration, and seed sovereignty will further enhance their knowledge of practices aimed at improving resilience and productivity in agricultural landscapes.

Field visits to local farms and agroecology projects will allow students to witness first-hand the impact of these practices and gain practical insights into agroecological management. In addition, group work will encourage collaborative analysis of case studies, where students will explore and debate the challenges and benefits of implementing agroecological systems. Finally, students will learn to assess ecological outcomes of agricultural practices, recognizing the role that agroecology can play in supporting long-term food security and community well-being.

# TEACHING METHODS:

Classroom lectures

Laboratory practicals

Fieldwork on soil sampling and analysis

#### PREREQUISITES:

A foundational knowledge of ecology, biology, or agricultural sciences is recommended to ensure that students can engage deeply with the ecological principles underpinning agroecology. Prior exposure to environmental policy and sustainable agricultural practices will also be beneficial.

# EVALUATIONS DETAILS:

**Research Project (40%)**: Students will conduct in-depth research on a specific agroecological practice or system, analyzing its ecological, social, and economic impacts.

**Group Presentation (30%)**: Working in small groups, students will present case studies of successful agroecological projects, highlighting innovative practices and outcomes.

Field Visit Report (30%): After attending a field visit, students will submit a reflective report discussing the practical applications of agroecology observed and the challenges and opportunities identified.

<b>Course 16</b> : Water Management in Agriculture	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h





To equip students with essential skills in managing water resources to promote agricultural sustainability and resilience.

# PROGRAMME:

Water is a vital resource in agriculture, and its management is essential to ensure long-term food security and environmental health. This course provides students with an in-depth understanding of efficient water management techniques in agriculture, focusing on strategies that enhance water conservation and quality. The course explores irrigation methods, from traditional systems to modern drip and sprinkler systems, and emphasizes sustainable practices that reduce water waste and improve soil-water interactions. Students will learn about water harvesting, storage techniques, and the use of recycled water in agriculture.

Through hands-on lab work and field visits, they will observe and evaluate water management practices in local farms, including assessing soil moisture, understanding crop water requirements, and analyzing irrigation scheduling. Additionally, the course examines the impacts of climate change on water availability and explores adaptation strategies to address water scarcity. Case studies from various regions provide practical examples of successful water management practices and highlight the role of policy, technology, and community engagement in achieving sustainable water use.

# TEACHING METHODS:

**Lectures:** Cover theoretical knowledge on water management, irrigation systems, and sustainability.

Field Visits: Observe water management practices firsthand and evaluate their effectiveness.

Lab Work: Analyze soil-water interactions and explore irrigation techniques.

Group Discussions and Case Studies: Discuss case studies and share insights.

# PREREQUISITES:

Basic understanding of hydrology, soil science, or environmental science is beneficial.

# EVALUATIONS DETAILS:

**Case Study Report (40%)**: Analyze water management practices in selected case studies.

Field Visit Log (30%): Document and assess field observations.

Final Exam (30%): Test theoretical knowledge and practical applications.





<b>Course 17</b> : Organic Farming Systems	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

To provide students with a comprehensive understanding of organic farming principles and practices, focusing on sustainability, ecosystem health, and food quality.

# PROGRAMME:

This course explores organic farming systems in depth, providing students with knowledge and skills to evaluate and implement sustainable farming practices. Topics include organic certification standards, soil fertility management, organic pest control, and biodiversity enhancement. Students will explore the ecological, social, and economic impacts of organic farming, with a particular focus on how organic practices promote biodiversity, improve soil health, and reduce reliance on chemical inputs.

Practical sessions and field visits to organic farms will allow students to observe organic farming methods in action and understand the challenges and opportunities associated with them. The course will also cover consumer trends, market challenges, and policy implications for organic farming. Through group discussions and case studies, students will analyze successful organic farms and reflect on the impact of organic farming on both local communities and global food systems.

#### TEACHING METHODS:

**Lectures:** Provide theoretical understanding of organic farming practices and principles.

Field Visits: Observe organic farming practices and methods in real-world settings.

**Practical Sessions:** Engage in hands-on activities to apply organic farming techniques.

Group Discussions: Analyze and reflect on case studies and current issues.

# PREREQUISITES:

Basic knowledge in agriculture, ecology, or sustainable farming practices is recommended.

# EVALUATIONS DETAILS:

Field Report (40%): Document observations and reflections from organic farm visits.

**Case Study Analysis (30%)**: Evaluate and compare organic practices from selected case studies.

**Group Presentation (30%)**: Present findings on a specific aspect of organic farming.





Course 18:	To be							
GIS and	filled					Cupanticad		Draigst
Remote						Supervised		Project
Sensing in		Lectures	Tutorials	Practicals	Field	WOIK	Evaluation	WOIK
Agriculture					trips			
Cradite: 7.00		70.00 h	10.00 h	20.00 h	15 00 h	5 00 b	5 00 h	15.00 h
Cieuits. 5.00		50.00 11	10.00 11	20.00 11	13.00 11	5.00 11	5.00 11	13.00 11

To develop students' skills in using GIS and remote sensing technologies to monitor and manage agricultural landscapes effectively.

# PROGRAMME:

This course explores organic farming systems in depth, providing students with knowledge and skills to evaluate and implement sustainable farming practices. Topics include organic certification standards, soil fertility management, organic pest control, and biodiversity enhancement. Students will explore the ecological, social, and economic impacts of organic farming, with a particular focus on how organic practices promote biodiversity, improve soil health, and reduce reliance on chemical inputs.

Practical sessions and field visits to organic farms will allow students to observe organic farming methods in action and understand the challenges and opportunities associated with them. The course will also cover consumer trends, market challenges, and policy implications for organic farming. Through group discussions and case studies, students will analyze successful organic farms and reflect on the impact of organic farming on both local communities and global food systems.

# TEACHING METHODS:

**Lectures:** Provide theoretical understanding of organic farming practices and principles.

Field Visits: Observe organic farming practices and methods in real-world settings.

**Practical Sessions:** Engage in hands-on activities to apply organic farming techniques.

**Group Discussions:** Analyze and reflect on case studies and current issues.

# PREREQUISITES:

Basic knowledge in agriculture, ecology, or sustainable farming practices is recommended.

# EVALUATIONS DETAILS:

**Field Report (40%)**: Document observations and reflections from organic farm visits.

**Case Study Analysis (30%)**: Evaluate and compare organic practices from selected case studies.

**Group Presentation (30%)**: Present findings on a specific aspect of organic farming.





Course 19: <b>Agroecological Design and Planning</b>	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

To teach students how to design agricultural landscapes that align with ecological principles, fostering sustainability and biodiversity.

# PROGRAMME:

This course focuses on the application of ecological design principles in agriculture, teaching students how to create sustainable farming systems that support ecosystem health and resilience. Students will learn techniques such as crop-livestock integration, agroforestry, and habitat restoration, gaining insights into how to optimize biodiversity while maximizing productivity.

Through hands-on workshops and practical design sessions, students develop skills to design tailored agroecological plans that incorporate water and soil management, crop diversification, and natural pest control. The course includes case studies and field visits to agroecologically managed farms, offering examples of how these practices are implemented in diverse environments. By the end of the course, students will be able to create sustainable farming designs that balance productivity with environmental stewardship.

# TEACHING METHODS:

**Lectures:** Explain key concepts in agroecological design and planning.

**Workshops:** Hands-on sessions for students to develop and refine agroecological designs.

Field Visits: Observe agroecological practices in action.

**Group Projects:** Collaborative design projects to create real-world agroecological plans.

# PREREQUISITES:

Familiarity with agroecology or environmental planning is beneficial.

# EVALUATIONS DETAILS:

**Design Project (50%)**: Develop an agroecological farm plan.

**Field Visit Report (30%)**: Reflect on observations from agroecological sites.

**Group Presentation (20%)**: Present design concepts and strategies.





Course 20:	To be							
Indigenous	filled					Supervised		Droject
Knowledge						Supervised		Project
Systems in		Lectures	Tutorials	Practicals	Field	WOIK	Evaluation	WOIK
Agriculture					trips			
Credits: 3.00	_	30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

To provide students with insights into the role of indigenous knowledge in sustainable agricultural practices and biodiversity conservation.

# PROGRAMME:

This course introduces students to the agricultural practices rooted in indigenous knowledge systems and explores their significance in promoting sustainability and resilience in farming. Indigenous agricultural knowledge encompasses centuries-old techniques adapted to local environments, including crop rotation, soil preservation, and traditional pest management. These practices often offer effective, low-cost alternatives that have a minimal environmental impact.

Students will explore specific case studies showcasing indigenous practices, such as terracing, agroforestry, and water conservation techniques, which have helped communities adapt to changing climates and preserve biodiversity. Field visits and community engagements provide students with hands-on experience and direct interaction with local farmers and knowledge holders. Students will learn how traditional farming practices, cultural beliefs, and community governance play a vital role in maintaining the balance of ecosystems and enhancing food security. The course also addresses the challenges of integrating indigenous knowledge into mainstream agricultural systems and the importance of respecting and preserving these practices in the face of modernization.

# TEACHING METHODS:

Lectures: Cover the theory and history of indigenous agricultural knowledge systems.

Field Visits and Community Engagements: Facilitate direct interaction with practitioners of indigenous methods.

**Case Study Analysis:** Allow students to analyze real-world examples and draw parallels with modern techniques.

**Group Discussions:** Enable students to discuss and evaluate the relevance of indigenous practices today.

# PREREQUISITES:





A foundational knowledge of agriculture or environmental science is recommended, with an interest in social and cultural studies.

# EVALUATIONS DETAILS:

Field Visit Report (40%): Document and analyze insights gained from field visits.

**Case Study Presentation (30%)**: Present findings on a specific indigenous practice and its applications.

**Reflection Essay (30%)**: Reflect on the role and potential of indigenous knowledge in sustainable agriculture.

<b>Course 21:</b> Post-Harvest Technology	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

#### OBJECTIVE:

To equip students with knowledge and skills in managing post-harvest processes to reduce losses, improve quality, and enhance the sustainability of food systems.

# PROGRAMME:

Post-harvest technology focuses on the processes that take place after harvesting to reduce losses, maintain quality, and extend shelf life. This course covers key principles and techniques of post-harvest handling, including harvesting methods, storage, preservation, and transportation practices. Students will examine the physical and biochemical factors affecting post-harvest quality and the importance of controlled environments in preserving freshness.

The course will explore modern technologies in packaging and storage, such as modified atmosphere storage and cold chain logistics, alongside traditional methods that remain effective in resource-limited settings. Practical lab sessions will enable students to handle different crops, observe storage techniques, and analyze the effects of various treatments on produce longevity. Through case studies, students will assess the economic and environmental implications of post-harvest losses and explore strategies to minimize them. By the end of the course, students will understand how post-harvest technology plays a critical role in food security, especially in developing countries, and gain the skills to improve post-harvest practices in diverse agricultural contexts.

# TEACHING METHODS:

**Lectures:** Provide theoretical knowledge on post-harvest physiology and technologies.





**Practical Sessions and Lab Work:** Hands-on practice in post-harvest handling and preservation techniques.

**Case Study Analysis:** Analyze real-world examples to understand challenges and solutions.

**Group Discussions:** Facilitate collaborative learning and peer exchange on post-harvest issues.

# PREREQUISITES:

Basic knowledge in agriculture, food science, or crop management is recommended.

### EVALUATIONS DETAILS:

**Lab Report (40%)**: Document findings from lab sessions and experiments on post-harvest methods.

**Case Study Project (30%)**: Analyze a specific post-harvest issue and propose solutions.

**Final Exam (30%)**: Assess understanding of key concepts and application of post-harvest practices.





#### Semester 4

Total of Credits	Contact ho	Contact hours								
Credits: 36	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work			
	210.00 h	76.00 h	140.00 h	105.00 h	51.00 h	38.00 h	225.00 h			

Course 22 :	To be							
Food	filled					Supervised		Droject
Systems and						Supervised		Project
Food		Lectures	Tutorials	Practicals	Field	WOIK	Evaluation	WOIK
Security					trips			
Credits: 3.00	-	30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To develop students' understanding of global food systems, food security issues, and the interconnections among environmental, economic, and social factors affecting food access and availability.

# PROGRAMME:

This course examines the structure of global food systems and the challenges related to achieving food security worldwide. Students will study the components of food systems, from production and processing to distribution and consumption, and explore how these components influence food availability and accessibility.

Topics include the impact of climate change on food security, the role of policy and governance in food system resilience, and the importance of sustainable agricultural practices. Through case studies and field visits, students will investigate local and global food systems and assess strategies to promote sustainable food security. Workshops will enable students to explore topics like agroecology, supply chain logistics, and economic inequalities in food access.

By the end of the course, students will understand the multi-dimensional nature of food security and the role of innovation in addressing these challenges.

# TEACHING METHODS:

**Lectures:** Provide foundational knowledge on food systems and food security concepts.

Field Visits: Allow students to observe real-world food production and distribution systems.

**Workshops:** Interactive sessions for exploring complex issues in food security.





Group Discussions: Facilitate collaborative analysis of case studies and challenges.

# PREREQUISITES:

Introductory knowledge of environmental science or agriculture is recommended.

# EVALUATIONS DETAILS:

**Case Study Analysis (40%)**: Analyze food security issues in a specific context.

**Workshop Participation (30%)**: Contribute to workshop discussions and activities.

**Research Essay (30%)**: Discuss a selected food system and food security topic.

<b>Course 23 :</b> Renewable Energy in Agriculture	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To equip students with knowledge of renewable energy solutions for agricultural practices and explore sustainable alternatives to conventional energy sources in farming.

# PROGRAMME:

This course covers the principles of renewable energy technologies and their applications in agriculture. Topics include solar, wind, and bioenergy systems, with a focus on their potential to improve energy efficiency, reduce emissions, and enhance farm productivity.

Students will examine case studies of farms that have adopted renewable energy technologies, analyzing the benefits and challenges faced. Lab sessions offer hands-on experience with renewable energy tools and techniques, such as solar irrigation and biomass generation. Additionally, the course addresses the economic, environmental, and social impacts of adopting renewable energy solutions in rural areas, including barriers to implementation and the role of policy.

By the end of the course, students will have a practical understanding of how renewable energy can transform agricultural systems for greater sustainability.

# TEACHING METHODS:

**Lectures:** Introduce renewable energy sources and their agricultural applications.

Lab Sessions: Hands-on practice with renewable energy technologies.

**Case Study Analysis:** Explore real-world examples of renewable energy in agriculture.

Group Projects: Collaborative projects to design renewable energy solutions for farms.





# PREREQUISITES:

Basic understanding of agricultural systems and environmental science is beneficial.

# EVALUATIONS DETAILS:

**Lab Report (40%)**: Document findings and observations from lab sessions.

**Group Project (30%)**: Design a renewable energy plan for a selected agricultural system.

Final Exam (30%): Assess understanding of key concepts and applications.

Course 24 :	To be							
Conservation	filled					Supervised		Project
Biology and						Superviseu		work
Agroecology		Lectures	Tutorials	Practicals	Field	WUIK	Evaluation	WUIK
					trips			
	-							
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

# OBJECTIVE:

To provide students with a comprehensive understanding of conservation biology principles within the context of agroecology, emphasizing biodiversity preservation in agricultural landscapes.

# PROGRAMME:

This course explores the role of conservation biology in supporting sustainable agriculture. Students will study the ecological functions and biodiversity in agroecosystems, learning how conservation practices can support ecosystem services essential for agriculture.

Key topics include habitat restoration, biodiversity monitoring, and the management of species in agricultural environments. Fieldwork provides hands-on experience with biodiversity assessment techniques, while group projects allow students to develop conservation plans for agricultural landscapes.

The course also covers the policy and socio-economic factors influencing conservation in agricultural systems, preparing students to balance production needs with ecological preservation.

# TEACHING METHODS:

**Lectures:** Cover conservation biology theories and practices.

Field Work: Practical training in biodiversity monitoring and conservation methods.

Workshops: Engage students in interactive exercises on conservation planning.

Group Projects: Encourage collaborative development of conservation strategies.

PREREQUISITES:




A background in biology or ecology is recommended.

### EVALUATIONS DETAILS:

Field Report (40%): Summarize findings from fieldwork and biodiversity assessments.

**Conservation Plan Project (30%)**: Develop a conservation plan for an agricultural setting.

Final Reflection Essay (30%): Reflect on learning and conservation implications for agroecology.

<b>Course 25 :</b> Urban Agriculture	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

### **OBJECTIVE:**

To examine urban agriculture as a sustainable solution for food security, community building, and environmental benefits in urban settings.

### PROGRAMME:

Urban agriculture explores the integration of food production into city environments, examining its benefits, challenges, and socio-economic impacts.

Students will study various urban farming models, from rooftop gardens and vertical farms to community plots, and investigate their role in addressing food security. Field visits allow students to observe urban farms firsthand and learn about innovative practices. Group projects provide the opportunity to design urban agriculture projects suited to different urban contexts. The course also addresses the policy, social, and economic dimensions of urban farming, highlighting its role in promoting sustainable cities and resilient communities.

## TEACHING METHODS:

**Lectures:** Present theoretical foundations and case studies of urban agriculture.

Field Visits: Observe urban agriculture operations and practices.

**Group Workshops:** Collaborative sessions for designing urban agriculture projects.

**Project Work:** Application of theoretical knowledge to real-world urban scenarios.

## PREREQUISITES:

None required; familiarity with sustainable development concepts is helpful.

## EVALUATIONS DETAILS:

Urban Farm Case Study (40%): Analyze a selected urban farm project.





**Group Project (30%)**: Design an urban agriculture proposal for a specific urban area.

**Reflective Journal (30%)**: Document personal learning and insights.

<b>Course 26:</b> Social Dimensions of Agroecology	To be filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

### **OBJECTIVE**:

To explore the social, cultural, and community aspects of agroecology, with a focus on participatory practices and social justice in agriculture.

### PROGRAMME:

This course delves into the social dimensions of agroecology, examining the importance of community engagement, equity, and cultural knowledge in sustainable agriculture. Topics include participatory research, farmer-led innovation, and the role of social movements in promoting agroecology.

Students will analyze case studies of successful agroecological initiatives that prioritize community well-being and social equity. Workshops and role-playing exercises will provide practical skills in community engagement, fostering empathy and collaborative problem-solving. By the end of the course, students will understand the importance of social justice in achieving sustainable agricultural systems.

## TEACHING METHODS:

**Lectures:** Explore theories of social equity and community engagement in agroecology.

Workshops: Focus on participatory methods and community-based approaches.

**Role-Playing Exercises:** Simulate real-world challenges in agroecological contexts.

**Case Study Discussions:** In-depth analysis of social dimensions in agroecology projects.

### PREREQUISITES:

Basic understanding of social science concepts is recommended.

### EVALUATIONS DETAILS:

**Case Study Analysis (40%)**: Analyze a community-focused agroecological project.

Workshop Participation (30%): Active involvement in role-playing and workshop activities.





**Reflection Essay (30%)**: Reflect on the social aspects of agroecology.

Course 27:	To be							
Advanced GIS Applications in Agroecology	filled	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3.00		30.00 h	10.00 h	20.00 h	15.00 h	5.00 h	5.00 h	15.00 h

### **OBJECTIVE**:

To equip students with advanced GIS skills for spatial analysis and mapping in agroecology, enabling effective planning, monitoring, and decision-making in sustainable agricultural landscapes.

### PROGRAMME:

This course provides an in-depth understanding of Geographic Information Systems (GIS) and their applications in agroecology. It focuses on advanced GIS techniques for spatial data analysis, land-use planning, and ecosystem service evaluation within agricultural landscapes. Students will learn how to use GIS to assess soil health, monitor crop growth, manage water resources, and track biodiversity. Topics include spatial data acquisition, remote sensing integration, and the application of multi-layered mapping to identify areas for agroecological intervention.

The course includes hands-on lab sessions where students will work with GIS software to perform spatial analyses relevant to agroecology. They will engage in field data collection and learn methods for accurately capturing, processing, and integrating data with GIS software for various applications, such as soil mapping and erosion analysis. Case studies will cover the use of GIS in resource optimization, biodiversity conservation, and risk assessment for pest and disease outbreaks.

By the end of this course, students will have the skills to design and implement GIS-based projects that support sustainable agricultural management and resilience planning.

### TEACHING METHODS:

**Lectures:** Cover advanced GIS concepts and agroecological applications.

Lab Sessions: Practical training in GIS software and spatial analysis techniques.

**Field Data Collection and Analysis:** Hands-on experience in collecting geospatial data for agroecological projects.

**Case Study Discussions:** Examination of real-world GIS applications in agroecology.





# PREREQUISITES:

Students should have foundational knowledge in GIS and basic agroecological principles. Familiarity with environmental science or agriculture is recommended.

## EVALUATIONS DETAILS:

**Lab Project (40%)**: Students will complete a GIS-based analysis project related to agroecology, demonstrating skills in spatial data analysis and mapping.

**Field Report (30%)**: Documentation and analysis of field data collection and integration with GIS.

**Final Exam (30%)**: Assess understanding of GIS applications and ability to analyze spatial data within agroecological contexts.

<b>Course 28:</b> Thesis Research and Dissertation	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 18	0.00 h	6.00 h	0:00 h	.00 h	16.00 h	3.00 h	120.00 h

# OBJECTIVE:

The aim is to ensure that, the student has developed a final research project, a component of the MasterAgroecology, which equips the candidate with skills to apply cumulative knowledge and skills gained in the programme.

# PROGRAMME:

Students are expected to use the tools acquired from the courses to undertake a typical research project that addresses the challenges of agribusinesses sustainability in line with the SDGs. This will be a continuation of the supervised project, culminating in the presentation and defence of the thesis. The student's supervisors and Department head will approve the final thesis for onward submission to the school of post-graduate studies, for submission for external examination and defence.

## TEACHING METHODS:

Independent research work will be bounded into three copies, as the candidate's master's thesis is to be vetted and examined by experts in the field. One external examiner and an internal examiner will review the research independently. Afterwards, the independent external examiners, one internal examiner, and the candidate's supervisors will be present at the defence of the thesis.

# PREREQUISITES:

No particular pre-requisites for this course.

# EVALUATIONS DETAILS:

-End of course 2: Presentations for grading.





# Annex 2.6 Syllabus of the NJALA UNIVERSITY (NJALA), Sierra Leone

### Semester 1

Total of credits	Contact	ontact hours								
Credits: 15	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work			
	100.00 h	30.00 h	-16.00h	40.00 h	40.00 h	15.00 h	88.00 h			

# Personal work = Contact hours x2

Course 1: Introduction to Agroecology and Sustainable Agriculture	Name of the coordinator	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	6	-	8	8	3	16

## OBJECTIVE:

To understand and apply agroecological principles in agricultural systems, focusing on ecological diversity, resilience, and sustainable practices.

To promote co-creation and sharing of knowledge among students, instructors, and stakeholders, emphasizing synergies in agriculture, human and social values, and responsible governance.

## PROGRAMME:

Introduces agroecology principles through foundational lectures on the FAO indicators (e.g., system diversity, resilience, recycling, and circular economy).

Practical component includes field trips to local farms or agricultural hubs where students assess agroecological practices and synergies between crop and livestock systems.

Emphasis on interactive activities, including group discussions, stakeholder interviews, and exercises in recycling and resource efficiency.

Concludes with a student presentation of case studies, focusing on the integration of agroecological practices and sustainability metrics.

## TEACHING METHODS:

Classroom lectures Literature study Tutorials and field trips Hands-on fieldwork, including stakeholder interviews and transect studies

# PREREQUISITES:

Basic understanding of ecological principles and agricultural systems.





Familiarity with sustainability concepts, including circular economy and social dimensions in agriculture, is recommended.

## EVALUATIONS DETAILS:

End Semester:

Final assessment: Individual report on agroecological practice observed during field trip (60%) Final presentation: Group presentation on sustainability practices and solutions (40%)

Course 2:								
Soil Science Management	Name of the coordinator	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	6	8	-	8	3	16

## OBJECTIVE:

To understand and analyse soil physical properties (texture, structure, fertility, pH)

To understand soil health (soil biota, carbon and organic matter)

To understand risks through poor management, (erosion, water-logging, compaction, leaching).

To explore different ways of categorizing soils, ethno-pedology versus scientific soil taxonomy.

## PROGRAMME:

Begins with classroom lectures on the foundational principles of soil science and the critical functions of soil in agroecological systems

Field trips to farms employing agroecological practices to observe and analyze soil types, organic matter management, crop rotation impacts, and composting methods that enhance soil fertility. Practical exercises in soil sampling, nutrient analysis, and evaluation of soil health indicators (e.g., pH, organic carbon content, microbial activity).

## TEACHING METHODS:

Classroom lectures Literature review Field trips to observe agroecological soil management Practical sessions on soil management

## PREREQUISITES:

Basic understanding of soil science principles, agricultural systems, and ecology.

Familiarity with the concept of sustainability in agriculture and a preliminary knowledge of ecosystem services in agroecological farming is recommended.

### EVALUATIONS DETAILS:

Individual report on soil taxonomy (50%)

Group project: Development of an agroecological soil management plan (50% of final grade).





Course 3:								
Climate and						Supervised		Project
Agriculture	Name of the	Lectures	Tutorials	Practical	Field	work	Evaluation	work
	coordinator				trips			
Credits: 3		20	6	16	8	8	3	24

## OBJECTIVE:

To understand the interactions between climate and agriculture, with a focus on the impacts of climate variability on agroecological farming systems.

To analyze how climate change could affect crop and livestock productivity, soil health, and ecosystem resilience.

To analyze the difference between "climate smart" agriculture and traditional systems (e.g. mulching, mixed cropping, forest gardens).

# PROGRAMME:

Begins with introductory lectures on climate science fundamentals, climate change impacts on agriculture, and the principles of agroecology as they relate to climate adaptation and mitigation. Hands-on training in using climate data tools to analyze weather patterns, drought cycles, and seasonal variability in agroecological regions.

Field excursions to observe climate-adaptive practices on agroecological farms, such as crop diversification, water management, and soil conservation techniques, with an emphasis on FAO indicators such as resilience, synergies, and recycling.

Practical on developing adaptive farm plans that integrate sustainable water usage, croplivestock synergies, and culturally-informed practices in response to local climate challenges.

Concludes with group presentations where students present climate-adaptive strategies for agroecological farms, integrating traditional practices, human and social values, and circular economy principles.

## TEACHING METHODS:

Classroom lectures Case study analysis on climate resilience practices Practical Fieldwork

# PREREQUISITES:

Basic knowledge of climate science, agricultural systems, and ecosystem services.

An understanding of sustainability concepts in agriculture, particularly in the context of environmental resilience and social impact, is recommended.

# EVALUATIONS DETAILS:

Statistical assessment of the rate of change (if any) in rainfall in Districts (one District per student, rainfall data from CHIRPS) (50%)

Group project: Development of a climate adaptation plan for the AgrEcoFarm at Njala (50% of final grade).





Course 4: Farming Systems (agro-forestry, organic Agriculture	Name of the coordinator	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
etc)	COOLUMATOL				uips			
Credits:3		20	6	-	8	8	3	16

## OBJECTIVE:

To understand and evaluate diverse farming systems, including agroforestry, organic agriculture, silvopasture, and mixed farming.

To explore how these systems contribute to sustainable land management, soil health, biodiversity conservation, and resilience against climate variability.

To promote co-creation and sharing of knowledge by engaging with local practitioners and stakeholders, integrating traditional farming methods with modern agroecological practices.

To encourage responsible governance, focusing on the role of circular and solidarity economies in building sustainable farming communities.

# PROGRAMME:

Begins with lectures introducing key concepts of agroecology, followed by an overview of different farming systems such as agroforestry, organic farming, and permaculture.

Field visits to observe diverse farming systems in practice, with a focus on evaluating system diversity, recycling of resources, and synergies between crops and livestock.

Practical on integrated farming techniques that enhance efficiency, resilience, and biodiversity, such as crop-livestock integration, composting, and polyculture practices.

Group activities where students analyze case studies of agroforestry and organic farms, focusing on cultural and food traditions, responsible governance, and the role of human and social values in farming communities.

Concludes with group presentations where students present their evaluations and strategies for implementing sustainable farming systems, emphasizing circular economy principles and social solidarity.

## TEACHING METHODS:

Classroom lectures

Case study analysis on organic farming, agroforestry, and mixed farming systems,

Fieldwork

Project

## PREREQUISITES:

Basic understanding of ecology, soil science, and agricultural systems.

Familiarity with sustainable agriculture principles, including concepts of recycling, resource efficiency, and resilience in farming, is recommended.

## EVALUATIONS DETAILS:

Case study report on a chosen agroecological farming system that evaluates synergies, biodiversity, and recycling practices (40% of final grade).





Individual presentation "economic, social and environmental sustainability of xxxx farming system" (60% of final grade)

Course 5:								
Plant and Animal Health and Management	Name of the coordinator	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	6	-	8	8	3	16

## OBJECTIVE:

To develop an understanding of "Integrated Pest Management" To develop an understanding of "One health" concepts

## PROGRAMME:

Begins with classroom lectures introducing fundamental concepts of plant pathology, animal health, and pest management within an agroecological framework.

Field visits to farms practicing integrated plant and animal health management to observe methods for disease prevention, biodiversity enhancement, and sustainable resource use.

Practicals on eco-friendly pest management, crop rotation, integrated livestock practices, and natural disease control techniques that prioritize FAO indicators like resilience, recycling, and synergies.

Ends with student-led group projects where they design a comprehensive plant and animal health management plan for a hypothetical agroecological farm, integrating social values, food traditions, and responsible governance.

### TEACHING METHODS:

Classroom lectures Literature review Field visits

## PREREQUISITES:

Basic knowledge of plant and animal biology, ecology, and agricultural systems.

Familiarity with sustainable agricultural practices, including basic pest and disease management concepts within a framework of ecosystem resilience, is recommended.

## EVALUATIONS DETAILS:

Group presentation on the control of "fall army worm", "tetse fly", "wooly white aphids", or "liver flukes" in an agroecological setting. (50%)

Experiment on efficiency of Neem tree extracts on the control on pests of cow pea (50%)





Semester 2

Total of Credits	Contact l	hours			of the Europea		Project work
Credits: 18	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
	120	70	32	36	36	18	84

### Personal work = Contact hours x2

Course 6:								
Processing and Agricultural Engineering	Name of the coordinator	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
credits: 3		20	6	24	8	8	3	-

### **OBJECTIVE:**

To introduce students to the range of machinery available for production and processing of farm products in an agroecological context.

To explore ways to improve post-harvest handling, processing, and storage of agricultural products to enhance resource efficiency, recycling, and resilience.

To promote practices that contribute to circular and solidarity economies in agroecological communities, aligning with FAO indicators.

## PROGRAMME:

Begins with classroom lectures introducing fundamental principles of agricultural processing, post-harvest management, and engineering innovations for small-scale agroecological systems. Field visits to processing facilities (ABC (agricultural business centers), BeniMix, and "Bo gari") to observe sustainable practices, resource recycling, and efficient handling of agricultural products. Practical on eco-friendly processing techniques, such as solar drying, and low-energy storage solutions that enhance resilience and reduce waste.

Hands-on projects where students design and implement small-scale processing systems that prioritize resource efficiency, minimal waste, and cultural considerations in line with FAO indicators.

Concludes with group presentations where students propose improvements to existing agroecological processing systems, incorporating principles of responsible governance and social solidarity.

### TEACHING METHODS:

Classroom Field visits to ABC, processors e.g. BeniMix, equipment at Njala Practical

### PREREQUISITES

Basic knowledge of agricultural systems, resource management, and engineering principles.





Familiarity with sustainable practices in food processing, storage, and waste management, particularly within a framework of resilience and recycling, is recommended.

# EVALUATIONS DETAILS:

Group project: The development of a sustainable processing system (post-harvesting) strategy (50% of final grade).

Experiment drying pawpaw (or other fruit) (50%)

Course 7: Agricultural Policy and Social Inclusion	Name of the	Lectures	Tutorials	Practicals	Field	Supervised work	Evaluation	Project work
Credits: 3		20	6	-	8	0	3	24
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### **OBJECTIVE:**

To examine how agricultural policy evolves over time in response to internal and external forces.

To analyze how the current policy frameworks affect social inclusion, resilience and sustainable agroecological practices.

To foster understanding of responsible governance, human and social values, and the role of culture and food traditions in shaping agricultural policies.

To engage students in collaborative knowledge-sharing and discussions on creating policies that promote responsible governance.

### PROGRAMME:

Begins with introductory lectures on the history of evolving agricultural policy, through the lens of rural sociology, and social inclusion, covering topics such as gender, economic equity, and community development in the context of agroecology.

Case studies on how different policies affect agroecological farming practices, emphasizing resilience, social values, and cultural traditions.

Field visits to rural communities to engage with farmers, policy-makers, and local organizations, observing the impact of policies on inclusivity and agroecological practices.

Class discussion and presentations where students analyze existing agricultural policies and propose revisions or new policies that support diversity, responsible governance, and social inclusion.

Concludes with group projects where students design policy frameworks that support sustainable development, gender equity, and socio-economic resilience in agroecological farming communities.

### TEACHING METHODS:

Classroom lectures Literature review

## PREREQUISITES:

Basic understanding of agricultural systems, rural sociology, and socio-economic factors in farming.





Familiarity with agroecological principles, including social inclusion and sustainable development goals, is recommended.

# EVALUATIONS DETAILS:

Group presentation "a policy to reduce conflict between cattle herders and arable farmers" (50% of final grade).

Report on "access to land in theory and in practice; issues in relation to transforming agriculture" (50% of final grade).

Course 8: Circular Economy in Agriculture: Waste Management	Name of the coordinator	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	6	8	8	8	3	16

## OBJECTIVE:

To equip students with knowledge and skills in waste management strategies that support a circular economy in agriculture, focusing on techniques like composting and waste-to-value systems (e.g., Black Soldier Fly bioconversion).

To promote understanding of efficient recycling methods that enhance soil health, reduce environmental impact, and support resource sustainability within agroecological systems.

To foster a holistic approach to waste management that integrates cultural practices, social values, and responsible governance.

## PROGRAMME:

Begins with introductory lectures on circular economy principles, waste management techniques, and the role of agroecology in sustainable agriculture.

Case studies on various waste-to-value systems such as composting, anaerobic digestion, and Black Soldier Fly larvae for organic waste processing.

Practical fieldwork on local farms using composting and waste recycling processes, focusing on enhancing soil fertility, resource efficiency, and environmental sustainability.

Practical to design waste management systems suited to different agroecological environments, addressing recycling, resilience, and efficiency in agricultural production.

Concludes with student-led group projects where students propose integrated waste management strategies tailored to specific agroecological farms, aligning with FAO indicators of circular economy, synergies, and cultural traditions.

## TEACHING METHODS:

Classroom lectures Literature studies Fieldwork Group discussions





### PREREQUISITES:

Basic understanding of agricultural production systems, soil science, and principles of sustainability.

Familiarity with recycling and waste management practices, as well as knowledge of agroecological systems, is recommended.

### EVALUATIONS DETAILS:

Report on different methods of composting (50% of final grade). Raise 100gm of black soldier fly larvae (50% of final grade).

Course 9: Agribusiness Management and Value Chains	Name of the coordinator	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	6	-	8	8	3	16

### **OBJECTIVE:**

To understand the principles of agribusiness management, focusing on sustainable value chain development and marketing economics within agroecological systems.

To analyze agricultural value chains that prioritize social inclusion, environmental

sustainability, and economic viability in rural communities.

To equip students with the skills to build resilient, efficient, and inclusive value chains that support circular and solidarity economies.

The importance of keeping accurate records.

## PROGRAMME:

Begins with lectures introducing core agribusiness concepts, value chain structures, and market dynamics, with a focus on sustainability in agroecological contexts.

Case studies on successful agroecological value chains, covering topics like fair trade, local sourcing, SWOT analysis, and eco-friendly marketing strategies.

Concludes with group projects where students develop value chain plans that address specific challenges in agroecological systems, including local marketing strategies and sustainable production practices aligned with FAO indicators.

### TEACHING METHODS:

Classroom lectures Literature studies Group discussions

### PREREQUISITES:

Basic understanding of agricultural economics, sustainable production, and value chain management.





Familiarity with marketing principles and agroecological systems, including social and cultural aspects, is recommended.

# EVALUATIONS DETAILS:

Individual report on the existing value chain for a minor crop such as pumpkin, spinach, and plantains (50% of final grade).

Group presentation on problems of developing a value chain (20% of final grade). Records of the black fly soldier production (carried out in course 2.3) (30% of final grade).

Course 10: Research Methods in Agroecology (Statistics and Scientific Writing)	Name of the coordinator	Lectures	Tutorials	Practicals	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	6	-	0	0	3	24

# OBJECTIVE:

To develop students' research skills including statistical analysis, scientific writing, and literature review techniques tailored to agroecological research.

To provide a foundation in statistical methods (e.g., regression, ANOVA) and their application to data in agroecology, focusing on sustainable practices and systems.

To train students in designing and conducting surveys, literature searches, and critical evaluations of scientific literature related to agroecological principles.

To foster proficiency in presenting research findings that address agroecological diversity, synergies, resilience, and human and social values.

# PROGRAMME:

Starts with an introduction to research design in agroecology, covering data collection techniques that emphasize the principles of diversity, co-creation of knowledge, and resilience.

Lectures and tutorials on statistical methods such as descriptive statistics, correlation, regression, and ANOVA, applied to agroecological datasets (e.g., crop yield, soil health, biodiversity metrics). Literature on scientific writing skills, focusing on structuring research papers, formulating research questions, and constructing cohesive literature reviews that highlight agroecological sustainability and social inclusivity.

Practical sessions on literature searches and survey design, where students learn to gather, analyze, and synthesize scientific information related to agroecology and responsible governance. Concludes with student research projects that integrate data analysis, literature review, and scientific writing.

## TEACHING METHODS:

Classroom lectures Literature studies Group discussions

## PREREQUISITES:





Basic understanding of agroecological systems and introductory knowledge in statistics. Familiarity with scientific literature and research principles is beneficial.

# EVALUATIONS DETAILS:

Report on reflecting on personal experience of falling prey to logical fallacies and biases (50%). Group debate "Select a statistical test based on data or collect data to satisfy a statistical test" (50% of final grade).

Course 11:								
Guest lecture	Name of the coordinator	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project work
Credits: 3		20	40	-	0	8	3	0

### OBJECTIVE:

To expose students to diverse perspectives from key stakeholders in agroecology, including; farmers, policymakers, industry experts, NGO (eg, USAID), government officials (like district agricultural officers), academics, donors (e.g. FAO, EU), and researchers.

agricultural officers), academics, donors (e.g. FAO, EO), and researchers

To enhance understanding of attitudes of stakeholders to agroecology

To expose students to real-world applications of agroecological principles.

To foster dialogue on current challenges and innovations in agroecology, supporting the cocreation and sharing of knowledge.

## PROGRAMME:

Guest lectures featuring professionals from various sectors, including organic and sustainable agriculture, agroforestry, environmental policy, and rural development.

Each lecture will address a specific FAO indicator or set of indicators, such as recycling in circular economies, efficiency in resource use, or cultural and social values in agroecological farming.

Q&A sessions with guest speakers to allow students to engage directly with stakeholders, gaining insights into both challenges and opportunities in agroecological systems.

Concludes with a panel discussion where several guest speakers participate, allowing students to analyze the synergies and contrasts among different perspectives and disciplines within agroecology.

## TEACHING METHODS:

Classroom lectures Literature studies Group discussions

## PREREQUISITES:

Basic knowledge of agroecological systems and familiarity with the FAO indicators.

Interest in understanding diverse, real-world applications of sustainable agriculture principles from a multi-stakeholder perspective.





## EVALUATIONS DETAILS:

Summary of each presentation (500 words), 10% for each one.

### Semester 3

Total of Credits	Contact l	nours					Project w	vork
Credits: 40	Lectures	Tutorials	Practical	Field trips	Supervised work	Evaluation	Project w	vork
		20	100			23		

Internship								
						Supervised		Project
	Name of the	Lectures	Tutorials	Practical	Field	work	Evaluation	work
	coordinator				trips			
Credits:10		0	0	50	0	0	3	0

### **OBJECTIVE:**

To gain "real world" experience in some relevant aspect of agro-ecology

### PROGRAMME:

Placement at commercial, government or "not for profit" organisation for 3 months

## TEACHING METHODS:

On-the-job training by the host organisation.

### PREREQUISITES:

Passed all modules up to the date of internship. In addition will be expected to be in the upper quartile of directly relevant modules

## EVALUATIONS DETAILS:

(1) brief report (~10 pages) with strong emphasis on (a) lessons learnt and (b) advice to any follow up students.

(2) presentation to the group (10 to 15 powerpoint slides) assessment of presentation based on (a) presentation itself (b) response to questions asked about the presentation and (c) "good" questions asked of over presentations.





Thesis								
						Supervised		Project
	Name of the	Lectures	Tutorials	Practical	Field	work	Evaluation	work
	coordinator				trips			
Credits: 30		0	20	100	0	0	20	0

## OBJECTIVE:

To extend knowledge of agro-ecology in the Sierra Leone context

# PROGRAMME:

### TEACHING METHODS:

tutorials on; (a) scientific writing with emphasis on structured literature reviews, correct citations, identification and ranking of information sources, and, the approved structures of reports, (b) research methods, with an emphasis on practical experiments, Assistance will be provided on data analysis and appropriate statistical tests depending on the thesis topic

## **PREREQUISITES:**

to have passed all modules

### EVALUATIONS DETAILS:

(a) evaluation of the written thesis (70%), (b) presentation of the results (short power-point) (30%).





# Partnership of the Project



The AGRECOFARM Project is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

