**BAYERO UNIVERSITY, KANO (BUK)**

**Faculty of Agriculture**

**Department of Forestry and Wildlife Management**

**BSc Forest Resources and Wildlife Management**

**Proposed 30% addition to the CCMAS Course Structure/Summary**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Course code** | **Course title** | **Unit** | **Status** | **LH** | **PH** |
|  | **Level 100** |  |  |  |  |  |
| 1. | BUK - FWM 107 | Introduction to Climate Change and Renewable Natural Resources | 2 | C | 45 | 45 |
| 2. | BUK - FWM 108 | Introduction to West African Wildlife Resources and its Utilization | 2 | C | 45 | - |
| 3. | BUK – FWM 109  (AGG 101) | Introductory Agricultural statistics | 2 | C | 30 | - |
|  |  | **Total** | **06** |  |  |  |
|  |  | **Grand total** | **32** |  |  |  |
|  |  |  |  |  |  |  |
|  | **Level 200** |  |  |  |  |  |
| 4. | BUK - FWM 207 | Computer Application in Forest and Wildlife Resources Management | 3 | C | 45 | - |
| 5. | BUK - FWM 208 | Forest and Wildlife Taxonomy | 3 | C | 45 | - |
| 6. | BUKFWM 209 | Introduction to Tree Physiology | 2 | C | 45 | - |
| 7. | BUK – FWM 210 | General Agriculture | 2 | C | 45 | - |
| 8. | BUK – FWM 211  (SOS 201) | Introduction to Soil Science | 2 | C | 45 | - |
| 9. | BUK – FWM 212  (AGN 203) | Introduction to horticulture | 2 | C | 45 | - |
|  |  | **Total** | **14** |  |  |  |
|  |  | **Grand Total** | **30** |  |  |  |
|  |  |  |  |  |  |  |
|  | **Level 300** |  |  |  |  |  |
|  | **Course code** | **Course title** | **Unit** | **Status** | **LH** | **PH** |
| 10. | BUK – FWM 312 | Forest Restoration and Rehabilitation | 2 | C | 45 | - |
| 11. | BUK – FWM 313 | Wood Energy Development and Utilization | 2 | C | 45 | 45 |
| 12. | BUK – FWM 314 | Introduction to Ecotourism and Hospitality Management | 2 | C | 45 | - |
| 13. | BUK – FWM 315 | Biodiversity Conservation and Management | 3 |  | 45 | - |
| 14. | BUK – FWM 316 | Physiology and Adaptation of Wild Animal | 2 |  | 45 | - |
|  |  | **Total** | **11** |  |  |  |
|  |  | **Grand** **Total** | **30** |  |  |  |
|  |  |  |  |  |  |  |
|  | **Level 400** |  |  |  |  |  |
|  | **Course code** | **Course title** | **Unit** | **Status** | **LH** | **PH** |
| 15. | BUK – FWM 411 | Wood Based Panel Products | 2 | C | 45 | 45 |
| 16. | BUK – FWM 412 | Forest Industries and Timber Quality Control | 2 | C | 30 | 45 |
| 17. | BUK – FWM 413 | Biometrics and Data Processing of Renewable Resources | 3 | C | 45 | 45 |
|  |  | **Total** | **07** |  |  |  |
|  |  | **Grand** **Total** | **32** |  |  |  |
|  |  | **Levels 1 – 4 Total** | **124** |  |  |  |

Bayero University, Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK – FWM 107 Introductory Agricultural Statistics (2 Unit; Core; LH = 30)**

**Senate-Approved Relevance**

To produce graduates who can lead agricultural statistics research and education in Africa. The students will be committed to addressing African developmental challenges through cutting-edge research, knowledge transfer and training of high-quality graduates.

**Overview**

Statistics is a familiar and accepted part of modern world that is concern with obtaining an insight into the real word by means of the analysis of numerical relationships. It is used in almost all fields of human endeavour.

Since this course Introductory Statistics entails analysis of numerical relationships, we will focus on the meaning of statistics and biostatistics (collections of quantitative information and method of handling such data, descriptive analysis of the observation). We will also discuss frequency of distribution, measures of locations and probability. This course exposes students to basic statistics and descriptive statistics, the knowledge will be helpful in further statistics at higher levels. It is indeed very interesting field of agriculture and biology.

**Objectives**

The objectives of the course are to:

1. Illustrate the philosophy and significance of household resource management.
2. Describe family values and its significance in societal development.
3. Discuss the major characteristics of household resource and their management process.
4. Outline the strategies for maximizing the use of household resources.
5. Discuss food security and it’s important to developing countries.
6. Highlight the different type of food insecurity and suggest ways of reducing food insecurity.
7. Describe gender analysis and its application in participatory research approach.
8. Highlight the best approach for household resource inventory and valuation.
9. Explain household resource ownership and control.
10. Discuss the importance of gender inclusion in decision making for household resource utilization.

**Learning Outcomes**

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

1. Discuss the at least 5 uses of statistics in area of agriculture.
2. Discuss population and samples.
3. Discuss all the different sampling methods and understand the purpose and importance of sampling.
4. Mention 3 types of frequency distributions.
5. Organize data using frequency distribution.
6. Explain the normal and binomial distributions.

**Course Contents**

Basic concepts of statistics. Population and Sample. Frequency distribution, measures of location, measures of variation. Probability distribution, normal and binomial distributions. Histograms, means, mode and median, sampling, data collection, data processing techniques.

**Minimum Academic Standards (MAS)**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Department of Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**FWM 108: Introduction to West African Wildlife Resources and its Utilization.**

**Credit Unit: 2, Lectures: 45hours, Practical: 45 hours, Contact hours: 45 hours**

**Total contact: 90hours**

**Senate Approved Relevance:**

To produce graduates who are foremost in research, scientific knowledge, skills and techniques in wildlife conservation and management and can contribute to the development of Nigeria and African.

**Overview**

Introduction to West African Wildlife Resources and its Utilization is aimed at teaching the concept of wildlife and their diversity management. Students are exposed to the role of International Union for Conservation of Nature (IUCN) and other international organizations concerned with wildlife resources conservation and protection.

The course is a prerequisite for higher level courses of wildlife resources in West Africa, and the understanding of wildlife interrelationships, vegetation, animal behaviour and local and international wildlife production, conservation, management and sustainable utilization.

**Objectives**

The course will:

1. Describe and define the concept of wildlife management
2. Produce map of ecological zones of Nigeria and show the relationship between the zones and wildlife species composition and diversity.
3. Explore different wildlife species of West Africa and their utilization
4. Explain what IUCN is and its roles globally.
5. Discuss IUCN red list for conservation, wild animals and Avians as well as RAMSAR sites.
6. Explain and appraise the treaties signed by Nigeria Such as CITES etc.

**Learning outcomes**

Students to:

1 Define and explain the concept of wildlife management.

2. List some common wildlife resources in Nigeria and West Africa.

3. Prepare and explain the various ecological zones in Nigeria and their features.

4. List some wild animals found in each ecological zone and features of mode of survival.

5. List and distinguish between the different wildlife resources utilization methods.

6. Explain IUCN and protected areas in the management of wildlife resources.

7. List the IUCN red list for conservation of wildlife.

8. Tell and identify the important birds, bird areas/ RAMSAR sites and protected areas,

9. Explain CITES and other conservation treaties which Nigeria is a signatory.

**Course Contents**

Definition and concept of wildlife and its diversity. Ecological interrelationships of different vegetative zones to wildlife diversity. Identification, range, morphology and conservation status of some common species of wild animals in West Africa. Protected Area and its classification. Important bird areas/ RAMSAR sites. International Union for Conservation of Nature (IUCN) red-list/checklist of wild animals. Wildlife management: types and practices and importance. Challenges of conservation of wildlife management in West Africa. Wildlife utilization; classification, harvesting techniques and importance of animal behaviour.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Department of Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK – FWM 109 (AGG 101): Introductory Agricultural Statistics**

**(2 Unit; Core) (LH = 30)**

**Contact Hours 30Hours**

**Senate-Approved Relevance**

To produce graduates who can lead agricultural statistics research and education in Africa. The students will be committed to addressing African developmental challenges through cutting-edge research, knowledge transfer and training of high-quality graduates.

**Overview**

Statistics is a familiar and accepted part of modern world that is concern with obtaining an insight into the real word by means of the analysis of numerical relationships. It is used in almost all fields of human endeavour.

Since this course Introductory Statistics entails analysis of numerical relationships, we will focus on the meaning of statistics and biostatistics (collections of quantitative information and method of handling such data, descriptive analysis of the observation). We will also discuss frequency of distribution, measures of locations and probability. This course exposes students to basic statistics and descriptive statistics, the knowledge will be helpful in further statistics at higher levels. It is indeed very interesting field of agriculture and biology.

**Objectives**

The objectives of the course are to:

1. Illustrate the philosophy and significance of household resource management.
2. Describe family values and its significance in societal development.
3. Discuss the major characteristics of household resource and their management process.
4. Outline the strategies for maximizing the use of household resources.
5. Discuss food security and it’s important to developing countries.
6. Highlight the different type of food insecurity and suggest ways of reducing food insecurity.
7. Describe gender analysis and its application in participatory research approach.
8. Highlight the best approach for household resource inventory and valuation.
9. Explain household resource ownership and control.
10. Discuss the importance of gender inclusion in decision making for household resource utilization.

**Learning Outcomes**

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

1. Discuss the at least 5 uses of statistics in area of agriculture.
2. Discuss population and samples.
3. Discuss all the different sampling methods and understand the purpose and importance of sampling.
4. Mention 3 types of frequency distributions.
5. Organize data using frequency distribution.
6. Explain the normal and binomial distributions.

**Course Contents**

Basic concepts of statistics. Population and Sample. Frequency distribution, measures of location, measures of variation. Probability distribution, normal and binomial distributions. Histograms, means, mode and median, sampling, data collection, data processing techniques.

**Minimum Academic Standards (MAS)**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 207: Introduction to Climate Change and Renewable Natural Resources;**

**Credit Unit: 2, Lecture 45hrs, Practical 45hrs**

**Contact hours: 90hours**

**Senate-approved relevance**

To train and produce forest and wildlife graduates with requisite scientific knowledge, skills and techniques in forest and wildlife resources sustainable production, development and management. The course is designed to produce quality Graduates geared towards self- employment, relevant to industry and society, who can contribute effectively to national and international goals in forestry and wildlife resources and who should be able to adapt to rural setting where forest and wildlife resources abound. This is with a view to achieving the mission of BUK, Nigeria, African and global sustainable forest and wildlife resources production, development and management.

**Overview**

The course is designed to fulfil the needs for proper understanding by the students on climate change and its influence on production and management of natural resources.

Students to be able to reproduce and interpret climatic and hydrological maps, and relate it to natural resource production and management. The course is designed to be an introduction to other higher level courses that have direct relation to climate, forest, wildlife and other natural resources management.

**Objectives**

The students should be able to:

1. Define climate, climate change and ocean current.
2. Explain the relationship of (i) above to natural resource management,
3. Generate and interpret climatic and hydrological maps.
4. Relate the impact of hydrological cycles on terrestrial and aquatic environments.
5. Describe the principles of carbon sequestration and carbon dioxide (CO2) fertilization.
6. Explain the greenhouse gas and its effects on terrestrial and aquatic ecosystems.
7. Explain climate change effects and mitigations.

**Learning outcomes**

The students:

1. Define and explain climate, climate change and ocean current.
2. Tell the relationship of (i) above to natural resource management,
3. Produce and interpret climatic and hydrological maps.
4. Explain the impact of hydrological cycles on terrestrial and aquatic environments.
5. Describes the principles of carbon sequestration and carbon dioxide (CO2) fertilization.
6. Discuss the greenhouse gas effects on terrestrial and aquatic ecosystems.
7. List the effects of climate change and its mitigation.

**Contents**

West African climate. Ocean current and its flow. Climatic maps. Hydrological cycles. Heat exchange in forest and aquatic environments. Climate forecast in agro-forestry systems. Adaptation of species to climatic variation. Carbon sequestration and CO2 fertilization. Greenhouse gases. Effects of greenhouse gases on aquatic and terrestrial ecosystems. Climate change effects. Climate effects mitigation.

**Minimum Academic standards (MAS)**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

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**BUK – FWM 208 Computer Application in Forest and Wildlife Resources Management**

**Credit Unit: 3, Lecture 30hrs, Practical 45hrs)**

**Contact hours: 75 hours**

**Senate approved relevance**

To train and produce forest and wildlife graduates with requisite scientific knowledge, skills and techniques in forest and wildlife resources sustainable production, development and management. The course is designed to produce quality Graduates geared towards self- employment, relevant to industry and society, who can contribute effectively to national and international goals in forestry and wildlife resources and who should be able to adapt to rural setting where forest and wildlife resources abound. This is with a view to achieving the mission of BUK in Nigeria’s, African and global sustainable forest and wildlife resources production, development and management.

**Overview**

This course is an exploratory, first course in computer usage designed primarily for students in forestry and wildlife Management. However, it also meets the need of students in other fields, as a course that provides hands-on training in the use of computers for word processing, descriptive data analysis and preparation of slides for presentation.

As a practical course, real-life situations will be used to give students hands-on training in computer usage. It will focus on how we can use computer technologies to better manage forests in a sustainable manner and prepare the students for a future use of advanced computer applications in forestry and wildlife research and advancement.

**Objectives**

The course will

1. Describe useful skills that will enhance students’ computer literacy level and prepare them for other specialized applications to be encountered at higher / advanced levels courses.
2. Appraise the Importance of computers in forestry and wildlife management
3. Define and describe Computer hardware components and their functions
4. Explain different computer operating systems, their capacities and limitations
5. Explain different spread sheets for data processing
6. Describe different statistical packages for various forestry and wildlife management data analysis

**Learning outcomes**

The graduate to:

1. Discuss the Importance of computers in forestry and wildlife management
2. Describe the Computer hardware components and their functions
3. Operate and appreciate different computer operating systems, their capacities and limitations
4. Prepare and use different spread sheets for data processing in forestry research and education
5. Test and analyse data using various statistical packages for various forestry and wildlife management and data analysis

**Contents**

Importance of computers in forestry. Computer hardware components and their functions. Operating systems with emphasis on Windows Operating System. File and disk management. Use of spreadsheet. Use of graphics for forestry and wildlife communication. Use of Power Point for presentation. Forest and wildlife data management and processing. Use of statistical packages (SPSS, GENSTAT, STATA, PAST, R). Visits to organizations,

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**FWM 209 Forest and Wildlife Taxonomy;**

**Credit Unit: 3, Lecture 45hrs, Practical 90hrs)**

**Contact hours: 135 hours**

**BUK - FWM 208 Forest and Wildlife Taxonomy**

**Senate approved relevance:**

To train and produce forest and wildlife graduates with requisite scientific knowledge, skills and techniques in forest and wildlife taxonomy which will ensure their commitment to addressing Africa’s developmental challenges through cutting edge research, knowledge transfer and training of high quality graduates.

**Overview**

Taxonomy and systematics are important components in the students understanding of forestry and wildlife naming conventions and classifying new plants and animals species. This is carried out via observations of physiology and morphology of the fauna and flora.

This will further strengthened through herbarium plant collection, preservation, vegetation survey, animal survey and analysis and practical plant and animal identification.

**Objectives**

The course is aimed at enabling the students to

1. Explain and define the concepts of taxonomy and systematics.
2. Explain the principles and systems of plant classification.
3. Discuss the origin, distribution, and economic importance of major forest trees and wildlife in Nigeria.
4. .Describe the process of plant and animal identification using plant keys and their characteristics.
5. Describe the various principles of plant organization of families, orders, classes, genus, and species names.
6. Explain the application of nomenclature and author citation in taxonomy.
7. Discuss taxonomic characters of forest plant and wild animal naming and classification.
8. Explain how to apply modern systems of plant and animal classification.

**Learning outcomes**

On completion of the course, students to:

1. List at least 5 differences between higher and lower plants.
2. Explain the 3 basic principles of plant and animal classification
3. List and demonstrate at least 4 different plant and wildlife families using the plant keys and taxonomic techniques.
4. List and explain the economic importance of some forest trees and wildlife species of different families of West Africa.
5. Prepare and produce herbarium plant and museum animal collections.

**Content:**

Concept of forest taxonomy and Plant systematics. Nomenclature and author citation. Morphological features of plants and animal species that aid identification. Taxonomic characters of forest plant and wildlife species. Modern system of plant classification, Use of herbarium, plant collection and preservation. Vegetation and animal survey and analysis. Importance of forest and wildlife taxonomy. Practical plant and animal identification. Plants and animal diversity and distribution in Africa.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 210 Introduction to Tree Physiology**

**Credit Unit: 2, Lecture 45hrs, Practical 0hrs)**

**Contact hours: 45 hours**

**Senate approved relevance:**

To produce graduates who will lead in Tree physiology in Africa. The students will be committed to addressing African developmental challenges through cutting-edge research, knowledge transfer and training of high-quality graduates.

**Overview**

Tree physiology is an important requisite in understanding tree growth and development, forest management and production. Tree physiology determines normal functions of tree structures that govern growth and development which dictates the general forest production.

Learning tree physiology exposes the student to understanding the various functions of anatomical structures and organs of the trees that are involved in growth, maintenance and development of forest trees.

**Objectives**

The objectives of the course are to:

1. Describe to the students the concept of tree physiology
2. Explain to the students the anatomical features of trees
3. Expose the student to functions and roles tree anatomical features in growth and development
4. Describe to the student on how trees absorb water and nutrients and convert them into various nutrients compounds for growth and development
5. Explain to students on the roles of each anatomical structures of tree as they relates to growth and development
6. Discuss to the student the roles of different hormones in tree physiology, growth and development
7. Demonstrate to the student on the significance of water efficiency in trees and its importance in tree physiology

**Learning outcomes**

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

1. Explain the principles of tree physiology
2. Describe and draw anatomical features of trees
3. Explain the functions and roles tree anatomical features in growth and development
4. Describe how trees absorb water and nutrients and convert them into various nutrients compounds for growth and development
5. Explain the roles of each anatomical structures of tree as they relates to growth and development
6. List and explain the roles of different hormones in tree physiology, growth and development
7. Discuss the significance of water efficiency in trees and its importance in tree physiology

**Content:**

Introduction to tree physiology. Anatomical features of tree. Functions and roles of anatomical features of trees. Principal parts of vascular plants. Tree anatomy and physiology. Water use in trees. Tree growth and development. Tree nutrients uptake. Tree vascular tissues and transport systems. Hormonal signalling in trees. Roles of natural and artificial hormones in plants physiology. Whole tree water use.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University, Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK- FWM 201 (SOS 201): Introduction to Soil Science**

**(2 Units; Core) (LH =30)**

**Contact Hours 30Hours**

**Senate-Approved Relevance**

Training of high-quality graduates in any field of Agriculture requires basic knowledge of Soil Science. This is in line with BUK’s mission to address African developmental challenges in sustainable food production through production highly-skilled and knowledgeable graduates in Agriculture.

**Overview**

Introductory Soil Science course is critical in preparing the graduate of Agriculture to be able to handle and improve the developmental and infrastructural deficits for sustainable development.

This course is designed to afford the students of any field of agriculture to, first, become familiar with soils as natural units or entities and with their inherent characteristics. Second, to equip students with understanding of the significance of fundamental soil properties. Third, to set forth basic relationships between soils and plants. And finally, to appraise the students with basic principles involved in soil use and management. General principles of soil science are emphasized and explained in unambiguous terms, while most of the technical detailed are retained for students pursuing soil science at higher levels.

**Objectives**

At the end of the course the student should be able to:

1. Describe basic concepts and terms in Soil Science.

2. Describe and justify the importance of Soil Science.

3. Outline and explain basic chemical, physical and biological properties of soil.

4. Outline the origin, classification, and distribution of soils and their relationships with people and food production.

5. Appraise basic principles and management of soil fertility and plant nutrition; and

6. Categorize major types of problem soils and outline their remediation methods.

**Learning Outcomes**

On completion, the students should be able to:

1. Outline and describe basic concepts of Soil Science.

2. Describe basic physical, chemical, and biological properties of soils.

3. Classify types of problem soils and describe their remediation methods.

4. Differentiate between soil fertility and soil productivity.

5. List and describe roles of essential plant nutrients; and

6. Describe fertilizer and manure types, sources, and their methods of application.

**Course Contents**

History and development of Soil Science. Soils as a natural body. Soil components: Air, water, mineral and organic matter*. Physical properties of soil*: soil separates, texture, aggregation and structure, temperature, color, properties of soil mixture, pore space, bulk density, particle density, aeration, drainage and compaction. *Chemical properties of soil*: Soil colloids, ion exchange, soil reaction and problem soils and their reclamation. *Biological properties of soil*: Soil organism, microbial transformation of nutrients. *Soil fertility and fertilizers*: Soil fertility versus soil productivity, essential plants nutrients and their functions, manure and fertilizers (types, sources and methods of application).

**Minimum Academic Standards (MAS)**

If needed as addition as what is contained in the CCMAS.

Bayero University, Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK- FWM212 (AGN203): Principles of Horticulture**

**(2 Units, Core) (LH= 15; PH=45)**

**Contact Hours 60Hours**

**Senate-Approved Relevance**

To produce graduates who lead in research and education of horticultural crops in Africa who are committed to addressing African developmental challenges through cutting-edge research, knowledge transfer and training of high-quality graduates

**Overview**

Principles of horticulture refer to the fundamental concepts, theories, and practices that govern the cultivation, management, and use of horticultural crops for human purposes. It also encompasses the application of various techniques and technologies used in the cultivation and management of fruits, vegetables, and ornamentals. Techniques such as propagation, irrigation, fertilization, and pest management.

Principles of horticulture is aimed at developing and implementing sustainable and efficient methods for producing healthy, high-quality crops for food, medicine, and ornamental use. Overall, the principles of horticulture involve understanding the biology and growth of crops, as well as the appropriate techniques and practices for propagating, growing, and maintaining healthy plant, knowledge of garden design, pruning, transplanting, tree training, and production systems to create beautiful, productive outdoor spaces.

**Objectives**

At the end of the course the student should be able to:

1. Demonstrate the skills required for nursery establishment and management.

2. Explain the environmental factors affecting successful growth and development of fruits and vegetables.

3. State any 3 examples each of sexual and asexually propagated crops

4. Distinguish between sexual and asexual propagation techniques of fruits and vegetables.

5. Demonstrate the interest in horticultural (fruit, vegetables and ornamental) crops enterprise.

**Learning Outcomes**

On completion, the students should be able to:

1. List and explain 10 essential nursery management techniques.

2. List and explain all the environmental factors affecting growth and development of fruits and vegetables.

3. List at least 4 differences between sexual and asexual propagation.

4. Enumerate 5 examples each of sexual and asexually propagated crops.

5. Illustrate and differentiate between different vegetative propagations of horticultural crops

**Course Contents**

Definition of Horticulture. History of horticulture. Essentials of nursery management. Soil and water management of horticultural crops. Nursery structures. Compost preparations and application. Tools and equipment use nursery. Environmental factors affecting vegetables and fruits cultivation. Propagation of plants. Sexual and asexual reproduction. Vegetative propagation; budding, grafting, layering. Pruning, and training of horticultural plants. Ornamental gardening.

**Minimum Academic Standards (MAS)**

The required facilities for the course have been adequately captured.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 312 Forest Restoration and Rehabilitation**

**Credit Unit: 2, Lecture 45hrs, Practical 0hrs)**

**Contact hours: 45 hours**

**Senate approved relevance:**

Produce forest and wildlife graduates with requisite scientific knowledge, skills and techniques in forest research and education in degraded land and forest rehabilitation and restoration techniques. This is with a view to achieving the mission for Nigeria, Africa and global sustainable forest resources production, rehabilitation, restoration, development and management.

**Overview**

The field of Ecological Restoration and rehabilitation is a complex interdisciplinary field that is becoming more important in a world that depends on increasingly degraded ecosystems to support growing human societies. Ongoing human disturbances associated with urbanization, energy development, climate change, poor land management, and pollution create the need for the restoration of degraded ecosystems.

Restoration of degraded ecosystems benefits society by improving biodiversity, human livelihoods, empowering local people, and improving ecosystem productivity. Much attention will be given to drastically disturbed forests, and the principles and concepts will have application to a wide variety of disturbance scenarios.

**Objectives**

1. Define and explain forest restoration and rehabilitation.
2. Describe deforestation and measure rate of deforestation.
3. Discuss the approaches to restoration and rehabilitation at both local sites and landscape levels.
4. List and identify types of sand dune, their formation processes, and fixation techniques aimed at restoration and rehabilitation of degraded forest and degraded environment.
5. Explain the historical development of restoration concepts and the role that restoration can serve in the future stewardship of natural resources

**Learning outcomes**

The graduate should be able to

1. Describe the major ecological principles underlying the successful restoration and rehabilitations of forest ecosystems.
2. Identify and explain concepts of disturbance and succession
3. Explain ecological and management principles and select appropriate methods and tools for designing and conducting restoration projects,
4. Identify and discern elements of successful versus failed restoration and rehabilitations projects.
5. Explain deforestation, restoration, rehabilitation and the forestry techniques to achieve them.
6. Establish a sand dune fixation plantation and identify the list types of dunes in arid, semi-arid and coastal lands.

**Content:**

Deforestation and measuring forest degradation. Restoration and rehabilitation approaches at site and landscape levels. Desertification, causes, effects and mitigation. Sand formation processes. Sand dune fixation and stabilisation techniques. Climate change and forest disturbance in environmental degradation. Historical development in environmental degradation. Ecological Concepts and ecological Succession. Understanding limitations, biological, Physical and chemical limitations. Restoration in Various Settings wetlands, rivers, game reserves, and varied ecological regions. Dunes and their types. Dry land and coastal dunes. Dunes fixation plantation techniques.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 313 Wood Energy Development and Utilization**

**Credit Unit: 2, Lecture 30hrs, Practical 0hrs)**

**Contact hours: 30 hours**

**Senate approved relevance:**

To produce graduates who can lead in the development and utilization of wood energy in Africa. The graduates should be able to bring about development in Africa by leading in research, training and transfer of knowledge in the development and utilization of wood energy, and training of high-quality graduates.

**Overview**

Wood energy is an important alternative to Africa’s energy crisis. The livelihood of most Africans depends on cooking fuel, which is derived mostly from wood based sources, wood energy is renewable, carbon neutral, cheap and readily available, compared with other energy sources,

Learning wood energy development and utilization would expose the students to renewable and readily available sources of energy for Africans. The development of various improved models of fuel efficient wood stoves, briquettes from mill wastes and by-products, alternative wood fuels and the significance of wood energy development in reducing wastage and deforestation.

**Objectives**

The objectives of learning the course are to

1. Explain wood energy and its determination
2. Describe the properties of wood associated with its energy production
3. Identify wood –based energy and the use of alternative biomass as sources of energy.
4. Explain the significance of calorific value in wood energy development and identify tree species with high calorific energy value.
5. Demonstrate Improve wood stove energy efficiency.
6. Explain the economics of wood energy utilization.
7. Identify the effects of wood energy production on climate change.
8. Appraise the effect of wood energy utilization on rural livelihoods

**Learning outcomes**

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

1. Identify and list the types of wood energy
2. Infer wood properties with its energy value
3. Explain calorific value and its determination
4. Identify the alternative biomass as source of energy.
5. Identify and name t tree species that are highly valued for energy production
6. Develop an energy efficient stoves for economic sustainability.
7. Modify energy efficient stoves towards improved efficiency.
8. Identify and create awareness on the environmental impacts of misusing wood energy.

**Content:**

Forms of Biomass energy and energy resources. Advantages of biomass energy sources. Fuel wood species and their characteristics. Charcoal production. Environmental impact of fuelwood utilization. Wood energy utilization and efficiency. Economics of wood energy utilization. Calorific value in wood. Climate change and wood fuel production. Create awareness on efficient wood fuel utilization to rural populace. Economic sustainability in fuelwood production. Consequences of over exploitation of wood resources.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 314 Introduction to Ecotourism and Hospitality Management**

**Credit Unit: 2, Lecture 45hrs, Practical 0hrs**

**Contact hours: 45hours**

**Senate approved relevance:**

To produce graduates who are equipped with the requisite scientific knowledge, skills and techniques in tourism and hospitality management, and are able positively influence Nigeria, African and global tourism industry development and management.

**Overview**

The tourism industry is a very important area of source of foreign exchange to nations, and Nigeria is blessed with a lot of natural and cultural features of interest which attracts tourists. Therefore, acquisition of skills and knowledge in tourism and hospitality management is vital for Nigeria.

It will also boost the transportation sector, hotels and travel agencies, consequently boosting local economy.

**Objectives**

Student are to be able to:

1. Describe how to design and setup an ecotourism industry in Nigeria and Africa to the international community.
2. Explain the work ethics in the tourism industry and its transport and hotel sectors.
3. Describe the hygiene concept and good environmental practices in the players of the industry.
4. Explore the significance of effective service delivery in the industry.
5. Explain the principles of ecotourism and hospitality.

**Learning outcomes**

Students to:

1. Design and setup an ecotourism industry in Nigeria and Africa that will attract international community.
2. Enumerate and apply work ethics in the tourism, transport and hotel sectors of the industry.
3. Apply the general hygiene and good environmental practices in the players of the industry.
4. Enumerate the effective service delivery strategies of the tourism industry.
5. Explain the principles of ecotourism and hospitality in relation to forestry and wildlife resources.

**Content:**

Principles of ecotourism. Hospitality management. Challenges of ecotourism management in Nigeria and Africa. Introduction to transportation in tourism. Travel agencies and tour operators. Roles of travel agencies and tour operators in tourism.

Hotel set up. Hotels functions and classification. Control measures to check pilfering and wastages. General hygiene and environmental practices for effective service delivery. Work ethics in a fast changing industry.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 315 Biodiversity Conservation and Management**

**Credit Unit: 3, Lecture 45hrs, Practical 45hrs)**

**Contact hours: 90 hours**

**Senate approved relevance:** T

To produce graduates who can lead in biodiversity conservation and management research and education in Africa. The students will be committed to addressing African developmental challenges through cutting-edge research, knowledge transfer and training of high-quality graduates.

**Overview**

The over exploitation and harvest of biological diversity has resulted in endangering and extinction of some plants and animal species globally. To this effect, this course intends to review the status of these biological species and proper solution to their population via in-situ and ex-situ breeding and management.

It is also aimed at creating awareness on legislation, problems of enforcing biodiversity laws and regulation. Create awareness on policies, administration and management of biodiversity, conservation of endangered species, and their endemic status with reference to global convention.

**Objectives**

The objective of the course are to:

1. Explain to the students the basic and practical aim of biodiversity management and conservation
2. Discuss the problems of biodiversity conservation and management in Nigeria as well as law enforcement challenges.
3. Discuss the government policies, management plans on endangered species
4. Highlight to the students on the economic importance of conservation with reference to international conventions
5. Produce management plans

**Learning outcomes**

At the end of the course, students to:

1. Discuss the basic and practical aim of biodiversity management and conservation

1. Explain the problems of biodiversity conservation and management in Nigeria as well as enforcing its laws
2. Highlights on the government policies, management plans on endangered species
3. Highlight the economic importance of conservation with reference to international conventions
4. Develop management plans for biodiversity conservation.

**Content:**

Basic and practical objectives of biodiversity management. Biodiversity conservation in Nigeria. Biodiversity administration and legislations. Problems of enforcing biodiversity conservation laws and regulations. Development, management and conservation methods of the various biodiversity components. Natural habitats or ecosystems and their constituents. Producing management plans for biodiversity and the protected areas in Nigeria. Government policy regarding biodiversity administration and management in Nigeria. Conservation of endangered species of flora and fauna of endemic status. Biodiversity economic importance with reference to the United Nation Global convention and demands on biodiversity. Global Biodiversity and Conservation status.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Department of Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**Credit Unit: 2, Lecture 45hrs, Practical 0hrs)**

**Contact hours: 45 hours**

**FWM 316: Physiology and Adaptation of Wild Animals**

**Senate approved relevance:**

To produce graduates equipped with the requisite scientific knowledge, skills and techniques in wild animal physiology and adaptation. Graduates who are able to demonstrate their understanding by producing first class research output that are relevant to development of Nigeria, Africa and the world.

**Overview**

Every ecological zone has its unique physical features and prevailing environmental conditions. These habitat conditions to a great extent influences distribution and the behavioural manifestation in different species of animal. The adaptation and chances of survival of an animal in the ecological setting it finds itself is related to its fitness, morphological and anatomical make up.

The course explains the functions of the organs and their physiological processes as it shapes the behaviour of an organism and its systems.

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**Objectives**

The course students should be able to

1. Explain the morphological and anatomical features of large and small mammal and their functions.
2. Discuss the morphological and anatomical features of different species of reptiles and their functions.
3. Discuss the morphological and anatomical features of different species of birds and their functions.
4. Explain the types of wild animal organs and their physiological functions and importance.
5. Describe the influence of habitat on evolution of species, wild animal behaviour, physiology, and an animal’s ability to adapt to the prevailing conditions in its habitat.
6. Explain the relationship between habitat, physiology and the behaviour of wild animals.

**Learning outcomes**

Students are able to:

1. Compare and contrast the morphological and anatomical features of large and small mammal and their functions.
2. Compare and contrast the morphological and anatomical features of different species of reptiles and their functions.
3. Compare and contrast the morphological and anatomical features of different species of birds and their functions.
4. Compare and contrast the morphological and anatomical features of different species of Pisces and their functions.
5. List and explain the types of wild animal organs and their physiological functions and importance.
6. Infer the influence of habitat on evolution of species, wild animal behaviour, physiology, and an animal’s ability to adapt to the prevailing conditions in its habitat.
7. Tell the relationship between habitat, physiology and the behaviour of wild animals.

**Course Content:**

Introduction to the morphology and anatomy of wild animals. Morphological features of different species of wild animals. Anatomical features of different species of wild animals. The Organs and their functions in wildlife. Functioning System of Wild Animals organs. Habitat and evolution of species. Animal behaviour and factors that influence behavioural changes. Adaptation features in different species of animals.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 411 Wood Based Panel Products**

**Credit Unit: 2, Lecture 45hrs, Practical 45hrs)**

**Contact hours: 90hours**

**Senate approved relevance:**

To produce graduates who will lead in requisite scientific knowledge, skills and techniques in wood based panel products for sustainable production in Africa. Such graduates should be able to solve Africa’s developmental challenges through outstanding research, education and training.

**Overview**

Wood based panel production is an important sustainable area in forest industry as it reduces waste and improves overall raw materials utilization efficiency.

The course also addresses the issue of skills acquisition, manufacturing technique, mechanical characteristics of raw materials and final products, aimed at quality control and marketing of products.

**Objectives**

The objectives of the course are to

1. Explain the concept and principles of panel production.
2. Describe to students the categories of raw materials for panel production, especially, chips, flakes and fibre materials.
3. Describe the various panel manufacturing techniques, products mechanical characteristics and economics of the manufacturing processes.
4. Explain to students the durability of panel products and ways of preserving them
5. Explain to students the dimensional stability, quality control and marketing of products.

**Learning outcomes**

At the end of the course the student should be able to

1. Identify and differentiate the advantages of panel products over conventional solid wood
2. Apply the principles of panel production in the forest industry.
3. Identify and use fibre, chips and flakes in panel production.
4. Differentiate between the various manufacturing techniques and products mechanical characteristics.
5. Apply quality control skills and marketing strategies of products
6. Appraise the economic efficiency of various manufacturing processes.

**Content:**

Wood based panel products. Principles of panel production. Wood chips, flakes and fibre conversion processes. Properties of wood adhesives and additives. Manufacturing techniques of particular boards, fibre and wood cement. Mechanical characteristics of particular board, fibre and wood cement boards. Dimensional stability of panel products. Quality control in wood based panels. Marketing of panel products.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University, Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 412 Forest Industries and Timber Quality Control**

**Credit Unit: 2, Lecture 45hrs, Practical 45hrs)**

**Contact hours: 90 hours**

**Senate approved relevance:**

To produce graduates who will lead in establishing forest-based industries in Africa. Such graduates will be able to bring about sustainable development in Africa with high quality timber production and processing, through cutting-edge research, knowledge transfer and training of high quality, self-reliant graduates.

**Overview**

Forest industries stimulates sustainable production and management. The flow of products into manufacturing industries encourages the establishment of both private and public investments in forestry.

The study and understanding of forest industries encourages plantation forestry and value addition to forest products. This will contribute a lot to human economic, social and industrial development, sustain the supply, and maintain the quality standards of forest products.

**Objectives**

The objectives of the course are to:

1. Explain what forest-based industries are and their significance
2. Describe to students the concept of timber quality and its control
3. Explain to students how forest industries and wood users determine timber quality
4. Describe to students how timber quality affects its utilization
5. Highlight the factors of siting and establishing forest industries
6. Explore the entrepreneurship opportunities in forestry through forest products utilization
7. Explain to students how timber quality can be manipulated through natural and artificial means

**Learning outcomes**

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

1. Identify both primary and secondary forest industries, with their products
2. Identify factors necessary for the siting and establishment of forest industries
3. Explain timber quality and its variables, including natural durability
4. Describe how timber quality can be manipulated naturally through genetic control
5. Explain how timber quality determines its utilization
6. Describe how forest industries sustains the livelihood of Africans
7. Expatiate on how forest industries stimulate plantation forestry
8. Explain how to grade and determine various qualities of timber.
9. Describe how prices and marketing of forest industrial products and raw materials are made.
10. Identify and list various ways of preserving wood and their limitations
11. Explain the importance of provenance trials in controlling wood quality and establishing forest plantations

**Content:**

Forest based industries. Furniture. Saw mills. Ply mills. Fibre board, chipboard, and particular board mills. Wood processing. Wood based industries locational factors. Determination of timber quality and its control. Timber quality determination through inspection, sampling and grading. Wood protection. Minor forest based industries e.g. charcoal production. Cellulose derivative industry. Marketing of forest resources. Marketing of processed forest products.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.

Bayero University Kano (BUK)

Faculty of Agriculture

Forestry and Wildlife Management

BSc. Forest Resources and Wildlife Management

**BUK - FWM 413: Biometrics and Data Processing in Renewable Natural Resources**

**Credit Unit: 3, Lecture 45hrs, Practical 45hrs)**

**Contact hours: 90 hours**

**Senate-approved relevance**

To produce high quality graduates in Biometrics and Data Processing of Renewable Natural Resources with sound knowledge that can lead in addressing African developmental challenges in renewable natural resources inventory and biometrics.

**Overview**

Biometrics and Data Processing in Renewable Natural Resources is a prerequisite requirement for a research and report writing of any scientific project. It involves measurements and inventory of resources’ variables, data processing, results interpretation and drawing relevant conclusion.

The course also provides baseline knowledge on how data (information) of forest and wildlife resources would be assessed, monitored and evaluated for conservation and sustainable management and utilization. The course covered 45 lectures hours in a semester.

**Objectives**

The students should be able to:

1. Describe the renewable natural resources (forests and wildlife)
2. Outline how the tree variables are measured in the field
3. Explain inventory and biometrics techniques to evaluate renewable natural resources
4. Explain various methods used in assessments of renewable natural resources
5. Describe statistical analysis appropriate for different renewable natural resources
6. Describe how to interpret results of statistical analysis
7. Discuss different models used in estimation of variables and/or parameters of renewable natural resources

**Learning outcomes**

The students should be able to:

1. Define and explain the renewable natural resources
2. Discuss how tree variables are measured by the use of different instruments
3. Explain the techniques of inventory and biometrics in evaluation of renewable natural resources
4. Describe the various methods used in assessment of renewable natural resources
5. Distinguish the different methods used in assessments of renewable natural resources
6. Classify statistical analysis appropriate for different renewable natural resources
7. Explain how results of statistical analysis can be interpreted
8. Apply different models used in estimation of some variables and/or parameters of renewable natural resources

**Course contents**

Research objectives, research designs and field implementations. Analysis of variance and covariance of tree crops. Analysis of variance and covariance in wildlife. Correlation and regression analysis of renewable natural resources. Advanced survey techniques as they relate to forestry problems. Development and application of models on renewable natural resources. Application of basic statistical software such as Microsoft Excel, Tableau, SPSS and R for analysis. Visualization and presentation of data.

**Minimum academic standards:**

If needed as addition as what is contained in the CCMAS.