LANDMARK UNIVERSITY, OMU-ARAN

COURSE COMPACT

COLLEGE: Science and Engineering
DEPARTMENT: Biological Sciences
PROGRAMME: Microbiology
COURSE COMPACT for: Introductory Genetics and Evolution (BLY 211)

Course

BLY 211 Introductory Genetics and Evolution: [2 Units] [L 30: P0: T0]
Course code: BLY 211
Course title: Introductory Genetics and Evolution
Credit unit: 2
Course status: Compulsory

Lecturer's Data

Name of lecturer: Dr. C. E. O. Okolie
Qualifications obtained: PhD
Department: Biological Sciences
College: Science and Engineering
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Office Location: Room A311, Biological Sciences Corridor, 1st College Building

Name of the lecturer: S.O. Dahunsi
Qualifications obtained: MSc
Department: Biological Sciences
College: Science and Engineering
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Office Location: Room A304, 1st College Building

Consultation Hours:

INTRODUCTION TO THE COURSE

Course Description: The course BIO 201 exposes students in the second year of study to the basic concepts of inheritance, the structure and behaviour of chromosomes and the variations in genome structure. The course will also make students acquire basic knowledge of the concept of evolution and genetic speciation.

Course Justification: Although the students are already familiar with courses like Animal diversity an Plant diversity which has given then pre-exposure to the world of animals and plants, they still need to understand the basic principles of inheritance, to understand the structures and behaviour of chromosomes and learn the various forms of variation existing within different groups of animals and plants as these will afford them the opportunity to appreciate genetic diversity and the importance of heredity among living organisms

Course Objectives: At the end of this course, students would be able to:

(i) Understand the concept of inheritance
(ii) Understand the structure and behaviour of chromosomes

(iii)Understand the variations in genome structure
(iv)Acquire basic knowledge on the concept of evolution and genetic variations
(v) Understand the concept of evolution and speciation

Course Content: The course will introduce the students to the principles of inheritance, quantitative inheritance, heritable and non-heritable characteristics in living organisms. Basic knowledge of the structures and behaviour of chromosomes, probability and goodness of fit, variation in genome structures will be taught in addition to current concepts of evolution, genetic variations and appreciation, evolution and speciation

Course Expectations:

S/N	GRADING	SCORE (%)
1.	**Continuous Assessments** • C.AI • C.AII (Mid-Semester Test) • C.AIII	 **7%** **15%** **8%**
2.	**Assignment**	
3.	**Practical (Laboratory work)/ Case Studies**	**10%**
4.	**Final Examination**	**60%**
5.	**Total**	**100**

Course Delivery Strategies: Lecturing method is strictly adopted. Students may sometimes be grouped for the classwork and assignments are given at intervals for efficient understanding

Course Duration: Two hours per lecture

LECTURE CONTENT

Week	Outline	Lecturer
One	Overview of the course	Dr. CEO Okolie
Two	Basic principles of inheritance	Dr. CEO Okolie
Three	Heritable and non-heritable characteristics	Dr. CEO Okolie
Four	Continuous Assessment I	Dr. CEO Okolie
Five	Variation in chromosomal structure and genome complexity I: Prokaryotic chromosomes	Dr. CEO Okolie
Six	Variation in chromosomal structure and genome complexity II: Eukaryotic chromosomes	Dr. CEO Okolie
Seven	Trends in Genetics and evolution	Dr. CEO Okolie
Eight	Introduction to population genetics and quantitative inheritance I	Dahunsi OS
Nine	Introduction to population genetics and quantitative inheritance II	Dahunsi OS

Week	Outline	Lecturer
Ten	Continuous Assessment II	Okolie and Dahunsi
Eleven	Probability and tests of goodness of fit	Dahunsi OS
Twelve	Concept of speciation and variation	Dahunsi OS
Thirteen	Continuous Assessment III	Dahunsi OS
Fourteen	Revision	Okolie and Dahunsi
Fifteen	Examination	LMU

Teaching details

Week 1: Overview of the course

- **Objectives:** The meeting this week is intended to provide a platform for the student to understand what to expect in terms of course content, course delivery, ground rules.

- **Description:** Lecturers' expectations in terms of decorum, ethics and etiquettes. Explanation to earning and scoring of marks at each level will be explained in details.

- **Study Question:** As may arise during the meeting.

Week 2: Principles of inheritance

- **Objectives:** At the end of this week, the students should be able to understand the principles underlining inheritance of traits

- **Description:** The principles and methods of genetic inheritance from parents to offspring will be taught giving examples in humans, plants and microbes; pre-Mendelian, Mendelian and post-Mendelian concepts and methods will be explained in details.

- **Study Question:** Explain the principle of inheritance of the albinism trait in an individual whose parents are not albinos

Week 3: Heritable and non-heritable characteristics

- **Objectives:** At the end of this week, the students should be able to differentiate between characteristics that are heritable and those that are not heritable

- **Description:** The difference and modes of both heritable and non-heritable characteristics are fully discussed

- **Study Question:** Citing typical examples, explain in detail the difference between heritable and non-heritable characteristics

Week 4: Continuous Assessment I – Okolie. This test is intended to ensure that the students are enjoying what has been taught so far. This accounts for 7% of the total score for this course.

Week 5: Variation in chromosomal structures and genome complexity I: Prokaryotic

chromosomes

- **Objectives:** At the end of this week, the students should be able to describe the basic structures and organization of the prokaryotic chromosomes which is associated with simpler life forms as exemplified in bacteria.

- **Description:** The structures, forms, disorders and arrangement of chromosomes will be taught in details

- **Study Question:** Using a well-labelled diagram, illustrate the structures of the bacterial chromosome and explain their functions in bacteria life

Week 6: Variation in chromosomal structure and genome complexity II: Eukaryotic chromosomes

- **Objectives:** At the end of this week, the students should be able to describe the basic structures and organization of the prokaryotic chromosomes which is associated with complex life forms as exemplified in yeasts, plants and humans.

- **Description:** The structures, forms, disorders and arrangement of chromosomes will be taught in details

- **Study Question:** Using a well-labelled diagram, illustrate the structures of the bacterial chromosome and explain their functions in bacteria life

Week 7: Trends in Genetics and evolution

- **Objectives:** At the end of this week, the students should be able to understand the principles of genetic evolution, the effects of various pressures on genetic evolution, and how evolution is studied

- **Description:** How to study genetic evolution; Genetic evolution in bacteria; Genetic evolution in bacteria

- **Study Question:** Discuss the evolution of virulence and antibiotic resistance in Gram positive bacteria

Weeks 8 and 9: Introduction to population genetics and quantitative inheritance I and II

- **Objectives:** The goal of the module is to introduce both classical population genetics theory developed in terms of allele and haplotype frequencies and modern population genetics theory developed in terms of coalescent theory.

- **Description:** Methods and modes of population genetics and quantitative inheritance will be discussed in details. Numerous applications of theory to problems that arise in the study of human and other populations are presented. Appendices provide the mathematical background necessary to understand the basic theory.

- **Study Question:** Explain the principle of population genetics and quantitative inheritance and the various methods of studying them

Week 10: Continuous Assessment II – Okolie and Dahunsi. This test is the biggest of the CATs. It is important that the students are appreciating the teachings as this accounts for 15% of the total score for this course.

Week 11: Probability and tests of goodness of fit

- **Objectives: At the end of this week, the students should understand the application of probability and goodness of fit in genetics**
- **Description:** Various test to quantify goodness of fit will be taught
- **Study Question: Explain the application of probability studies in genetics**

Week 12: Genetic speciation and variation

- **Objectives: At the end of this week, the students should understand the concepts of chromosomal speciation and variation**
- **Description:** Speciation and variation as concepts will be taught in details
- **Study Question: Explain the concept of speciation and variation**

Week 13: Continuous Assessment III – Dahunsi. This test is intended to ensure that the students have enjoyed the teachings and accounts for 8% of the total score for this course.

Week 14: Revision – Dr. Okolie and Dahunsi

Week 15: Examinations – Dr. Okolie and Dahunsi

Course Expectations:

S/N	Grading	Score (%)
1	**Continuous Assessments** • **CA 1** • **CA 11** • **CA 111**	 **7%** **15%** **8%**
2	**Assignment**	
3	**Practical (Laboratory work)/ Class studies**	**10**
4	**Final Examination + Practical**	**60**
5	**Total**	**100**

Ground Rules and Regulation:

- Punctuality
- Attention and Participation
- Dedication and Diligence

Topic for Term Paper / Assignment:
Principles of inheritance before, during and after Gregor Mendel.

Alignment with Goals and Vision of Landmark University:

To prepare the students and harness their potential for future application of their knowledge of genetics to challenges in applied research and diagnosis of human, plant and animal diseases

Contemporary Issues / Industry Relevance:
Understanding the origin, processes and mechanisms of genetics in the structure and functions of living systems and how this can be applied in agriculture, medicine and the environment.

Recommended Reading:

1. Akre B et al., (2009). Biology. Flexbook Publishers.

HOD's COMMENTS: _____

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Name: _____ Signature _____ Date: _____