

NATIONAL OPEN UNIVERSITY OF NIGERIA

BIO 217



General Microbiology Course Guide

BIO 217 (General Microbiology) Course Guide

Course Developer/Writer

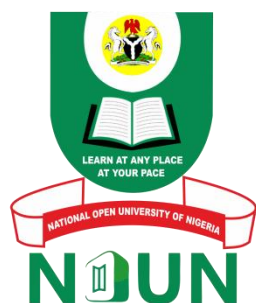
Mrs. O. A. F. Ilusanya, Olabisi Onabanjo University, Ago Iwoye, Ogun State, Nigeria

Programme Leader

Prof. Monioluwa Olaniyi, National Open University of Nigeria

Credits of cover-photo: Henry Ude, National Open University of Nigeria

National Open University of Nigeria - 91, Cadastral Zone, Nnamdi Azikiwe Express Way, Jabi, Abuja, Nigeria



www.nou.edu.ng centralinfo@nou.edu.ng

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Introduction

General Microbiology is a first semester course. It is a three -credit unit compulsory course which all students offering Bachelor of Science in Biology must take.

Microbiology is a branch of biology which involves the study of microorganisms. Microorganisms can be defined as living organisms which cannot be seen by the unaided eyes. These organisms include bacteria, fungi, algae, protozoa, viruses, etc.

Microorganisms are numerous in nature and have some characteristics which make them ideal specimens for the study of numerous fundamental like processes which occur at the cellular level in all living organisms. In microbiology, study of microorganisms is done extensively by observing their life processes while they are actively metabolising.

Microorganisms have a wider range of physiological and biochemical potentials than all other organisms combined. Some are able to utilise atmospheric nitrogen for the synthesis of proteins and other complex organic nitrogen compounds.

The study of microorganisms is applicable to all aspects of human endeavour including: medicine, food, agriculture, conserving human and animal reaction, combating diseases and used also as biological weapons. Some organisms are friends (beneficial) while others can be regarded as foes (harmful) to human beings.

What You Will Learn In This Course

In this course, you have the course units and a course guide. The course guide will tell you what the course is all about. It is a general overview of the course materials you will be using and how to use those materials. It also helps you to allocate the appropriate time to each unit so that you can successfully complete the course within the stipulated time limit.

The course guide also helps you to know how to go about your Tutor-Marked Assignment which will form part of your overall assessment at the end of the course. Also, there will be regular tutorial classes that are related to this course, where you can interact with your facilitator and other students.

This course exposes you to microbiology, a very important and interesting field in biology.

Course Aims

The course aims to give you an understanding of microbiology which is an important branch of biology.

Course Objectives

To achieve the aim set above, there are objectives. Each unit has a set of objectives presented at the beginning of the unit. These objectives will give you what to concentrate/focus on while studying the unit. Please read the objectives before studying the unit and during your study to check your progress.

The comprehensive objectives of the course are given below. By the end of the course, you should be able to:

- identify the different components of the microbial world
- explain the historical aspects, relevance and scope of microbiology
- explain the general characteristics of the different groups of microorganisms
- describe microbial growth and reproduction and methods of controlling microbial growth
- give a systemic classification of bacteria, fungi, viruses, etc.
- explain the causes of microbial variation and hereditary; and
- Describe some biogeochemical cycles in nature.

Working through This Course

To successfully complete this course, you are required to read each study unit, textbooks and other materials provided by the National Open University of Nigeria.

Reading the referenced materials can also be of great assistance.

Each unit has self assessment exercises which you are advised to do. At certain periods during the course, you will be required to submit your assignment for the purpose of assessment.

There will be a final examination at the end of the course. The course should take you about 17 weeks to complete.

This course guide will provide you with all the components of the course how to go about studying and how you should allocate your time to each unit so as to finish on time and successfully.

The Course Materials

The main components of the course are:

1. The Study Guide
2. Study Units
3. eference/Further Reading
4. Assignments
5. Presentation Schedule

Study Unit

The study units in this course are given below:

Module 1 Introduction to Microbiology

Unit 1 Composition of the Microbial World

Unit 2 Historical Aspects of Microbiology

Unit 3 The Relevance and Scope of Microbiology

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Unit 4 Microscopy and Specimen Preparation

Unit 5 A Brief Survey of Microbes as Friends and Foes

Module 2 General Characteristics of Microorganisms

Unit 1 General Characteristics of Bacteria

Unit 2 General Characteristics of Fungi

Unit 3 General Characteristics of Viruses

Unit 4 General Characteristics of Algae

Unit 5 General Characteristics of Protozoa

Module 3 Microbial Growth, Reproduction and Control

Unit 1 Microbial Growth

Unit 2 Measurement of Microbial Growth and Factors that Influence Microbial Growth

Unit 3 Physical Methods of Controlling Microbial Growth

Unit 4 Chemical Methods of Controlling Microbial Growth

Module 4 Systematic Classification of Microorganisms

Unit 1 Introduction to Systemic Classification of Microorganisms

Unit 2 Systematic Classification of Bacteria

Unit 3 Systematic Classification of Fungi

Unit 4 Systematic Classification of Algae

Unit 5 Systematic Classification of Protozoa

Module 5 Microbial Genetics and Biogeochemical Cycling of Elements

Unit 1 Mechanisms of Genetic Variation and Hereditary

Unit 2 Biogeochemical Cycling of Elements

In module one, unit one deals with the historical aspects of microbiology, the second unit focuses on the meaning of microbiology, microorganisms as *cells*, and the different groups of microorganisms, and the domains in which they are placed. The third unit focuses on the relevance and scope of microbiology. The fourth unit focuses on the use of difference microscopes to study microorganisms while the fifth unit is a brief survey of microorganisms as friends and foes.

Module two is concerned with the general characteristics of microorganisms. Units one, two, three, four and five in this module deal with the characteristics, morphology, distribution and importance of bacteria, fungi, viruses, algae and protozoa respectively.

In module three, unit one focuses on microbial growth and reproduction, unit two deals with measurement of microbial growth and factors that influence microbial growth. Unit three deals with different physical methods of controlling microbial growth and unit 4 deals with the use of chemical agents to control microbial growth.

Units one, two, three and four in module 4 deal with the systematic classification of microorganisms.

In module 5, unit one is on microbial variation and hereditary while unit two focuses on biogeochemical cycling of nutrients in nature.

Each unit will take a week or two. Lectures will include an introduction, objectives, reading materials, self-assessment exercises, conclusion, summary, tutor-marked assignments (TMAs), references and other reading resources.

There are activities related to the lecture in each unit which will help your progress and comprehension of the unit. You are required to work on these exercises which together with the TMAs will enable you to achieve the objectives of each unit.

Presentation Schedule

There is a timetable prepared for the early and timely completion and submissions of your TMAs as well as attending the tutorial classes. You are required to submit all your assignments by the stipulated date and time. Avoid falling behind the schedule time.

Assessment

There are three aspects to the assessment of this course.

The first one is the self-assessment exercises. The second is the tutor-marked assignments and the third is the written examination or the examination to be taken at the end of the course.

Do the exercises or activities in the unit by applying the information and knowledge you acquired during the course. The tutor-marked assignments must be submitted to your facilitator for formal assessment in accordance with the deadlines stated in the presentation schedule and the assignment file.

The work submitted to your tutor for assessment will account for 30% of your total course work.

At the end of this course, you have to sit for a final or end of course examination of about a three hour duration which will account for 70% of your total course mark.

Self-Assessment Exercise

This is the continuous assessment component of this course and it accounts for 30% of the total score. You will be given 4 TMAs by your facilitator to answer. Three of which must be answered before you are allowed to sit for the end of course examination.

These answered assignments must be returned to your facilitator.

You are expected to complete the assignments by using the information and material in your reading references and study units.

Reading and researching into the references will give you a deeper understanding of the subject.

1. Make sure that each assignment reaches your facilitator on or before the deadline given in the presentation schedule and assignment file. If for any reason you are not able to complete your assignment, make sure you contact your facilitator before the assignment is due to discuss the possibility of an extension. Request for extension will not be granted after the due date unless there are exceptional circumstances.

2. Make sure you revise the whole course content before sitting for the examination. The self-assessment exercises and TMAs will be useful for this purpose and if you have any comments please do before the examination. The end of course examination covers information from all parts of the course.

Course Marking Scheme

Assignment	Marks
Assignments 1 – 4	Four assignments, best three marks of the four count at 10% each – 30% of course marks.
End of course examination	70% of overall course marks
Total	100% of course materials.

Facilitators/Tutors and Tutorials

Sixteen hours are provided for tutorials for this course. You will be notified of the dates, times and location for these tutorial classes.

As soon as you are allocated a tutorial group, the name and phone number of your facilitator will be given to you.

These are the duties of your facilitator:

- He or she will mark and comment on your assignment.
- He will monitor your progress and provide any necessary assistance you need.
- He or she will mark your TMAs and return to you as soon as possible.

Do not delay to contact your facilitator by telephone or e-mail for necessary assistance if:

- you do not understand any part of the study in the course material.
- you have difficulty with the self assessment activities.
- you have a problem or question with an assignment or with the grading of the assignment.

It is important and necessary you attend the tutorial classes because this is the only chance to have face to face contact with your facilitator and to ask questions which will be answered instantly. It is also a period where you can point out any problem encountered in the course of your study.

Summary

General Microbiology is a course that introduces you to the microbial world around us.

Biology is a field very important to your welfare or well being in both positive and negative ways. Microorganisms are cellular and acellular (viruses) entities which are capable of life processes found in plants and animals.

On completion of this course, you will have an understanding of basic knowledge of microorganisms, the history of men and women who contributed to this field of study by their discoveries during their research works. You also learn the general characteristics of microorganisms, microbial growth and reproduction, how the microorganisms are classified or placed in different groups, the mechanisms of variation and hereditary in microorganisms and the role of microorganisms in cycling elements in our environments. In addition, you will be able to answer the following questions:

- What is microbiology?
- What are microorganisms?
- Identify the different groups of microorganisms and their general characteristics.
- Explain the relevance and scope of microbiology.
- Differentiate between phyletic classification and phylogenetic classification.
- What are point mutations?
- What are frame shift mutations?
- Describe the four phases of the growth curve in a closed system.

The list of questions you are expected to answer is not limited to the above list. Finally, you are expected to apply the knowledge you have acquired during this course to your practical life.

I believe you will agree with me that microbiology is a very interesting field of biology with a wide application to life.

I wish you success in this course.