



EDO UNIVERSITY, IYAMHO

Department of Microbiology

MCB 311: General Mycology

Instructor: Mr. Arthur C. Okafor. Email: arthur.okafor@edouniversity.edu.ng

Lecture Period and venue: Tuesday, 10:00am – 12:00pm, ML2.

Office hours: Tuesday, 1pm - 4pm, Wednesday, 1pm - 4pm, Friday, 8am – 1pm.

Office: New Faculty of Science Block, Rm B2.

General overview of lecture: This course is intended to give the students a thorough knowledge of fungi, their morphology, classifications, ecology, importance to industry and public health significance.

Prerequisites: Students should have thorough knowledge of **Introductory Microbiology** and **General Microbiology** courses offered in 200 Level.

Learning outcomes: At the completion of this course, students are expected to:

- (1.) Recognize the common features of fungi.
- (2.) Gain knowledge of the diversity of fungi in various environments.
- (3.) Be able to classify fungi into major divisions based on the lifecycle.
- (4.) Become familiar with the enormous economic importance.
- (5.) Better understand how some fungi cause diseases and possible treatment plans.
- (6.) Know how to collect samples for laboratory study of fungi
- (7.) Be acquainted with different staining techniques and microscopy for fungal studies.

Assignments: There shall be a minimum of 3 assignments throughout the course in addition to a Mid-Term test and a Final Exam. Completed assignments must be submitted at the beginning of the lecture periods on the due dates. Assignments are organized and structured to serve as supplementary materials for the midterm quiz and final exam. There will also be 4 practical classes.

Grading: I will assign 10% of this class grade to assignments, 10% for participation in laboratory practical 10% for the midterm test and 70% for the final exam. The Final exam is comprehensive.

***Recommended Textbooks:**

- (1.) NESTER'S MICROBIOLOGY by Nester *et al.* 5th Edition. Jaypee Publishers.
- (2.) INTRODUCTION TO FUNGI by Webster J. and Weber R. 3rd Edition. Cambridge Univers. Press.
- (3.) PRESCOTT'S MICROBIOLOGY by Joanne *et al.* 9th Edition. Mc Graw Hill Education.

*The recommended textbooks above also serve as references from which this lecture note was compiled.

Lectures: Below is a description of the contents.

LABORATORY STUDY OF FUNGI

- The diagnosis of fungal infections relies upon a combination of clinical observation and laboratory investigation.
- Laboratory methods for the diagnosis of fungal infections is based on **three** broad approaches:
 - (a) Direct microscopic examination of clinical specimens.
 - (b) Isolation and identification of the pathogen in culture.
 - (c) The detection of a serologic response to the pathogen or some other marker of its presence.
 - (d) Detection of fungal DNA in clinical material.

Collection of Specimen

- The successful laboratory diagnosis of fungal infection depends majorly on the collection of adequate clinical specimens for investigation.
- Specimen collection depends on the site affected. Different specimens include:
 - Hair,
 - Skin scrapings,
 - Nail clippings,
 - Sputum,
 - Blood,
 - Cerebrospinal fluid (CSF),
 - Urine,
 - Corneal scraping,
 - Discharge or pus from lesions,
 - Biopsy.

All specimens must be transported to the laboratory without any delay to prevent bacterial overgrowth.

Infected hairs may be plucked using forceps. Those hairs that fluoresce under Wood's lamp may be selectively plucked. Hairs may be collected in sterilized paper envelopes.

Surface of the skin must be disinfected with spirit before specimen collection. The advancing edge of the lesion is scraped with the help of a blunt forceps and collected in sterilized paper envelopes.

Discoloured or hyperkeratotic areas of nail may be scraped or diseased nail clipping may be collected in sterilized paper envelopes.

Specimens from mucus membranes (oral) must be collected by gentle scraping and transported to laboratory in sterile tube containing saline. Swabs may be collected from vagina.

Corneal scrapings may be collected using a fine needle and inoculated at bedside.

Pus may be collected by aspiration; use of cotton swabs may give false positive microscopic results.

Clean catch urine may be collected in a sterile wide-mouthed container.

Biopsy specimens must be transported in saline.

Direct Microscopic Examination

- This examination is very helpful **to guide treatment decisions, to determine whether an organism recovered later in culture is a contaminant or a pathogen, and to assist the laboratory in selecting the most appropriate culture conditions to recover organisms visualized on direct smear.**
- Direct microscopic examination is less sensitive than culture.
- Microscopic examination of skin scrapings or other superficial material can reveal a fungal organism in a matter of minutes.
- Keratinized tissues require pre-treatment with KOH to dissolve the material and more readily reveal fungal elements.

The specimen is mixed with 10-20% potassium hydroxide (KOH) on a slide and a cover slip is placed. The slide is then gently heated by passing through the flame 2-3 times. The slide is observed after cooling.

ASSIGNMENT

What precautions can you take while studying fungi in the laboratory?