

Medical Mycology Course Description

Medical Mycology is a specialized course in medical microbiology that focuses on the biology, classification, identification, and clinical significance of fungi that cause human diseases. The course covers the morphology, physiology, taxonomy, ecology, and pathogenic mechanisms of medically important fungi, including superficial, cutaneous, subcutaneous, systemic, and opportunistic fungal pathogens. Students study the epidemiology, clinical manifestations, laboratory diagnosis, antifungal therapy, prevention, and control of mycotic infections. Practical laboratory sessions emphasize the collection and processing of clinical specimens, direct microscopic examination, fungal culture, identification of yeasts and molds, and the application of biosafety and quality assurance procedures.

1. Educational Institution	Shatt Al-Arab University
2. Scientific Department	Pathological Analysis Sciences
3. Course Name / Code	Medical Mycology / PATH-222
4. Available Attendance Forms	Basic Educational Activity
5. Semester / Year	Second Semester 2025-2026
6. Total Study Hours	125
7. Date of Preparation of This Description	2025/2026

8. Course Objectives

The **module aims of a Medical Mycology course** are usually to help students understand fungi that affect human health and build the skills needed to recognize, diagnose, and understand fungal diseases. The common aims include:-

- 1-Understand fungal biology and classification
- 2-Study medically important fungal pathogens
- 3-Understand mechanisms of fungal infection (mycoses)
- 4-Study the Risk factors contribute to fungal infection
- 5-Develop diagnostic skills

A - Cognitive Objectives

- 1- **Classify** medically important fungi according to their taxonomy, morphology, and clinical significance.
- 2- **Differentiate** between superficial, cutaneous, subcutaneous, systemic, and opportunistic mycoses.
- 3- **Explain** the morphology, life cycle, reproduction, and growth characteristics of pathogenic fungi.
- 4- **Describe** the epidemiology, transmission, virulence factors, and pathogenesis of major fungal pathogens.
- 5- **Correlate** fungal pathogens with the diseases they cause and their characteristic clinical manifestations.
- 6- **Interpret** laboratory findings used in the diagnosis of fungal infections, including direct microscopy, culture, histopathology, serological, and molecular methods.
- 7- **Compare** different laboratory techniques for fungal identification and evaluate their advantages and limitations.

B - Course-Specific Skill Objectives

- 1- **Collect, transport, and process** clinical specimens for the laboratory diagnosis of fungal infections using appropriate procedures.
- 2- **Perform direct microscopic examinations** of clinical specimens using potassium hydroxide (KOH) preparation, Gram stain, India ink, lactophenol cotton blue, and other relevant staining techniques.
- 3- **Culture and isolate** medically important fungi using appropriate fungal culture media (e.g., Sabouraud Dextrose Agar) under suitable incubation conditions.
- 4- **Identify pathogenic yeasts and molds** based on their macroscopic colony characteristics, microscopic morphology, and relevant biochemical or physiological tests.
- 5- **Differentiate** common fungal pathogens from contaminants and normal flora based on laboratory findings.

Teaching and Learning Methods

1. Theoretical lectures to explain concepts and scientific foundations.
2. Practical and laboratory applications using a light microscope and staining techniques.
3. Project-Based Learning to implement real-world laboratory applications.
4. Scientific discussions and presentations to enhance critical thinking and communication skills.
5. Self-learning through utilizing scientific resources, medical references, and the university library.
6. Seminars to discuss scientific topics and exchange knowledge.
7. E-learning through the use of digital resources, online lectures, and educational platforms.

Assessment Methods

1. Written tests (short, midterm, and final) to measure the cognitive aspect.
2. Reports and practical assignments to evaluate applied skills.
3. Practical laboratory tests to measure the ability to use microscopic examination tools and techniques.
4. A practical project involving the design and implementation of an application in the field of cytology, with a discussion of it.
5. Class participation and presentations to evaluate interaction and the ability to present and analyze results.

C - Affective and Value Objectives

- 1- Demonstrate professional responsibility when handling clinical specimens and fungal cultures.
- 2- Adhere to biosafety and infection control practices to protect themselves, colleagues, patients, and the laboratory environment.
- 3- Show respect for patient confidentiality and ethical considerations related to clinical microbiology investigations.
- 4- Appreciate the clinical importance of fungal infections, especially in immunocompromised and high-risk patients.

D - General and Transferable Qualification Skills (Other Skills Related to Employability and Personal Development)

- 1- Communicate effectively with colleagues, instructors, and healthcare professionals using appropriate scientific and medical terminology.
- 2- Work collaboratively as a member of a multidisciplinary healthcare or laboratory team.
- 3- Apply critical thinking and problem-solving skills to interpret laboratory findings and resolve diagnostic challenges.
- 4- Use information technology and digital resources to access, evaluate, and present scientific information related to medical mycology.
- 5- Search, evaluate, and utilize scientific literature and evidence-based guidelines to support clinical and laboratory decision-making.

9. Course Structure

Week	Lecture Topic	Practical Lab	Learning Method	Learning Outcomes
1	Medical Mycology, Fungal Diseases (Mycoses)	specimen collection methods	Theoretical lecture, presentation, practical training	1- Define medical mycology and explain its importance in human health and clinical medicine. 2- Describe the general characteristics of medically important fungi ,

				including their morphology, structure, and modes of reproduction.
2	Types of mycosis	Microscopically detection of pathogenic fungi in the specimen	Interactive lecture, applied examples, practical lab	1- Define mycoses and explain the principles used to classify fungal infections. 2- Classify mycoses into superficial, cutaneous, subcutaneous, systemic (endemic), and opportunistic fungal infections. 3- Describe the principles and importance of direct microscopic examination in the diagnosis of fungal infections.
3	Dermatophytosis	Cultivation of fungi on cultural medium plates	Theoretical explanation, application-based learning, lab	1- Define dermatophytosis (tinea) and explain its significance as a common superficial fungal infection. 2- Identify the major dermatophyte genera (<i>Trichophyton</i>, <i>Microsporum</i>, and <i>Epidermophyton</i>) . 3- Explain the epidemiology, transmission, and risk factors associated with dermatophyte infections.
4	Subcutaneous mycosis	Morphological identification of the fungi and yeasts isolates	Lecture, solving examples, practical lab	1- Define subcutaneous mycoses and distinguish them from superficial, cutaneous. 2- Identify the major causative fungi of subcutaneous . 3- Describe the epidemiology, environmental reservoirs, and modes of transmission of subcutaneous fungal infections

5	Systemic mycosis	Microscopic identification of Fungal Mycelium	Lecture, mini-project, lab	1- Define systemic mycoses and distinguish them from superficial, cutaneous, subcutaneous, and opportunistic fungal infections. 2- Identify the major causative agents of systemic mycoses. 3-Describe the epidemiology, geographic distribution, environmental reservoirs, and modes of transmission of systemic fungal pathogens
6	Blastomycosis	Microscopic identification of Yeasts	Lecture, practical lab, applied learning	1- Define blastomycosis and identify <i>Blastomyces dermatitidis</i> (and related <i>Blastomyces</i> species) as the causative agents. 2- Describe the epidemiology, geographic distribution, environmental reservoirs, thermal dimorphism and modes of transmission of blastomycosis.
7	Midterm Examination	Practical Assessment	Written and practical test	1. Measure academic achievement. 2. Assess practical skills. 3. Identify areas for improvement.
8	Opportunistic Mycoses	Germ Tube Formation Assay	Lecture, practical lab, applied learning	1-Define opportunistic mycoses and explain their clinical significance in immunocompromised and other high-risk patients. 2- Explain the pathogenesis of opportunistic mycoses and the role of host immune status in disease development.
9	Candidal infections	Chlamydospore Formation Assay	Lecture, lab, project-based learning	1- Define candidiasis and identify <i>Candida</i> species, particularly <i>Candida</i>

				<i>albicans</i>, as major opportunistic fungal pathogens. 2- Describe the morphology, virulence factors, and pathogenic mechanisms of <i>Candida</i> species, including yeast-to-hypha transition and biofilm formation
10	Cutaneous Candidiasis	Biofilm Formation Test	Lecture, practical lab, applied learning	1- Define cutaneous candidiasis and explain its significance as a superficial fungal infection of the skin and skin folds. 2- Identify the causative agents, particularly <i>Candida albicans</i> and other clinically important <i>Candida</i> species associated with cutaneous infections
11	Chronic Candidiasis	Biochemical identification methods for fungal species	Lecture, practical lab, applied learning	1- Define chronic candidiasis and distinguish it from acute and recurrent candidal infections. 3- Describe the epidemiology and risk factors associated with chronic candidiasis, including immunodeficiency, endocrine disorders, diabetes mellitus etc .
12	Cardiac candidiasis	Chromogenic Medium	Lecture, practical lab, applied learning	1- Define chromogenic media and explain the principle of chromogenic substrate technology in microbiological diagnostics. 2- Describe the composition and mechanism of action of chromogenic media used for the isolation and identification of clinically important fungi,

				particularly <i>Candida</i> species.
13	Candidal Onychomycosis	Virulence Factors Tests	Lecture, practical lab, applied learning	1- Identify the major causative <i>Candida</i> species associated with nail infections, particularly <i>Candida albicans</i> and other clinically important non-<i>albicans Candida</i> species. 2- Explain the concept of fungal virulence factors and their importance in the pathogenicity of <i>Candida</i> species.
14	Aspergillosis	serological identification methods	Lecture, practical lab, applied learning	1- Define aspergillosis and identify the major <i>Aspergillus</i> species responsible for human disease. 2- Explain the epidemiology, routes of transmission, and risk factors associated with aspergillosis, particularly in immunocompromised individuals
15	Mycotoxin	Molecular Identification techniques (PCR and DNA sequencing)	Presentations, discussion, project evaluation	1-Define mycotoxins and explain their importance in medical mycology, food safety, and public health. 2- Describe the major classes of mycotoxins, including aflatoxins, ochratoxins, fumonisins, trichothecenes, zearalenone, patulin, and ergot alkaloids

1-Shubhrata R. Mishra(2010) Textbook of Mycology Discovery Publishing House.

2-Larone's (2023)**Medically Important Fungi: A Guide to Identification** .
John Wiley & Sons, Inc.

3-Elias J. Anaissie , Michael R. McGinnis and Michael A. Pfaller (2023) **Clinical Mycology**. Churchill Livingstone.

4-Koneman's(2006) **Color Atlas and Textbook of Diagnostic Microbiology**.Lippincott &Wilkins .

1. Course Development Plan

- 1-Update course content to include recent advances in Medical mycology
- 2-Ensure alignment with the program learning outcomes
- 3-Update laboratory exercises according to current biosafety guidelines.
- 4-Introduce modern fungal identification techniques such as:
 - PCR ; Real -time PCR (where available)

أ.د. هادي سلمان عباس

عميد الكلية

أ. عبد الله حمود عبد الله

رئيس القسم

أ.د.محمد عامر فياض

مدرس المادة