

(Mycology)

2023-2024

College	Health & Medical Technical College- Erbil	
Department	Medical Laboratory Techniques	
Module Name	Mycology	
Module Code	MYC605	
Semester	6	
Credit	5	
Module type	Basic	
Weekly hours		
Weekly hours (Theory)	2h.	(5) hr. Workload
Weekly hours (Practical)	2h	(4) hr. Workload
Lecturer (Theory)	Dr. Sheylan Salah Abdullah	
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Lecturer (Practical)	Asst. lecture Eman Najdai Hayder	
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Course Book

Theoretical Topics (If there is any)	Week	Learning Outcome
Introduction to the course; General characteristics of fungi and Fungal Terminology Definitions	1	Define the terms mycology, saprophytic, dermatophyte, and polymorphic, dimorphic, and thermally dimorphic fungi.
Morphological, histological structure of fungi and Impact of exposure on a human health to fungal toxins (Mycotoxins: Prognosis and Treatment)	2	Morpho-Taxonomic Description of Mycotoxic Fungi
Classification of fungi – Based on colony morphology, reproduction. Systemic classification – Groups of fungi (Zygomycota, Ascomycota, Basidiomycota) and Fungi Imperfecti, Conidia and Other Spores	3	Describe structure and function of a fungal mycelium and discuss its adaptive Differentiate the colonial morphology of yeasts and filamentous fungi (molds)
Fungi growth (fungal life cycles) and Nutrition	4	Describe basic fungal life cycle, labeling main stages and structures and indicating ploidy of each. 5. Differentiate among Zygomycota, Ascomycota, and Basidiomycota in terms of asexual and sexual reproductive structures and differences in their life cycles. Describe three ways in which fungi reproduce Define and differentiate anamorph, teleomorph, and synanamorph. Discuss ecological importance of fungi in terms of saprobes, parasites, predators and mutualists
Disease mechanism of fungi; Overview of fungal diseases, Predisposing factors and Fungal Immunity.	5	Demonstrate knowledge and understanding of the pathogenesis of the various mycoses, their clinical manifestations, diagnosis and management Explain the steps of viral pathogenesis

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Superficial mycoses: Tinea versico, Tinea nigra palmaris and Piedra	6	Define and differentiate superficial
Dermatophytosis and the dermatophytes Cutaneous mycoses: Tinea capitis, Tinea pedis, Tinea corpories, Tinea cruris, Tinea barbae Tinea unguium	7	Define and differentiate cutaneous. List the common dermatophytes and describe their pathogenesis
Midterm Exam	8	
Subcutaneous mycoses: Sporotrichosis, Maudromycosis, Phaeohyphomycosis , Chromoblastomycosis and Rhinosporidiosis	9-10	Define and differentiate subcutaneous.
Systemic mycoses: Blastomycosis, Coccidiomycosis, Paracoccidiomycosis and Histoplasmosis	11-12	Define and differentiate systemic mycoses, including the tissues involved.
Opportunistic Mycoses: Candidiasis, Aspergillosis, Zygomycosis, Cryptococosis and Pneumocystis Jerovecii	13-14	Define and differentiate, Opportunistic Mycoses including the tissues involved.
Antifungal Agents: Polyenes and Azoles	15	Describe common antifungal agents and their mode of action
Final Examination		
Laboratory Experiments (Practical)	Week	Learning Outcome
<ul style="list-style-type: none"> Laboratory Orientation, Sterilization and biosafety in mycology lab 	1	Students learn theories and principles of Medical Laboratory science and Technology and. demonstrate the ability to plan and effect the change in laboratory practice and health care delivery system. Laboratory Safety; Sterilization, Sterile Distilled Water
<ul style="list-style-type: none"> Clinical Specimens: Collection, Transport, processing & preservation of Specimens. Direct microscopy of skin scrapings and nail clippings. 	2	Describe the proper method of specimen collection for fungal cultures, including collection site, acceptability, processing, transport, and storage.
<ul style="list-style-type: none"> Culture techniques: Introduction to media, Type, preparation, cultivation Maintenance of stock cultures 	3	Important Ingredients in Culture Media, Growth Media, Composition of Important Media. List the media that should be used for optimal recovery of fungi, including their incubation requirements. List the common antibacterial agents used in fungal media.

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<ul style="list-style-type: none"> Techniques used for Isolation and Identification of medically important fungi & common laboratory contaminants (Techniques for purifying and studying fungi (mould & yeast)) 	4	<p>Mycological Evaluation / Isolation Study Techniques Give the advantages and disadvantages of using screw-capped culture tubes, compared with agar plates, in the laboratory.</p> <p>Define and differentiate rapid, intermediate, and slow growth rates with regard to fungal reproduction and cultivation.</p>
<ul style="list-style-type: none"> Different forms of fungi (yeast & mould): Cultural & Morphological characters, microscopic exams of fungal cultures 	5	<p>Identification of Fungus Grown in Culture Explain and differentiate the characteristic colonial morphology of fungi, including topography (rugose, umbonate, verrucose), texture (cottony, velvety, glabrous, granular, wooly) and surface described (front, reverse).</p>
<ul style="list-style-type: none"> Microscopy techniques by making slide culture, mounts and stain 	6	<p>Direct Microscopic Examination: Slide Culture Method, Advantages of Slide Culture; Describe the chemical principle and methodologies used to identify fungi, including calcofluor white-potassium hydroxide preparations, hair perforation, cellophane (Scotch) tape preparations, saline/wet mounts, lactophenol cotton blue, potassium hydroxide, Gram stain, India ink, modified acid-fast stain, periodic acid-Schiff stain (PAS), Wright's stain, Papanicolaou stain, Grocott's methenamine silver (GMS), hematoxylin and eosin (H&E) stain, Masson-Fontana stain, tease mount and microslide culture.</p>
<ul style="list-style-type: none"> Special confirmatory test Germ tube, Biochemical tests (Carbohydrate fermentation, Capsule production, API and Vitek 	7	<p>Explain how molds and yeast are identified</p> <p>For yeast identification: Morphology on CMA, germ tube tests, pellicle formation, nitrate utilization, urease test, actidione inhibition, sugar fermentation, and sugar assimilation (API 20C)</p>

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<ul style="list-style-type: none"> Laboratory Diagnosis of Superficial mycoses and Skin fungi: (Malassezia, Tinea Nigra & Piedra) Laboratory Diagnosis of Superficial (cutaneous) Dermatophytes (Tinea unguium , Tinea barbae...etc.) 	8-9	Laboratory Diagnosis of Fungal Infection Superficial and Cutaneous Mycoses
<ul style="list-style-type: none"> Laboratory Diagnosis of Cutaneous mycoses Dermatomycosis (Candidiasis or Candidiasis) Laboratory Diagnosis of Subcutaneous mycoses (sporotrichosis, mycetoma) 	10	Describe and differentiate the sexual and asexual reproduction of the Ascomycota.
<ul style="list-style-type: none"> Midterm Exam 	11	
<ul style="list-style-type: none"> Common opportunistic fungal infection diagnosis (Candida, Cryptococcosis, Aspergillus and Penicillium) Systemic infections (Dimorphic Fungi) (Blastomycosis, Histoplasmosis and Coccidioidomycosis) 	12-13	Recognition of common fungal contaminants and opportunistic fungal pathogens. – Recognition of primary pathogens, namely Dermatophytes, agents of subcutaneous fungal infections (Moniliaceous and dematiaceous), agents of systemic infections: for example, Histoplasma capsulatum, Blastomyces, Coccidioides, and actinomycetous agents. Give examples of pathogens seen in the following organ infections: blood, upper and lower respiratory, oral cavity, CNS, eyes, ears, sinuses, urinary and genital tract, gastrointestinal tract, wound infections, sterile body fluids and bone.
<ul style="list-style-type: none"> Antifungal susceptibility testing 	14	antifungal drugs used for the treatment of fungal infections Explain how fungal susceptibility testing differs from bacterial
<ul style="list-style-type: none"> Serological & Molecular techniques 	15	performance and interpretation of common serological tests used for the diagnosis and follow-up of fungal infections. The serological tests employed routinely were immunodiffusion tests, counter immunoelectrophoresis (C.I.E.), and latex agglutination
<ul style="list-style-type: none"> Final Examination 		

References

- Kavanagn. Fungi biology and application
- Arthur D. Introduction to mycology
- Chester W, Chapman H.,Kwon-Chung.,Medical mycology,third edition.
- Manual of basic techniques for a health laboratory 2nd edition.
- Murre 5th edition medical microbiology
- Sherris, Medical microbiology ,an introduction to infection
- Jawetz, Melnick, & Adelberg's Medical Microbiology, 24th Edition

Assessment scheme:

Assessment task (e.g., essay, test, group project, examination, etc.) Your grade will be based on the following

Year Works	Details	Work load	Degree	Total
Midterm Examinations	Theoretical	1	10	60%
	Practical	1	15	
Activities	Homework	2	5	
	Seminar	1	10	
	Report	1	10	
	Essay	1	10	
	Quiz	2	8	
	Class Activity (Attendance)	1	2	
	Lab Report	1	10	
Final Examinations	Theoretical		20	
	Practical		20	
Total			100	100%