Course Title	**Parasitology and Mycology**				
Course Code	ABS406				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	4th / 8th Semester				
Teacher's Name	Dr Sophia Kyradji, Dr Stavroula Gouzelou				
ECTS	6	Lectures / week	3	Laboratories / week	2
Course Objectives	The aim of this course is to introduce the students to the fields of Parasitology and Mycology, to provide a comprehensive overview of the main pathogenic parasites and fungi, and the most important fungal and parasitic infections affecting humans. In particular, the course aims to help the students: • Become confident with the basic principles and concepts in Parasitology and Mycology. • Understand the biology, life cycle and transmission of major pathogenic fungi and parasites. • Familiarize with the pathogenesis of the main parasitic and fungal diseases affecting humans, and the host immune responses. • Realize the global burden and epidemiological impact of human parasitic and fungal infections. • Appreciate the PH threat posed by the emergence of drug resistance and the need for new antiparasitic and antifungal agents. • Comprehend the importance of timely and accurate diagnosis, the requirement for systematic surveillance, improved prevention strategies and control measures.				
Learning Outcomes	Upon successful completion of the course the students will be able to: • Identify and describe the main pathogenic parasites and fungi, and most important diseases affecting humans. • Explain the mechanisms of pathogenesis and describe the main clinical and epidemiological characteristics of medically important parasitic and fungal diseases. • Describe the standard diagnostic tools for parasite and fungi detection, and explain their advantages and disadvantages. Be familiar with the recent advancements in mycology and parasitology diagnostics.				

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<tr><td></td><td colspan="3">• List the main antiparasitic and antifungal drugs, understand the mode of action and resistance mechanisms. Explain the impact of drug resistance in Public Health and the importance of drug susceptibility testing.

• Demonstrate the ability to critically review bibliography and prepare scientific essays/ reports relevant to parasitology and mycology using appropriate literature and data sources. Be able to present a scientific work in a professional manner.</td></tr>
<tr><td>Prerequisites</td><td>ABS305</td><td>Required</td><td>None</td></tr>
<tr><td>Course Content</td><td colspan="3">The course will cover the following topics:

<u>Theory:</u>
• Introduction to Parasitology: General concepts of parasitology and the biology of parasites, the structure, classification, life cycle and reproduction of the main pathogenic parasites.

• The spectrum of parasites and human parasitic infections: Focus on medically important parasites with reference to pathogenesis and host defences, clinical presentation and epidemiology, diagnosis, therapy and prevention. Indicative topics:
- Intestinal and urogenital protozoa, such as amebas (E. histolytica- amoebiasis), flaggelates (G. lamblia- giardiasis, T. vaginalis- trichomoniasis), sporozoa (Cryptosporidium- trichosporidial diarrhea).
- Hemoflagellates, such as trypanosomes (Trypanosoma spp.- African and American trypanosomiasis), Leishmania spp.- leishmaniasis, Plasmodium spp.- malaria, T. gondii- toxoplasmosis.
- Helminths, such as trematodes (Schistosome spp.- schistosomiasis), cestodes (Taenia spp.- tapeworm infection and Echinococcus spp.- cystic echinococcosis), filarial nematodes (O. volvulus- onchocercosis).

• Vector-borne parasitic human diseases (indicative special topics): Malaria (Anopheline mosquitoes, Plasmodium spp.), african trypanosomiasis (tsetse flies, T. brucei), american trypanosomiasis (Triatomine bugs, T. cruzi), leishmaniasis (sand flies, Leishmania spp.), river blindness (black flies, O. volvulus). Ectoparasitic: Relapsing fever (lice, B. recurrentis, typhus (lice, R. prowazekii), plague (fleas, Yersinia and Rickettsia spp.), haemolytic anemia (ticks, Babesia spp.) and Lyme disease (ticks, B. burgdorferi).

• Laboratory diagnostic approaches in Parasitology: Overview of the standard diagnostic tools for parasite detection (culture, microscopic and histopathological examination, and serology (such as IFAT, ELISA). Molecular parasite identification (such as PCR/real-time PCR, microarrays, microsatellites, Sanger sequencing, NGS, transcriptomics, proteomics). Advantages and disadvantages. Advancements and challenges in the diagnosis of parasites/ parasitic infections.

• Antiparasitic treatment and drug resistance: Overview of the most important antiparasitic drugs (antiprotozoan and antihelminthic), spectrum and mode of action. The emergence and impact of antiparasitic drug resistance. Advances and challenges in treatment and drug discovery.</td></tr>
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• **Integrated approaches to control and prevent human parasitic diseases:** Chemotherapy, chemoprophylaxis, surveillance and diagnosis, vaccination, reservoir and vector control, environmental control, health education.

• **Introduction to Mycology:** The importance of fungi, overview of the classification, structure and reproduction of fungi. Factors that contribute to pathogenesis and host defences.

• **The spectrum of human fungal infections:** Classification of mycoses, focus on the most common and medically important fungal infections with reference to clinical presentation, epidemiology, diagnosis and prevention.
Indicative topics: Superficial mycoses (piedra, pityriasis, tinea nigra). Cutaneous mycoses (dermatophytoses, dermatomycoses). Subcutaneous mycoses (chromoblastomycosis, mycetoma, sporotrichosis). Deep mycoses with reference to primary fungal infections (histoplasmosis, blastomycosis) and opportunistic mysoses (candidiasis, aspergillosis, cryptococcosis).

• **Laboratory diagnostic approaches in Mycology:** Overview of the standard diagnostic tools for fungal detection (microscopic and histopathological examination, culture, biochemical analysis and immunological assays). Molecular diagnostic/ typing tools and proteomics profiling (PCR, FISH, ribosomal sequencing, MALTI-TOF MS). Strengths and limitations of diagnostic techniques. Challenges and technological advancements in diagnosing fungal infections, next-generation diagnostics.

• **Antifungal treatment and drug resistance:** Summary of the most important antifungal agents (polyenes, azoles, etc.), their mode of action and spectrum. Antifungal drug resistance and susceptibility testings. Advances in the development of new antifungal agents.

Practical Exercises:

• Hands-on practice on the standard laboratory techniques used for the diagnosis of parasites and fungi will be contacted in collaborative laboratories.
Indicative practicals include: sample collection and handling, culture media preparation and *in vitro* culturing, microscopic examination and evaluation of structural and morphological elements on slides, serology/ immunoassays, extraction of genetic material, molecular characterization, sensitivity testing.

• Individual and group bibliography exercises/ systematic review, and group exercises on case study investigation (CSI). Sample exercises:

Case study investigation:
- Water- or food-borne outbreak in the local population (community-acquired) caused by parasites or of a nosocomial (hospital-acquired) respiratory or urinary tract fungal infection.
- Patient case suspected with fungal or parasitic infection. Identify the potentially responsible infectious agent; describe how you would proceed

	to determine diagnosis and the appropriate lab testing(s), discuss what treatment options are available and likely to be effective. Literature review: - The latest advances in laboratory diagnosis or new insights in drug treatment/discovery for a particular fungal or parasitic disease affecting humans. - The molecular epidemiology of an endemic vector-borne parasitic disease affecting humans in Cyprus. - The emergence (or re-emergence) of a health-threatening fungal or parasitic disease in Europe. Describe the phenomenon and the related risk factors. Discuss strategies and actions for preventing the introduction/ establishment of a non-endemic species (or for controlling disease re-emergence) in Cyprus.
Teaching Methodology	Teaching methodologies will include: **1. Lectures** using PowerPoint and image-rich material and short animations, to help students gain the necessary theoretical background in Parasitology and Mycology, and their application in clinical practice, diagnostic laboratories and scientific research. **2. Practical sessions** to provide better comprehension of important fungi and parasites causing human disease and the necessary technical skills for diagnosis. Practical sessions include individual and group exercises on case study investigation, bibliography review and hands-on laboratory exercises. The wet labs will be conducted under instructor's supervision, using appropriate infrastructure/ materials, and will focus on the methods and techniques used for diagnosing fungal and parasitic infections. Each practical will initiate with a thorough demonstration of the experimental procedures and finalize with a Q&A session and closing remarks. Assessment of practical exercises includes written assignments (laboratory reports, mini literature reviews) submitted by the student or student group. **3. Regular open-discussion and Q&A sessions** to encourage the students to participate, interact and develop analytical and critical thinking.
Bibliography	Textbooks: Murray R.P., Rosenthal K., Pfaller A.M. (2020) Medical Microbiology. 9th edition, Elsevier (ελληνική έκδοση 2016, Ιατρική Μικροβιολογία, εκδόσεις Παρισιάνος Α.Ε.). Cox F.E.G. (2009) Modern Parasitology: A Textbook of Parasitology, 2nd edition, Wiley-Blackwell Science. Kibbler C.C., Barton R., Gow N.A.R., Howell S., MacCallum D.M., Manuel R.J. (2017) Oxford Textbook of Medical Mycology, Oxford University Press. * Supplementary readings including journal articles will be assigned on a per lecture basis.
Assessment	For student evaluation, the overall grade is determined by: **1. In-Class activities and midterm exams (20% total):** The students are asked to actively participate at in-class activities, exercises and discussions. Supplementary course material and readings will be provided to help students prepare for the sessions, foster effective discussions and

	promote their participation in class. On completion of the main course modules, midterm written exams will take place to examine specific topics, in the form of short answer, multiple choice and problem solving questions. **2. Practical assignments (20% total):** Students are expected to submit a laboratory report for each individual or group exercise (hands-on practical, case study, literature review). The practical assignments/ reports (about 1500 words) will include the following sections: introduction, methodology, results, discussion, conclusion, appendix. **3. Final written assignment and oral presentation (20%):** Students are expected to submit a written assignment on their topic of interest, choosing from a given list of subjects, and to present it orally. An indicative list of subjects is provided in section 'course content/ practical exercises'. The written assignment can be in the form of an academic essay or literature review (2500–3000 words or 10–12 pages). The oral presentation will be carried out using a computer/video projector and PowerPoint software as a supporting tool. The maximum presentation time will be 15 minutes, leaving 2-3 minutes at the end for questions/discussion. **4. Final written exam (40%):** The final course examination will include short answer, multiple choice and/or problem solving questions. The content will be based on the overall lecture material and required readings covered during the course.
Language	Greek, English