UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Course Code	**Course Title**	**Credits (ECTS)**
PHAR-250	Pharmaceutical Microbiology Φαρμακευτική Μικροβιολογία	5
Department	**Semester**	**Prerequisites**
Life & Health Sciences	Fall	PHAR-122
Type of Course	**Field**	**Language of Instruction**
Required	Pharmacy	Greek/English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	2nd year	Maria Mastorikou
This course covers principles of microbiology and the impact these organisms have on man and the environment. Topics include the various groups of microorganisms, their structure, physiology, genetics, microbial pathogenicity, infectious diseases, immunology, and selected practical applications. Upon completion, students should be able to demonstrate knowledge and skills including microscopy, aseptic technique, staining, culture methods, and identification of microorganisms		

Objectives of the Course:

The aims of this module are to enable students to:

- develop an understanding of the importance of microorganisms in pharmaceutical manufacture
- develop a knowledge of the key unit operations used in pharmaceutical manufacture

Learning Outcomes:

Upon completion of this course, the student will demonstrate basic knowledge in the following:

a. Comparative characteristics of microbial organisms
b. General bacteriology and microbial techniques.
c. Microbial metabolism and enzymes
d. Chemical and physical requirements for microbial growth and how these are used to classify microorganisms
e. Physical and chemical microbial control
f. Collection and handling of laboratory specimens.
g. Microbial genetics, mutation and biotechnology.
h. Pathogenicity, virulence, and epidemiology
i. Disease transmission and control of nosocomial infections
j. Use of molecular techniques to identify sources of contamination.
k. Common bacterial, fungal, and viral diseases.

After completion of the course students are expected to:

- appreciate the ubiquitous nature of microorganisms and their influence on pharmaceutical manufacture
- describe the kinetics of sterilization
- discuss the mode of action of antimicrobial agents
- appreciate the basic principles of the unit operations used in pharmaceutical manufacture
- culture and examine microorganisms in the laboratory
- prepare a sterile pharmaceutical product
- write an abstract of a scientific paper
- apply numerical technique to design processes
- locate and communicate scientific information

Course Contents:

1. Introduction to the scope of microbiology
2. Structure of bacterial cell.
3. Classification of microbes and their taxonomy. Study of phylogenetic relationships, classification of organisms, methods for classification and identification of microorganisms.
4. Identification of Microbes: Stains and types of staining techniques. Microscopy and sample preparation for light microscopy.
5. Microbial growth. Physical and chemical requirements, materials and cultivation techniques, stages of development, estimation of bacterial population.
6. Microbial genetics and variation.
7. Control of microbes by physical and chemical methods.

a) Disinfection, factors influencing disinfectants, dynamics of disinfection, disinfectants and antiseptics and their evaluation.

b) Sterilization, different methods, validation of sterilization methods & experiments.

8. Sterility testing of all Pharmaceutical products.
9. Basic principles of epidemiology and pathogenesis of infections: Normal flora, etiology, classification and standards infections. Koch Postulates. Classifying Infectious Diseases, reservoirs of infection, transmission of disease, nosocomial infections. Epidemiology of infections.
10. Microbial Mechanisms of Pathogenicity: Portals of Entry, penetration of host, damage of host cells by bacteria, viruses, protozoa, helminthes and algae, portals of exit.
11. Diseases and disease-producing microorganisms.
12. Antimicrobial Drugs: Actions, resistance, safety, The Future of Chemotherapeutic agents.

Exercises 1-2: Microscopy of microorganisms; Microbe and yeast culture
Exercise 3: Serial dilutions, pure culture and aseptic technique
Exercise 4: Microbe staining
Exercise 5: Antiseptics, disinfectants and antibiotics.

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments, laboratory reports/ quizzes

Assessment Methods:

Midterm, Examination, Final Examination, Course (laboratory) work

Required Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
Tortora Gerard J.,Funke Berdell R.,Case Christine L	Εισαγωγή στη Μικροβιολογία	ΕΚΔΟΣΕΙΣ ΠΑΣΧΑΛΙΔΗΣ	2009	0321733606

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Michael T. Madigan, John M. Martinko, David Stahl and David P. Clark	Biology of Microorganisms	Pearson	2010	032164963X
S. Denyer, N. Hodges, S. Gorman	Hugo and Russell's Pharmaceutical Microbiology	Blackwell Publishing	2010	0632064676