



Department of Department of General Science

College of Basic education

University of Salahaddin

Subject : General Microbiology

Course Book : Second stage

Lecturer's name : Dr. Suzan A. Sharif

Mr. Ahmad M. Ahmad

Academic Year: 2023 - 2024

Course Book

1. Course name	General Microbiology (Theory & Practical)
2. Lecturer in charge	Dr. Suzan A. Sharif
3. Department/ College	General Science\ Collage of Basic Education
4. Contact	e-mail: suzan.sharif@su.edu.krd Tel: 07504437564
5. Time (in hours) per week	Theory: 2 Practical: 3
6. Office hours	
7. Course code	
8. Teacher's academic profile	<p>1993 B Sc University of Salahaddin, Erbil, Iraq. 2004 M Sc in Microbiology, Al-Neelain University. 2007 PhD in Microbiology, Al-Neelain University.</p> <p>Teaching Experience</p> <ul style="list-style-type: none"> - Practical undergraduate classes, practical microbiology, Al-Neelain University. - lecturer of food industry, histology, parasitology and genetics. - Lecturer of Microbiology, Parasitology and Zoology at the college of basic education. <p>Duties : Teaching, examination, laboratory supervision and thesis project supervision.</p> <p>Publication:</p> <ol style="list-style-type: none"> 1. Incidence and Isolation of Bacteria Associated With Nosocomial Urinary Tract Infection (UTI) In Sudanese Woman. Research Journal of Microbiology, 1(6): 534-539. 2. Sterilization of Culture Media for Microorganisms Using a Microwave Oven Instead of Autoclave. Rafidain journal of science 28 (1E), 1-6. 3. Formulation of Alternative Culture Media from Natural Plant Protein Sources for Cultivation of Different Bacteria and Fungi. Zanco Journal of Pure and Applied Sciences 31 (4), 61-69. 4. Synergistic Effect of Different Plant Extracts and Antibiotics on Some Pathogenic Bacteria. Science Journal of University of Zakho 8 (1), 7-11.
9. Keywords	Bactria, fungi , antibiotics, plasmid, viruses, binary fission
10. Course overview:	<p>Microbiology is the study of life forms too small to be seen with the naked eye, including Viruses, Bacteria and fungus.</p> <p>In the next few months you will learn about the biology of microorganisms and their many important roles in daily life.</p> <p>You will increase your understanding of many key biological concepts starting with definition of bacteria, morphology, cellular structure, physiology, growth requirements, reproduction, growth phases of bacteria and importance.</p> <p>You will also learn about fungus and viruses.</p>

11. Course objective

The objective from studying Microbiology as general for this stage of our students is to :

- The student should develop a thorough foundation in microbiology.
- The purpose of this course of Microbiology is to familiarize the student with those concepts that are basic to bacteria, viruses and fungus.
- Understand basic concepts of microbial metabolism, reproduction, growth.
- The student should acquire all techniques of laboratory work.
- The student should perceive the relationship between man and microbe: advantageous, threatening, benign and cooperative.
- Be able to apply the basic concepts toward understanding the functional roles of microorganisms in natural (human and non-human) ecosystems.

12. Student's obligation

The role of students and their obligations throughout the academic year is the attendance and completion of all tests, exams.

13. Forms of teaching

1. Data show
2. White board
3. Printed lectures

14. Assessment scheme

1. Theory (15 marks)
2. Practical (35 marks) = 1st midterm (14 marks) + 2nd midterm (14 marks) + Quiz (7 marks)
3. The final exam (theory) = 50 marks

15. Student learning outcome:

By the end of the course, students will be able to:

- Explain the structure of bacteria, fungi and viruses; and how they replicate and grow.
- Understand the growth requirement and reproduction, growth phases of bacteria and microbial growth curve.
- Compare the characteristics for various microbes (this includes viruses, bacteria, and fungi).
- Differentiate between Eubacteria and Archaeobacteria.
- Explain why viruses cannot be classified as prokaryotes and eukaryotes.
- Understand the role of bacteria, fungi and viruses to cause disease, in food industry, agriculture and genetic engineering.
- Understand how to control microbial growth, the mechanism of antibiotics to kill bacteria.
- Classify viruses and understand how they replicate.
- Understand the economical and medical Importance of fungi.

16. Course Reading List and References:

An introduction to Microbiology

- Prescott H., Klein. Microbiology
- Journals in Microbiology
- Internet

17. The Topics / by**Dr. Suzan**

Taxonomic Groups of Microorganisms

History of microbiology (2h)

Overview of Bacteriology

Bacterial Colony Morphology

Classification of bacteria according to different factors

Structure of Bacterial Cells

Motility in bacteria

Bacterial nutrition and metabolism

Nutrients or nutritional requirements and Growth factors

Bacterial Growth and Reproduction

<p>Growth phases of bacteria</p> <p>The Important Impacts of Microbes on Ecosystems,</p> <p>Economic Importance of Bacteria</p> <p>Food microbiology, Microorganism Growth in Foods</p> <p>Factors affecting microbial growth in food</p> <p>Microbial spoilage of food</p> <p>Food preservation principles</p> <p>Food-borne infections, classification of food borne diseases</p> <p>Food intoxications</p> <p>Industrial microbiology</p> <p>Antibiotics and antimicrobial chemotherapy</p> <p>Types of action of antibacterial chemotherapeutics</p> <p>The relationship between a host and a pathogen</p> <p>Normal flora</p> <p>Mycology, General Characteristics of Fungi, Molds, Reproduction of molds</p> <p>Yeasts, Growth requirements of yeasts, Ecology, and reproduction</p> <p>Uses of yeast, Importance of fungi</p> <p>Kinds of fungi (Classification)</p> <p>Viruses, Biological (living) and non-living characteristics of viruses</p> <p>Virus structure and reproduction</p> <p>Algae</p> <p>Vaccines</p> <p>Types : Inactivated, Attenuated, Toxoid</p> <p>General characteristic, Structure of algae, Algae groups</p>	
18. Practical Topics	
<p>Lab (1) Introduction and Safety</p> <p>Lab (2) The names and uses of the various laboratory tools</p> <p>Lab (3) Methods of sterilization</p> <p>Lab (4) Culture media</p> <p>Lab (5) Cultivation of bacteria</p> <p>Lab (6) Colony characteristics of bacteria</p> <p>Lab (7) Pure culture techniques</p> <p>Lab (8) Use of microscope</p> <p>Lab (9) Motility demonstration</p> <p>Lab (10) Smear preparation & simple stain</p> <p>Lab (11) Gram Stain</p> <p>Lab (14) Antibiotic sensitivity testing</p> <p>Lab (15) Detection of microbes in soil sample</p> <p>Lab (16) Food microbiology</p> <p>Lab (17) Methods for Microbiological examination of foods</p> <p>Lab (18) Environmental contamination and normal flora</p> <p>Lab (19) Bacteriological Examination of Drinking Water Sample</p> <p>Lab (20) Morphology of Fungi</p> <p>Lab (21) fungal culture methods</p>	
<p>19. Examinations:</p> <p>1. Compositional:</p> <p>Q. What are the differences between?</p>	

Abiogenesis & Biogenesis

Cell wall of G-ve & G+ve bacteria

Q. Answer the questions below:

- Define Fermentation, and give 2 examples of fermentation with their products.
- Draw and explain the nutrition mechanism of molds.
- What is Virulence factor? There are many virulence factors produced by bacteria, what are they?

Q. Classify archaea according to their habitat.

Q. Draw and label the types of asexual reproductive spores in fungi

Q. Explain why high temperature is harmful for the survival of microbes?

3. Multiple choices:

1- Antimicrobial pesticides that remove all bacteria, fungi, spores, and viruses are called ----

Disinfectants - Sterilizers – Sanitizers – all the above

2- During ----- the microbe is growing at the maximum rate possible.

Stationary phase - lag phase - logarithmic phase - decline phase

3- Water activity in food lowered by

Chilling - fermentation - adding of salt - boiling

4- In Conjugation

A virus introduces foreign DNA into the bacterial chromosome - bacteria are capable of taking up DNA from their environment - Genes are transferred from one bacterium to the other - bacteria reproduce by binary fission.

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

21. Peer review

Course Book

Microbiology lab Course name

Microbiology lab

Teacher name

Mr. Ahmed M. Ahmed

Department/ College

Basic education college / General science department

e-mail

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Tel

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Course overview:

This is an undergraduate laboratory course to learn and explore a variety of microbiological techniques, skills and concepts. Topics that will be covered include visualization and enumeration of microbes, traditional, , basic techniques used . Students will gain experience in technical writing and presentation skills. You will gain awareness about the ubiquity and diversity of microbes and the good and bad roles they play in your every day life. Student evaluation Student grades are composed through a multitude of activities, including quizzes, exams, presentations, , attendance and participation. FOLLOWING ,INSTRUCTIONS IS A MUST as well as CREATIVITY WILL BE REWARDED.

Course objective:

As the result of instructional activities, students are expected to become familiar with (1) observation and manipulation of microorganisms, (2) preparation of media and culturing, (3) the utilization of stains to observe microbial structures and other tests for microbial identification, and (4) develop independence on research skills and sources of scientific information.

Course Reading List and References

The Microbe blog by Dr. Schaechter's "Small Things Considered":

<http://schaechter.asmblog.org/schaechter/>

Todar's Online Textbook of Bacteriology: <http://www.textbookofbacteriology.net/>

Out come

(1) The biology graduate knows the role of the cell in life and living systems, and understands the inter-

-relationships between sub-cellular structures that contribute to its functioning as a unit.

- (2) The biology graduate understands the role of DNA in inheritance and can explain how environmental conditions influence natural selection processes and contribute to adaptation. (3) The biology graduate is aware of the diversity of life, and understands inter-relationships among organs and organ systems within an organism, and inter-relationships between an organism and its environment.
- (4) The biology graduate is familiar with the tremendous diversity in structure (organellar, cellular, organismal) and how that relates to the organismal niche or habitat.
- (5) The biology graduate understands how the organization of a specific structure within an organism is related to a specific function, and how this function contributes to survival of the organism.
- (6) The biology graduate understands the Scientific Method, is able to analyze and interpret data, and communicate research findings in both oral and written form.
- (7) The biology graduate is prepared to accept employment in a variety of environmental and health related professions, enter medical and dental schools, pursue graduate degrees in the biological sciences, or teach in public or private schools.

