Department of Animal Resources

College of Agricultural Engineering Sciences

University of Salahaddin- Erbil

Subject: Practical- Principle of Microbiology

Course Book – (Year 2)

Lecturer's name: Assistant Lecturer: Mr. Hemin Hussein Ali

Assistant Lecturer: Mrs. Ekhlas Salih

Academic Year: 2021/2022

Course Book

1. Course name	**Practical-Principle of Microbiology**
2. Lecturer in charge	**M. Sc., Assistant Lecturer; Mr. Hemin Hussein Ali** **M. Sc., Assistant Lecturer; Mrs. Ekhlas Salih**
3. Department/ College	**Animal Resources/ College of Agriculture**
4. Contact	**e-mail: Hemin.ali@su.edu.krd** **Tel: 0750 4206996**
5. Time (in hours) per week	**Theory: 2** **Practical: 3**
6. Office hours	**Availability all working day during the week**
7. Course code	
8. Teacher's academic profile (Mr. Hemin Hussein Ali)	I leave school on (15/9/2004) and my graduate university on (24/8/2008) in Sulimania University, Animal production Dept. After my graduation, I was employed at Salahaddin University-Erbil, College of Agricultural Engineering Sciences, Registrations unite from 20th/August/2009 till 14th /September/2010. My major work where was creating graduate certifications and supporting the letter and I was checking students' documents. I had been transported my duty to the same College but the department of Animal Resources. As sub-assistant lecturer from 14th /September/2010 until 22/8/2011. After, I got M. Sc. in Biotechnology from Bangalore University, Bangalore, India. (2013). I got my Scientific Title (Assistant Lecturer) on 31st / March/ 2014 then, I am working as an Assistant Lecturer at the Department of Animal Resources, College of Agricultural Engineering Sciences, Salahaddin University- Erbil until now. I am an assistant lecturer for the following subjects; Animal biotechnology, Principle of Microbiology, Principle of Biostatistics, General Zoology, and Principle of Biochemistry for many semesters and supervising final year undergraduate students' Research Projects. ➢ **Currently**, Also, I am a member of the College Exams Committee for the year (2021/2022) **Also, I have been the following Administrator:** ➢ College Registrar of Registration Section of College of Agricultural Engineering Sciences, Salahaddin University-Erbil from 24th /October/ 2019 until 24th /September/ 2020, I got corona disease, then I left. ➢ Administrator (Administrative officer) of Planning Unite of

	College of Agricultural Engineering Sciences, Salahaddin University- Erbil from 19th /May/ 2019 until 8th /September/ 2019. ➢ Administrator (Administrative officer) of Library Unite of College of Agricultural Engineering Sciences, Salahaddin University- Erbil from 22nd /February /2017 to 19th /May/ 2019. ➢ Supervisor of Summer Training (2018-2019) of 3rd stage undergraduate students of the Department of Animal Resources, College of Agricultural Engineering Sciences.
9. Keywords	

10. Course overview:

Microbiology is an exceptionally broad discipline including, cell immune-physiology genetics, taxonomy, pathogenic bacteriology, and ecology. A microbiologist must be acquainted with many animal field microbial disciplines and with all major groups of microorganisms: viruses, bacteria, fungi and protozoa pathogenic or non-pathogen commensals in livestock to be able isolated, identified and diagnosed, Students new to the subject need an introduction to the whole before concentrating on those parts of greatest interest to them Clarified with field example. This text provides a balanced introduction to some areas of microbiology for a variety of students.

Microbiology laboratory is the course set up to familiarize the student with safety and laboratory guideline, techniques necessary to grow and identify bacteria, fungi, virus, immune response in livestock etc. the first quarter of the semester covers basic techniques of laboratory safety, microscopic examination, media preparation, preparing bacterial smear and staining methods.

The second quarter covers cultivation, recognition, differentiation of microbial characteristics in culture. Also devoted to microbial identification based on isolation with selective media and metabolic deference. The second hand familiarize student with serological technique which is needed in the animal field and study on laboratory technique for culture and staining of important fungi. The last section is to study knowledge on laboratory technique for primary recognition of parasites.

11. Course Objectives:

Upon completion of this course, the student should be:

1. Practice aseptic technique and demonstrate an understanding of all safety rules in/out of the laboratory.
2. Use all power of magnification of the light Microscope.

3. Use equipment / apparatus used in microbiology laboratory.
4. Methods of sampling microorganism from various sources.
5. Preparing bacterial smear, stain, interpret stained slides for recognize the morphological characteristics of bacteria under light microscope.
6. Perform the bacterial culture, purification for Bacteria motility identification.
7. Apply the Haemagglutination serological technique for determine the titer of vaccine and antibody titer in serum.
8. Demonstrate the ability primary identification by Biochemical tests and ELISA technique.
9. Staining, recognize and primary differentiation between yeast and melds fungi.

12. Student's obligation:

Students should be practice each practical section and attendance all exams, quizzes and write report. Students have to attend the practical lectures and follow the lecturer and free to ask or clarified any question. Student has two monthly exam included 4-5 lectures.

13. Forms of teaching

Different forms of teaching will be used to make the subject clear for the students; power point presentation will be used to explain the subject, data show will be used to show pictures and video to clarify the subjects and help the students to understand the subject.

Lectures will be given to students before every lesson that helps the students to follow the subject. Also lectures include weekly quiz (in the first ten minutes of the lesson). Student will work in his/ here hand in laboratory to make bacterial cells (smear) on the slide and also do cultivation of bacteria on solid media or into liquid media and staining of bacteria and their spores.

14. Assessment scheme:

Examination: (10 marks).

Quiz: (3 marks).

Home work and report: (2 marks).

15. Student learning outcome:

1. Preparing bacterial smear, stain, interpret stained slides for recognize the morphological characteristics of bacteria under light microscope.
2. Taught student to establish health program with veterinary services for his farm livestock sustainability and provide clean livestock products (prevention, vaccination, treatment, and bio-security) in livestock farm and researches.
3. Student will be familiar with veterinary laboratory investigations, livestock pathogenic microbial and proper methods for diagnosis in farm and researches
4. Taught student to provide a healthy animal products to the market and keep livestock products in proper conditions avoid to waste products and prevent community from zoonotic disease.
5. Taught student to be active person in public livestock healthy program.

16. Course Reading List and References:

- **Key references:**

1. Benson. 2001. Microbiological Applications Lab Manual. The McGraw-Hill companies.
2. William C. F. and Dennis C. W. 2008. Food Microbiology. McGraw-Hill Companies, Inc., New York.
3. Burton E. P. & M. J. Leboffe. 1999. Exercises for the microbiology laboratory. Morton Publishing Company, USA.

- **Useful references:**

4. K.R. ANEJA. 2011. Experiments in Microbiology, Plant Pathology and Biotechnology. New Age International Ltd., publishes.
5. Harley Perscot. 2002. Laboratory Exercises in microbiology. McGraw-Hill Companies.

Magazines and review (internet):

6. microbiology official web pages

17. The Topics:	**Lecturer's name**
In this section the lecturer shall write titles of all topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture	Lecturer's name ex: (2 hrs) ex: 4/9/2021

18. Practical Topics (If there is any)	
Safety rules in/out of the laboratory and Guidelines. Recognize the basic compound of microscope and use all power of magnification of the light Microscope	Mr. Hemin Hussein Ali (3 hrs) on 13/9/2021
Recognize equipment / apparatus used in microbiology laboratory	Mr. Hemin Hussein Ali (3 hrs) on 20/9/2021
Broth and Solid Media preparation for cultivation and growth of bacteria & Methods of sampling microorganisms from various sources	Mr. Hemin Hussein Ali (3 hrs) on 27/9/2021
Simple stain; Principle, procedure of preparing bacterial smear, staining and interpret stained slides for primary identification under light microscope.	Mr. Hemin Hussein Ali (3 hrs) on 4/10/2021
Gram stain; Principle, procedure of preparing bacterial smear, staining and interpret stained slides for primary identification under light microscope.	Mr. Hemin Hussein Ali (3 hrs) on 11/10/2021
Principle, procedure of counting of colony and colony characteristics (Serial dilution). Perform the Pure Culture Technique, purification for bacterial identification.	Mr. Hemin Hussein Ali (3 hrs) on 18/10/2021
Visiting of Veterinary Lab.	Mr. Hemin Hussein Ali (3 hrs) on 25/10/2021
General information on the ELISA technique (Principle and procedure).	Mr. Hemin Hussein Ali (3 hrs) on 1/11/2021
Principle and procedure of Bacterial Motility identification.	Mrs. Ekhlas Salih (3 hrs) on 8/11/2021
Apply the Haemagglutination serological technique for determine the titter of vaccine and antibody titter in serum.	Mrs. Ekhlas Salih (3 hrs) on 15/11/2021
Staining techniques (Spore stain & Capsule stain); Principle, procedure of preparing smear, staining and interpret stained slides for primary identification under light microscope.	Mrs. Ekhlas Salih (3 hrs) on 22/11/2021 (3 hrs) on 29/11/2021
Biochemical tests (Methyl red test & Starch hydrolysis test); Principle, procedure, and interpret for primary identification of bacterial.	Mrs. Ekhlas Salih (3 hrs) on 6/12/2021 (3 hrs) on 13/12/2021

Testing of quality of water (Coliform test & Total Bacterial count); Principle, procedure, and interpret for primary identification of bacterial.	Mrs. Ekhlas Salih (3 hrs) on 20/12/2021

19. Examinations:

Q) Define only three of the following terms?

Microscopy, Autoclave, Bunsen burner, Inoculating loop, Thermometer, etc ….

Q) Fill the following blanks? OR (True and False questions)

1) The major optical parts of a microscope are **eyepiece, objective lens, condenser, and light source.**
2) The **objective lens** functions to magnify the object.
3) **Thermometer** is required to ensure the heating equipment is running at the correct temperature.
4) **Hot plate with magnetic stirrer** is electrically powered equipment performs the dual function of **heating** and **agitation**.
5) Microbiological medium can exist in three forms; **liquid media** , **solid media** , and **semisolid media**
6) Some of the most commonly used dyes for simple staining are **methylene blue**, **basic fuchsin,** and **crystal violet**.

Q) Write briefly on the principle of Simple stain?

Q) Write the Procedure of the Gram staining?

Q) Write the Procedure of the Methods of sampling Microorganisms?

20. Extra notes:

We suggest that course of cell biology for student in first year important for microbiology
We suggest that two course of microbiology to cover all microbial agents and immunity with example

21. Peer review : **پێداچوونەوەی هاوەڵ**

The course of principle of microbiology is important for livestock and farmer for biosecurity and provide a healthy products ,be keep environment from zoonotic disease and be active person in conducting public livestock health program to be familiar with microbial outbreaks which threat animal production in area

Mr. Ahmed Ibrahim Ahmed
Lecturer

Assistant Lecturer: Mr. Hemin Hussein Ali
Practical Lecturer

Assistant Lecturer: Mrs. Ekhlas Salih
Practical Lecturer