



Department of Animal Resources

College of Agricultural Engineering Sciences

University of Salahaddin- Erbil

Subject: Practical of Animal Biotechnology

Course Book – (Year 4)

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

Academic Year: 2021/2022

Course Book

1. Course name	Practical – Animal Biotechnology
2. Lecturer in charge	Mr. Hemin Hussein Ali
3. Department/ College	Animal Resources/ College of Agricultural Engineering

	Sciences
4. Contact	e-mail: Hemin.ali@su.edu.krd Tel: 07504206996
5. Time (in hours) per week	Theory: 2 Practical: 3
6. Office hours	9 hours
7. Course code	
8. Teacher's academic profile (Mr. Hemin Hussein Ali)	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>➤ Currently, Also, I am a member of the College Exams Committee for the year (2021/2022)</p> <p>Also, I have been the following Administrator:</p> <p>➤ 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.</p> <p>➤ Administrator (Administrative officer) of Planning Unite of</p>

	<p>College of Agricultural Engineering Sciences, Salahaddin University- Erbil from 19th /May/ 2019 until 8th /September/ 2019.</p> <p>➤ Administrator (Administrative officer) of Library Unite of College of Agricultural Engineering Sciences, Salahaddin University- Erbil from 22nd /February /2017 to 19th /May/ 2019.</p> <p>➤ Supervisor of Summer Training (2018-2019) of 3rd stage undergraduate students of the Department of Animal Resources, College of Agricultural Engineering Sciences.</p>
<p>9. Keywords</p>	<p>Biotechnology, Safety in the Laboratory; Personal safety, Handling of biologically hazardous material, and Radiation Safety, Pipette, Digital Balance, pH meter, Autoclave, Thermometer, Water bath, Centrifuge, Refrigerator, Gel Electrophoresis, UV Light, Thermal cycler, Spectrophotometer, Nano drop, ELISA, and HPLC, Statistical terms; Molarity, Normality, Percent concentrations & Dilutions.</p>
<p>10. Course overview:</p> <p>Biotechnology has an important role in the scientific of biology process and that we need a good understanding of biotechnology in which lead to better understanding of animal and poultry Genetic inheritance, Productivity and their physiology.</p> <p>The basic strategies we will follow are to first focus on the Introduction to biotechnology and Safety in the Laboratory. Statistical terms: Molarity, Molality, Normality, Percent concentrations & Dilutions. This text provides a balanced introduction to some areas of biotechnology for a variety of students.</p> <p>Biotechnology laboratory is the course set up to familiarize the student with safety and laboratory guideline, necessary techniques, and equipments such as Digital Balance, pH meter, Autoclave, Water bath, Centrifuge, Gel electrophoresis, UV Light, Thermal cycler, Spectrophotometer, Nano drop, ELISA, and HPLC.</p>	
<p>11. Course objective:</p> <p>Student successfully completing this course should:</p> <ol style="list-style-type: none"> 1) Understand and be able to description the basic concepts of application of biotechnology. 2) Understand and be able to use formula for Molarity, Normality, Percent 	

concentrations & Dilutions.

- 3) Prepare solution from solid and liquid sources.
- 4) Understand what are DNA, RNA and proteins.
- 5) Understand of Precautions to take care while performing some techniques
- 6) How to choose the technique, implementation and analysis of results.

12. Student's obligation

Students should be practice each practical section of tests and attendance all exams, quizzes and homework.

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, 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. Question will be given as home work to students and also lectures include weekly quiz (in the first ten minutes of the lesson).

14. Assessment scheme

- Written examinations (2 x 15%) = 30%
- Quiz/attendance and Reports = 5%
- Total practical = 35% Marks

Students will not be allowed to seat for the final examination if the attendance is less than 80%!!!

15. Student learning outcome: After completing this course, the student will be able to;

1. Define and description of biotechnology.
2. Describe and identify the Discipline, Cleanliness, Hazardous Chemicals, and Biological hazards
3. Define and identify the solutions and buffers.
4. Be able to use formula for Molarity, Normality, Percent concentrations & Dilutions.
5. Prepare solution from solid and liquid sources.
6. Understand what the necessary techniques of application of animal biotechnology are.
7. Understand of Precautions to take care while performing some techniques.
8. How to choose the techniques, implementation and analysis of results.
9. How to determination the presence of DNA, RNA and proteins.

16. Course Reading List and References:

▪ Key references:

- 1) Y.M. Dennis Lo, Rossa W.K. Chiu, K.C. Allen Chan. 2005. 'METHODS IN MOLECULAR BIOLOGY, Clinical applications of PCR', 2nd Edition' Humana Press Inc.

<p>2) Jeremy W Dale and Malcom von Schantz. 2002. From Genes to Genomes: ‘Concepts and Applications of DNA Technology’, by John Wiley & Sons, Ltd. England.</p> <p>▪ Useful references:</p> <p>3) Linnea Fletcher, Evelyn Goss, Patricia Phelps, Angela Wheeler, and Shelley O’Grady. 2011. ‘Introduction to Biotechnology’, Laboratory Manual.</p> <p>▪ Magazines and review (internet): (http://www.bio.org/about_biotech/)</p>	
17. The Topics:	Lecturer's name
<p>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</p> <p>Each term should include not less than 16 weeks</p>	<p>Lecturer's name ex: (2 hrs) ex: 3/2/2022</p>
18. Practical Topics (Animal Biotechnology)	
Introduction to biotechnology and Safety in the Laboratory; Personal safety, Handling of biologically hazardous and Carcinogen materials and Radiation Safety and List of equipment.	Mr. Hemin Hussein Ali (3 hrs) on 9/2/2022
Extraction of genomic DNA (principle, procedure and results)	Mr. Hemin Hussein Ali (3 hrs) on on 16/2/2022
Isolation of recombinant clones (p, 14, mod7-1)	Mr. Hemin Hussein Ali (3 hrs) on 23/2/2022
DNA detection Gel electrophoresis technique (principle, procedure and results for the detection of nucleic acids)	Mr. Hemin Hussein Ali (3 hrs) on 2/3/2022
Polymerase chain reaction (principle, procedure and results for the detection of nucleic acids)	Mr. Hemin Hussein Ali (3 hrs) on 9/3/2022
Restriction digestion of DNA by Restriction enzymes.	Mr. Hemin Hussein Ali (3 hrs) on 30/3/2022
Toxic assay by ELISA technique	Mr. Hemin Hussein Ali (3 hrs) on 6/4/2022
High pressure Liquid Chromatography (HPLC)	Mr. Hemin Hussein Ali (3 hrs) on 13/4/2022

Quantity & Quality of protein by Spectrophotometer	Mr. Hemin Hussein Ali (3 hrs) on 20/4/2022
Thin layer Chromatography (TLC)	Mr. Hemin Hussein Ali (3 hrs) on 27/4/2022
Blotting technique	Mr. Hemin Hussein Ali (3 hrs) on 11/5/2022
SDS PAGE technique	Mr. Hemin Hussein Ali (3 hrs) on 18/5/2022
19. Examinations:	
Q1) Define only two of the following terms?	
Electrophoresis, ELISA, pH meter	
Q2) What are the some common procedures for DNA extraction methods?	
Q3) Answer the following:	
A) How many grams of Tris-HCl would you need to prepare 75mL of a (0.5M) solution? The Molecular weight of Tris-HCl is 121.1 g/mol.	
B) Calculate how many mL of a 1.0 M stock solution of NaCl are needed to prepare 50 mL of a 80 mM solution.	
$C_1V_1 = C_2V_2$	
$(1.0 \text{ M}) * (V_1) = (0.080 \text{ M}) * (50 \text{ mL})$	
$V_1 = (0.080 \text{ M}) * (50\text{mL}) / 1.0 \text{ M}$	
$V_1 = 4.0 \text{ ml of stock}$	
Q4) Answer the following:	
A) Write down the steps of target gene amplify through the thermocycles device.	
B) Explain the principal of Enzyme Linked Immunosorbent Assay(ELISA) Test with figure.	
Q5) Answer only one branch (A or B):	
A) Write down the Types of ELASA tests and explain each one briefly.	
B) Explain the idea of High Performance liquid chromatography (HPLC) with figure.	
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	پیداچونہوہی ہاوہل

Assistant Lecturer: Hemin Hussein Ali

Practical Lecturer