

**Department of Animal Resources**

**College of Agriculture**

**University of Salahaddin–Erbil**

**Subject: (Biotechnology) Theory**

**Course Book – 4 Year**

**Lecturer's name: Asst.prof.Dr.Hurea Haddad (PhD Poultry Breeding and improvements )**

**Academic Year: 2022/ 2023**

**Course Book**

|  |  |  |
| --- | --- | --- |
| **1. Course name1.** | **Animal Biotechnology** | |
| **2. Lecturer in charge2.** | **Dr. Hurea Haddad** | |
| **3. Department/ College3.** | **Animal Resource, Agricultural College** | |
| **4. Contact4.** | **E.mail: Hurea.Abdulrezaq@su.edu.krd** | |
| **5. Time (in hours) per week5.** | **Theory: 2 hrs** | |
| **6. Office hours6.** | **6 hrs** | |
| **7. Course code7.** |  | |
| **8. Teacher's academic 8.profile** | **I hold a bachelor's degree from Salahadin University / College of Agricultural Engineering Science / Animal Resource in 2000. Obtained a master’s degree in poultry production from the same university in 2006. While a doctorate in poultry breeding and improvement from the College of Agriculture and Forestry, University of Mosul in 2015.** | |
| **9.Keywords** | **Molecular Diagnosis, Gene engeneering, Embryo Transfer, Nutritional biotechnology and Modern Vaccines** | |
| **10. Course overview**  **This lesson is designed to be an introductory lesson that will cover the recent Molecular methods which use the modern technology to improve animal production/health as well as cover the novel and rapid methods to characterize the responsible gene in animal products and biological agents which used in animal farms or added in animal food. Principle of Artificial insemination and embryo transfer (MOET, IVEP) in animal as well as gene engineering and cloning also the information on gene modified food and it is consequences on animal product.**  **Biotechnology laboratory is a course practical part to familiarize the students with laboratory biosafety, technical procedures, and equipment’s and materials as well as Knowledge of determine biological and chemical quantity needed and use biotechnology techniques ELISA, HPLC, Tissue Culture PCR gel electrophoresis used which available in laboratory.** | | |
| **11. Course objective**  **- Students understand and be able describe the concepts of application of biotechnology**  **- Students understand and familiar with artificial insemination**  **- students to be able how to extract DNA, RNA and proteins.**  **- Students learn how to precise and precaution when perform a techniques**  **-Student understand and to be able how to choose a proper technique/program and analysis result** | | |
| **12. Student's obligation**  **The students should be obligated attendance and completion of all techniques available in laboratory as well as quizzes, monthly/final examination , assignments, reports and assays** | | |
| **13. Forms of teaching**  1- PowerPoint.  2- Whiteboard.  3- Pictures.  4- video  5- field visit | | |
| **14. Assessment scheme**   * **Examination:** * **1st exam. After 4 lectures** * **2nd exam. After 8 lectures** * **Repots at each end week, poster, Quiz** * Mark distribution:   Monthly exam 50% [theoretical 15% + Practical35%  Final exam 50% | | |
| **15. Student learning outcome:**   * Students to be understand the types of biotechnology and its application with a modern information. * Students to be learn how to precisely perform techniques and precaution * Students to be familiar with recently developed biotechnology * Students to be understand how to choose a proper technique/ /protect his bioinformatics results | | |
| **16. Course Reading List and References:**   Panno, J. 2005. ANIMAL CLONING: The Science of Nuclear Transfer. Library of Congress Cataloging-USA.   Eberhard Passarge, M. D. 2007. Color Atlas of Genetics. Third edition, University Hospital Essen, Germa.ny | | |
|  Wojciech Gorczyca. 2008. Cytogenetic, FISH and molecular testing in hematologic malignancies. New York, NY, USA.   Fitzgerald-Hayes, M. and Reichsman, F. 2014. DNA and Biotechnology, third edition. Library of Congress Cataloging-in- Publication Data Fitzgerald -Hayes, Molly, USA.   Kitagawa, Y.; Matsuda, T. and Iijima. S. 1997. Animal Cell Technology: Basic and Applied Aspects. Volume 10. KLUWER ACADEMIC PUBLISHERS, NEWYORK, BOSTON, DORDRECHT, LONDON, MOSCOW.   Grewal and Moazed. 2003. “Heterochromatin and epigenetic control of gene expression” Science 301:798.   Goldmit and Bergman. 2004. “Monoallelic gene expression: a repertoire of recurrent themes” Immunol Rev 200:197.   American Genetics Journal.   Biotechnology book 2018-2022 | | |
| **17. The Topics** | | **Lecturer's name** |
| 1. Basic & Applied Biotechnology. 2. Branches Of Biotechnology.   -Animal Biotechnology  -Medical Biotechnology  -Environment Biotechnology  -Industria;L Biotechnology  -Plant Biotechnology  3. Structure Of DNA And RNA  4. Recombinant DNA Technology / Gene Cloning  5. Types of PCR , Sequencing  6. Transgenic chicken  7. Marker-assisted selection (MAS)/ genomic selection  8. 1st Examination  9. Artificial insemination and Embryo Transfer (MOET, IVEP),  10. Electrophoreses  11. Bioinformatics  12. Transgenic animal In vivo and In vetro  13. Nutritional biotechnology ( pre & probiotic ) GMO food  14-Transgenic Animal Technology (Poultry And Animal)  -Production Of Transgenic Animals And Poultry  15-Enzymes  16. 2nd Examination | | **Me at all lectures**  **Two hrs each lecture.** |
|  | |  |
| **18. Examinations** | |  |
| ***1. Compositional:*** | |  |
| ***Q: Write what you know about the gene clones by plasmid. (25 Marks)*** | |  |
| — *In the cloning by live cell, first must get the plasmid by extraction it from the live cells such as bacteria and must be detected the target DNA fragment which it be cloned and treated both them with one type of restriction enzyme to get two complementary fragments and mixed the cutting plasmid with target DNA, and adding the DNA Ligase to get the recombinant DNA from the two fragments after that transfer the recombinant DNA to the medium contain bacteria and down the temperature to zero, immediately up it to 40°C to help the recombinant DNA to inter inside the bacteria cells, after that transfer the sample of this medium to another medium contain the antibiotic after 1hours transfer the bacteria population isolated the plasmid from them and make the purification for the plasmid to get many copy of the target DNA.* | | **You must write or drawing the figure or curve when it necessary.** |
| ***2. True or false type of exams:*** | |  |
| ***Q2: Put the True (T) symbol for true sentences and Wrong(R) symbol for wrong sentences and correct the wrong sentences if found:***  *1. The plasmid is extra DNA found only in virus.*  *2. Cosmid composed from plasmid and cos sequence of lambda*  *3. Translation is the process of RNA guided DNA synthesis. Occurs in the Nucleus.*  ***Answers****:*  *1. R. The plasmid is extra DNA found only in bacteria.*  *2. T.*  *3. R. Translation is the process of RNA guided Protein synthesis. Occurs in the cytoplasm.* | |  |
|  | | |