

Jordan University of Science and Technology
Faculty of Veterinary Medicine
Department of Pathology and Animal Health
Second Semester 2019/2020

| Course Information | |
|---|---|
| Course Title | Animal Breeding & Genetics |
| Course Number | VM 102, VM205 |
| Prerequisites | |
| Course Website | Unavailable |
| Instructor | Dr. Mustafa M. Ababneh & Dr. Mofleh S. Awawdeh |
| Office Location | G3L3 & C1L3 |
| Office Phone | 22014 & 22068 |
| Office Hours | Dr. Awawdeh Sunday: 11:30-12:30 Tuesday: 11:30-12:30, 1:30-2:30 Wednesday: 10:30-11:30 Thursday: 11:30-12:30, 1:30-2:30 If I am in my office, all students are welcome. |
| E-mail | Ababnem@just.edu.jo & mawawdeh@just.edu.jo , |
| Teaching Assistant | None |
| Course Description | |
| <p>This course will familiarize students with fundamentals of genetic and their applications in animal breeding to improve livestock. Specifically understand: 1) basic genetics (chromosome structure, gene, cell cycle, gene mutations, molecular techniques, Mendel's laws, classical genetic, extension to Mendel's laws), 2) population genetics (genetic constituents of population, quantitative & qualitative traits, gene and genotypic frequencies, and Hardy-Weinberg equilibrium), and 3) selection & mating (how to select the best animal, selection for simply-inherited vs. polygenic traits, heritability & repeatability, and mating systems)</p> | |

| Text Book | |
|---------------------|---|
| Title | Genetics-A Conceptual Approach |
| Author(s) | Pierce, B. A. |
| Publisher | Freeman |
| Year | 2004 |
| Edition | 1 st |
| Book Website | http://www.whfreeman.com/pierce_bridge/ |
| Title | Understanding Animal Breeding |
| Author(s) | Bourdon, R. M. |
| Publisher | Prentice-Hall |
| Year | 2000 |
| Edition | 2 nd |
| Book Website | Unavailable |

| Assessment Policy | | |
|-------------------|----------------------------------|--------|
| Assessment Type | Expected Due Date | Weight |
| First Exam | | 30% |
| Second Exam | | 30% |
| Final Exam | Announced by registration office | 40% |

| Course Objectives | Weights |
|--|---------|
| 1. Understand the fundamentals of classical genetic including population genetic and how it is related to animal breeding. | 25% |
| 2. Understand animal selection for different important traits. | 50% |
| 3. Understand mating systems applied in animal breeding. | 25% |

| Teaching & Learning Methods |
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| Lectures, home works, and assignments. |

| Learning Outcomes: Upon successful completion of this course, students will be able to | | |
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| Understand chromosome and gene structures, mutation, cell cycle, and sexual reproduction. | | |
| Understand population genetics and how selection and mating affect gene's frequency. | | |
| Select the best animal based on the breeding purposes for future mating. | | |
| Differentiate mating strategies for selected animal to achieve the breeders' objective. | | |

| Useful Resources |
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| Internet. |

| Course Content | | |
|----------------|---|-------------|
| Week | Topics | Instructor |
| 1 | Introduction: Nuclei acid and inheritance | Dr. Ababneh |
| 2 | Chromosome, DNA, Gene Structure | Dr. Ababneh |
| 3 | DNA Replication: A Closer Look | Dr. Ababneh |

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|---------------------------|--|-------------|
| 4 | Expression of Genes | Dr. Ababneh |
| 5 | Gene Mutation | Dr. Ababneh |
| 6 | Molecular Techniques <ul style="list-style-type: none"> • DNA & RNA extraction • PCR • Fingerprinting & Parenting • Gene sequencing • Cloning (recombinant DNA) • Gene mapping & Jumping genes Marker-assisted selection | Dr. Ababneh |
| 7 | Basic principles of heredity, Genes in population | Dr. Ababneh |
| 8 | Extensions and modifications of basic principles | Dr. Ababneh |
| Breeding-Selection | | |
| 9 | What is the best animal | Dr. Awawdeh |
| 9 | How are animal populations improved; Simply-inherited and polygenic traits | Dr. Awawdeh |
| 10 | Selection for simply-inherited traits | Dr. Awawdeh |
| 10 | The genetic model for quantitative traits | Dr. Awawdeh |
| 11 | Heritability and Repeatability | Dr. Awawdeh |
| 12 | Multiple-trait selection | Dr. Awawdeh |
| Breeding-Mating | | |
| 13 | Selection for simply-inherited traits | Dr. Awawdeh |
| 13 | Mating systems | Dr. Awawdeh |
| 14 | Mating strategies based on pedigree relationship: inbreeding and outbreeding; Hybrid vigor | Dr. Awawdeh |
| 14 | Crossbreeding systems | Dr. Awawdeh |

| Additional Notes | |
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| Assignments | It is expected that all academic work completed in this class be done individually by you. |
| Exams | |
| Cheating | Plagiarism and cheating are serious offenses and may be punished by failure on the exam, paper, or project; failure in the course according to JUST rules. |
| Attendance | Highly recommended and required by JUST rules. There will be no makeup for quizzes and HW for unexcused absence. |
| Workload | Depends on your attendance, participation, and taking complementary notes. |
| Graded Exams | Will be discussed with students. |
| Participation | Highly recommended. |
| Laboratory | |
| Projects | No specific project. But, there will be some assigned papers. |