**The University of Jordan**

**Faculty of Agriculture Department of Animal Production**

**Program: B. SC. 2015-2016/Second semester**

**Course title: Reproduction and Artificial Insemination (602451)**

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| **Credit hours** | 3 | **Level** | Fourth year | **Pre-requisite** | Dairy Production (602215) |
| **Coordinator/ Lecturer** | Prof. Mufeed A. Alnimer | **Office number** | 165 | **Office phone** | 22383 |
| **Course website** | On UJ E. Learning portal @ Moodle LCM. | **E-mail** | **amufeed@ju.edu.jo** | **Place** | Room 103 |

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| **Office hours** |
| **Day/Time** | **Sunday** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** |
| **Day** |  | **----** |  | **----** |  |
| **Time** | **10:00-11:00** | **----** | **10:00-11:00** | **----** |  |

**Course Description**

This course concentrates on the importance of reproductive processes and techniques in farm animal's management through clarification and discussion of reproductive system in both female and male, estrous cycle, fertilization, gestation and parturition. In addition, the course give high attention for the modern biotechnologies related to reproduction such as semen collection and preservation, artificial insemination (AI), estrus and ovulation synchronization programs, multiple ovulation and embryo transfer (MOET) and *in vitro* fertilization (IVF).

**Learning Objectives**

The General objective of this course is to establish the basic knowledge of reproductive terms and processes of farm animals and to boost the students with the prerequisite information to be able for managing and evaluating the reproductive status of farm animals.

**INTENDED LEARNING OUTCOMES (ILOs):**

Successful completion of the course should lead to the following outcomes:

1. KNOWLEDGE AND UNDERSTANDING:

**A1.** Student should have the scientific knowledge regarding the basic concepts and subjects of reproduction and reproductive biotechnologies in farm animals.

**A2.** Student should be capable to combine between all subjects regarding the reproductive processes in order to give proper decisions.

**A3.** Student should understand how to apply the modern reproductive biotechnologies in efficient management of farm animals in order to obtain the most possible fertility outcomes.

**A4.** Student should expect the reproductive problems or imbalances that may occur in a farm to be ready to solve it.

* 1. INTELLECTUAL ANALYTICAL AND COGNITIVE SKILLS:

**B1.**The student's ability to distinguish and analyze the effects of reproductive imbalances on the farm animal's fertility and productivity.

**B2.** The capability of student to apply the modern reproductive biotechnologies on farm animals in order to distinguish its beneficial effects on farm animal's fertility and productivity.

* 1. SUBJECT-SPECIFIC SKILLS:

**C1.** Preparing scientific reports on various topics related to reproductive management and biotechnologies of farm animals based on different resources including scientific papers in refereed journals.

**C2.** Applying the topics of the course especially those about reproductive biotechnologies in the laboratory and field.

**C3.** Applying skills gained through the course topics theoretically and practically and scientific reports in the field training courses.

* 1. TRANSFERABLE KEY SKILLS:

**D1.** The student has the skill to manage and improve the reproductive status of farm animals depending on the acquired knowledge and skills in this course.

**D2.** The student uses all his energies with the acquired skills and knowledge in this course to improve the level of knowledge and skills of others especially farmers.

# ILOs: LEARNING AND EVALUATION METHODS

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| **ILO/s** | **Learning Methods** | **Evaluation Methods** |
| **A**. Knowledge and Understanding (A1-A4) | Lectures and discussions  | Exam and quizzes |
| **B**. Intellectual Analytical and Cognitive Skills(B1-B2) | Lectures, discussions and laboratory trainings. | Exam and quizzes |
| **C**. Subject Specific Skills(C1-C3) | Lectures, discussions, laboratory trainings. and Reports | Exam, quizzes and reports. |
| **D**.Transferable Key Skills(D1-D2)  | Reports  | Reports evaluations |

**COURSE CONTENTS**

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| No. of lecture (s) /Week | Subject | Sources | ILOs |
| **4** **(**1st and 2nd week**)** | **Introduction and objectives****Livestock Improvement Through Reproduction and Artificial Insemination*** + - Genetic improvement of cattle
* The role of Artificial Insemination
* Advantages of Artificial Insemination
 | * + Chapter 1 and 13, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, D2 |
| **2****(**3rd week**)** | **The Reproductive System of the Cow*** Origin and development
* The Ovaries
* Tubular genitalia
 | * + Chapter 2, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2 |
| **2****(**4th week**)** | **The Estrous Cycle*** Hormones that regulate estrous cycle
* Puberty and first estrus
* Periods of the estrous cycle
* Ovarian and tubular changes
* Artificial control of the estrous cycle
 | * + Chapter 4, 5 and 18, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, D2 |
| **2****(**5th week**)** | **Ovulation and Fertilization*** Ovigenesis
* Ovulation
* Fertilization
* *In vitro* fertilization (IVF)
* Superovulation and embryo transfer (ET)
 | * + Chapter 7 and 18, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, C1, C2, C3, D1, D2 |
| **2****(**6th week**)** | **Gestation*** Preparation of the reproductive tract
* Changes in the uterus
* The hormones in pregnancy
* Diagnosis of pregnancy
 | * + Chapter 8 and 20, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, A4, B1 |
| **2****(**7th week**)** | **Parturition*** Initiation of parturition
* Signs of approaching parturition
* Normal and abnormal presentation of the fetus
* Stages of parturition
 | * + Chapter 9, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A4,D1, D2 |
| **2****(**8th week**)** | **The reproductive tract of the bull*** The scrotum
* The testes
* The duct system
* The accessory sex glands
* The penis
 | * + Chapter 3, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2 |
| **2****(**9th week**)** | **The formation and ejaculation of spermatozoa*** Spermatogenesis
* Spermiogenesis
* Endocrine control of spermatogenesis
* Transport of spermatozoa in the ducts
* Ejaculation
 | * + Chapter 4 and 6, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2 |
| **2****(**10th week**)** | **Semen and its components*** Semen formation
* Composition of sperm cell
* Morphology of spermatozoa
 | * + Chapter 12, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A4 |
| **2****(**11th week**)** | **Physiology of spermatozoa in the female reproductive tract*** Site of semen deposition
* Transport of spermatozoa in the female reproductive tract
* Interaction between semen and female reproductive tract
 | * + Chapter 6 and 7, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2 |
| **2****(**12th week**)** | **Semen collection and evaluation*** Methods of semen collection
* Gross examination of the semen
* Semen quality
* Morphology of sperm cells
* Concentration of sperm cells
* Motility of spermatozoa
* Staining of live and dead spermatozoa
 | * + Chapter 14 and 15, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, A4, B1, B2, C2 |
| **2****(**13th week**)** | **Extenders and extension of semen*** Principles of sperm preservation
* Extenders for refrigerated semen
* Extenders for storage at ambient temperature
* Extension procedures and rates
 | * + Chapter 16, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, B2, C2 |
| **2****(**14th week**)** | **Freezing spermatozoa*** Aspects of freezing and thawing
* Extenders for freezing
* Variation in semen quality
 | * + Chapter 16, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, A4, B2, C2 |
| **2****(**15th week**)** | **Insemination of the cow*** Techniques of insemination
* Site of insemination
* Optimum time for insemination
 | * + Chapter 17, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A3, A4, B2, C2, C3, D1, D2 |
| **2****(**16th week**)** | **Conception rate and factors affecting it*** Sterility and reduced fertility
* Measures of reproductive efficiency
* Physiological causes of reduced fertility
 | * + Chapter 19, 21 and 22, Bearden and Fuquay, Applied Animal Reproduction, 2004.
	+ Animal reproduction and reproductive biotechnologies internet sites.
 | A1, A2, A4, B1, C1, D1, D2 |

**LEARNING METHODOLOGY:**

The course subjects will be presented basically through lectures with the focusing on discussions through lectures to activate the student's ideas and abilities in logical thinking. In addition, the course involves a laboratorial training and working specially those subjects related to reproductive biotechnologies.

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| **EVALUATION METHODS:** |
| **Exam** | **Grade** | **Day** | **Date** |
| **Midterm Exam** | **30%** |  |  |
| **Lab, Reports and Quizzes** | **10%** |  |  |
| **Participation** | **10%** |  |  |
| **Final Exam** | **50%** |  |  |

**MAIN REFERENCE:**

* Joe Bearden, H and Fuquay, J.W. Applied Animal Reproduction. Fourth Edition. Asimon and Schuster Company. New Jersey. 2004.

**ADDITIONAL REFERENCES:**

* Barth, A.D and OKO, R. J. Abnormal Morphology of Bovine Spermatozoa Insemination First Edition. Iowa State University. 1989.
* Hafez, B and Hafez, E.S.E. Reproduction in Farm Animals. 7th Edition. Lea and Febiger, Phyladelphia. 2000.
* Senger PL. Pathways to pregnancy and parturition. 1st edition. Pullman, WA: Current Conceptions, Inc.; 2003.
* Ball PJH, and Peters AR. Reproduction in Cattle. Third Edition. Blackwell Publishing; 2004.

**INTENDED GRADING SCALE**

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| **00-46 H**  | **64-66 C+** |
| **47-49 D-** | **67-69 B-** |
| **50-53 D** | **70-73 B** |
| **54-56 D+** | **74-76 B+** |
| **57-59 C-** | **77-79 A-** |
| **60-63 C** | **80-100 A** |

**Notes:**

* Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming, then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter, problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For final complaints, there will be a committee to review grading the final exam.
* For more details on University regulations please visit:

 <http://www.ju.edu.jo/rules/index.htm>