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| Form: Course Syllabus | Form Number | EXC-01-02-02A |
| | Issue Number and Date | 2/3/24/2022/2963 05/12/2022 |
| | Number and Date of Revision or Modification | |
| | Deans Council Approval Decision Number | 2/3/24/2023 |
| | The Date of the Deans Council Approval Decision | 23/01/2023 |
| | Number of Pages | 08 |

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| 1. | Course Title | Reproduction and Artificial Insemination |
| 2. | Course Number | 0602451 |
| 3. | Credit Hours (Theory, Practical) | 2,1 |
| | Contact Hours (Theory, Practical) | (2,3) |
| 4. | Prerequisites/ Corequisites | Dairy Production (602215) |
| 5. | Program Title | B.Sc. Animal Production |
| 6. | Program Code | |
| 7. | School/ Center | School of Agriculture |
| 8. | Department | Department of Animal Production |
| 9. | Course Level | 3 rd – 4 th Year |
| 10. | Year of Study and Semester (s) | 1st semester 2024/2025 |
| 11. | Other Department(s) Involved in Teaching the Course | None |
| 12. | Main Learning Language | English |
| 13. | Learning Types | X Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online |
| 14. | Online Platforms(s) | <input type="checkbox"/> Moodle X Microsoft Teams |
| 15. | Issuing Date | |
| 16. | Revision Date | 1/10/2024 |

17. Course Coordinator:

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| <p>Name: Prof. Mufeed Alnimer</p> <p>Contact hours: Sunday, Tuesday, and Thursday at 11.30 – 12.30.</p> <p>Office number: 032</p> <p>Phone number: 22383</p> <p>Email: amufeed@ju.edu.jo</p> |
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18. Other Instructors:

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| None |
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**19. 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, oestrous cycle, fertilization, gestation and parturition. In addition, the course gives high attention for the modern biotechnologies related to reproduction such as semen collection and preservation, artificial insemination (AI), oestrus and ovulation synchronization programs, multiple ovulation and embryo transfer (MOET) and in vitro fertilization (IVF).

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. Demonstrate a deep understanding of the basic principles in the various areas of livestock production; including nutrition, physiology, genetics, health and management.
2. Apply the acquired knowledge in various areas of livestock production.
3. Utilize critical thinking and logical reasoning in addressing issues related to livestock production.
4. Communicate effectively with a wide range of related stakeholders and provide appropriate extension services.
5. Apply the principles of public safety and environmental protection.
6. Acquire and apply practical skills along with keeping up with recent advances in livestock production.
7. Identify basic principles of research methodology and evidence-based decision making.
8. Abide by the professional, ethical and legal considerations relevant to the livestock production.

21. Course Intended Learning Outcomes: Upon completion of the course, the student will be able to achieve the following intended learning outcomes:

1. Understand the importance of reproduction in farm animal and its close relationship to the success of any farm animal project.
2. Know, distinguish and understand the anatomical parts of the female and male reproductive tract in farm animals.



3. Understand the estrous cycle with its all stages and events including the endocrine and artificial control in addition to the stages of gestation period and parturition.
4. Be able to apply the most common assistive technologies for farm animals mainly artificial insemination, pregnancy diagnosis and MOET.
5. Understand the way by which spermatozoa formed in the male tract, ejaculated, collected, evaluated and preserved for artificial insemination.
6. Able to understand the dairy sire summary sheet with its major terms and to evaluate the key performance indicators of fertility in dairy farms.

| Course ILOs | The learning levels to be achieved | | | | | |
|-------------|------------------------------------|---------------|----------|-----------|------------|----------|
| | Remembering | Understanding | Applying | Analysing | evaluating | Creating |
| 1 | X | X | | | | |
| 2 | X | X | | | | |
| 3 | | X | X | | X | X |
| 4 | | X | X | | X | X |
| 5 | X | X | X | X | X | |
| 6 | | X | | X | X | X |

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

| Program ILOs / Course ILOs | ILO (1) | ILO (2) | ILO (3) | ILO (4) | ILO (5) | ILO (6) |
|----------------------------|---------|---------|---------|---------|---------|---------|
| 1 | X | X | | X | X | |
| 2 | | X | X | | | X |
| 3 | | X | | | | X |
| 4 | | | X | | | X |
| 5 | X | | X | | | |
| 6 | | | X | | X | X |
| 7 | | | | | | X |
| 8 | | X | X | | | |



23. Topic Outline and Schedule:

| Week | Topic | ILO/s Linked to the Topic | Learning Resources |
|------|--|---------------------------|--|
| 1 | Introduction and objectives <ul style="list-style-type: none"> - Lifetime sequence of reproductive events - Genetic improvement of cattle - The role and advantages of Artificial Insemination | ILO (1) | Chapter 1, Senger PL, Pathways to Pregnancy and Parturition, 2012. Chapter 1 and 13, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004. Animal reproduction and reproductive biotechnologies internet sites. |
| 2 | The Reproductive System of the Cow/ewe/mare/hen <ul style="list-style-type: none"> - Origin and development | ILO (2) | Chapter 2, Senger PL, Pathways to Pregnancy and Parturition, 2012. |
| 3 | <ul style="list-style-type: none"> -The Ovaries -Tubular genitalia | | Chapter 2, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004. |
| 4 | The Oestrous Cycle <ul style="list-style-type: none"> - Hormones regulate oestrous cycle | ILO (1) ILO (3) | Chapter 5, 6, 7, 8 and 9, Senger PL, Pathways to Pregnancy and Parturition, 2012. |
| 5 | <ul style="list-style-type: none"> - Puberty and first oestrus - Periods of the oestrous cycle - Ovarian and tubular changes | | Chapter 4, 5 and 18, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004. |
| 6 | Ovulation and Fertilization <ul style="list-style-type: none"> - Ovogenesis - Ovulation and Fertilization - <i>In vitro</i> fertilization (IVF) - Superovulation and embryo transfer (MOET) | ILO (3) | Chapter 8, 9, 11 and 12, Senger PL, Pathways to Pregnancy and Parturition, 2012. Chapter 7 and 18, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004. Animal reproduction and reproductive biotechnologies internet sites |
| 7 | Gestation <ul style="list-style-type: none"> - Preparation of the reproductive tract - Changes in the uterus - The hormones in pregnancy - Diagnosis of pregnancy | ILO (3) | Chapter 13 and 14, Senger PL, Pathways to Pregnancy and Parturition, 2012. Chapter 8 and 20, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004. Animal reproduction and reproductive biotechnologies internet sites. |
| 8 | Parturition <ul style="list-style-type: none"> - Signs of approaching parturition - Normal and abnormal presentation of the fetus - Stages of parturition | ILO (3) | Chapter 14, Senger PL, Pathways to Pregnancy and Parturition, 2012. Chapter 9, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004. Animal reproduction and reproductive biotechnologies internet sites. |



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| 9 | <p>The reproductive tract of the bull, and ram</p> <ul style="list-style-type: none"> - The scrotum and testes - The duct system, accessory sex glands and penis | ILO (2) | <p>Chapter 3, Senger PL, Pathways to Pregnancy and Parturition, 2012.</p> <p>Chapter 3, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004.</p> <p>Animal reproduction and reproductive biotechnologies internet sites.</p> |
| 10 | <p>The formation and ejaculation of spermatozoa</p> <ul style="list-style-type: none"> - Spermatogenesis and Spermiogenesis - Endocrine control of spermatogenesis - Transport of spermatozoa in the ducts and ejaculation | ILO (5) | <p>Chapter 10 and 11, Senger PL, Pathways to Pregnancy and Parturition, 2012.</p> <p>Chapter 4 and 6, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004.</p> |
| 11 | <p>Semen and its components</p> <ul style="list-style-type: none"> - Semen formation - Composition of sperm cell - Morphology of spermatozoa | ILO (5) | <p>Chapter 12, Senger PL, Pathways to Pregnancy and Parturition, 2012.</p> <p>Chapter 12, 14 and 15, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004.</p> <p>Animal reproduction and reproductive biotechnologies internet sites.</p> |
| 12 | <p>Physiology of spermatozoa in the female reproductive tract</p> <ul style="list-style-type: none"> - Site of semen deposition - Transport of spermatozoa in the female reproductive tract - Interaction between semen and female reproductive tract | | |
| 13 | <p>Semen collection and evaluation</p> <ul style="list-style-type: none"> - Methods of semen collection - Gross examination of the semen - Morphology and Motility of sperm cells - Concentration of sperm cells - Staining of live and dead spermatozoa <p>Extenders and extension of semen</p> <ul style="list-style-type: none"> - Principles of sperm preservation - Extenders for refrigerated semen - Extenders for storage at ambient temperature - Extension procedures and rates | ILO (5) | <p>Chapter 11, Senger PL, Pathways to Pregnancy and Parturition, 2012.</p> <p>Chapter 14, 15 and 16, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004.</p> <p>Animal reproduction and reproductive biotechnologies internet sites.</p> |



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| 14 | <p>Freezing spermatozoa</p> <ul style="list-style-type: none"> - Aspects of freezing and thawing - Extenders for freezing - Variation in semen quality <p>Insemination of the cow</p> <ul style="list-style-type: none"> - Techniques of insemination - Site of insemination - Optimum time for insemination | <p>ILO (4) ILO (5)</p> | <p>Chapter 16 and 17, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004.</p> <p>Animal reproduction and reproductive biotechnologies internet sites.</p> |
| 15 | <p>Conception rate and factors affecting it</p> <ul style="list-style-type: none"> - Sterility and reduced fertility - Measures of reproductive efficiency - Physiological causes of reduced fertility | <p>ILO (1) ILO (6)</p> | <p>Chapter 19, 21 and 22, Bearden, Fuquay and Willard, Applied Animal Reproduction, 2004.</p> <p>Animal reproduction and reproductive biotechnologies internet sites.</p> |

Lab Topics Schedule

| Week | Subject |
|------|--|
| 2 | Female Reproductive Tract Anatomy |
| 3 | Estrus and Estrus Detection Aids |
| 4 | Artificial Control of Estrous Cycle |
| 5 | Artificial Insemination in Dairy Cows |
| 6 | Sire Selection in Dairy Farms |
| 7 | Pregnancy Diagnosis |
| 8 | Embryo Transfer Technology in Dairy Cows |
| 9 | Key Performance Indicators of Fertility in Dairy Herds |
| 10 | Male Reproductive Tract Anatomy |
| 11 | Semen Collection in Farm Animals |
| 12 | Semen Evaluation in Farm Animals |
| 13 | Processing of Bull Semen |
| 14 | Immunoassay Techniques (ELISA and RIA) |



24. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

| Evaluation Activity | Mark | Topic(s) | ILO/s Linked to the Evaluation activity | Period (Week) | Platform |
|-------------------------|------|--------------------------------|---|-----------------------|----------|
| 1 st Exam | 15% | All Topics of weeks 1 - 6 | ILO's (1, 2, 3) | 6 | - |
| 2 nd Exam | 15% | All Topics of weeks 7 - 12 | ILO's (2, 3, 5) | 12 | - |
| Home and Lab Worksheets | 10% | Almost weekly | ILO 's (1 - 6) | Almost weekly | - |
| Lab Quizzes | 10% | Topics of weeks 3, 5, 7, 9, 13 | ILO's (1, 3, 4, 5) | Weeks 4, 6, 8, 10, 14 | - |
| Final Exam | 50% | All Class Material | ILO 's (1 - 6) | 16 | - |

25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform...etc.):

e. learning and Microsoft Teams

26. Course Policies:

A- Attendance policies:

The regulations of the University of Jordan will be followed.

B- Absences from exams and submitting assignments on time:

The regulations of the University of Jordan will be followed.

C- Health and safety procedures:

Students should follow the Jordanian government guide.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

The regulations of the University of Jordan will be followed.

E- Grading policy:

The regulations of the University of Jordan will be followed.

F- Available university services that support achievement in the course:

None



27. References:

A- Required book(s), assigned reading and audio-visuals:

- Joe Bearden, H.; Fuquay, J.W. and Willard, S. T. Applied Animal Reproduction. 6th Edition. Asimon and Schuster Company. New Jersey. 2004.
- Senger PL. Pathways to pregnancy and parturition. 3rd edition. Pullman, WA: Current Conceptions, Inc.; 2012.

B- Recommended books, materials, and media:

- Hafez, B and Hafez, E.S.E. Reproduction in Farm Animals. 7th edition. Lea and Febiger, Phyladelphia. 2000.
- Ball PJH, and Peters AR. Reproduction in Cattle. 3rd Edition. Blackwell Publishing; 2004.
- Youngquist, R. S and Threlfall, W. R. Current Therapy in Large Animal Theriogenology. 2nd edition. Saunders Elsevier; 2007.
- Hopper, R. Bovine Reproduction. 2nd edition. John Wiley & Sons, Inc.; 2021

28. Additional information:

None

Name of the Instructor or the Course Coordinator:

Prof. Mufeed Alnimer

Signature:

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Date:

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Name of the Head of Quality Assurance Committee/ Department

Dr. Rabie Irshaid

Signature:

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Date:

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Name of the Head of Department

Prof. Anas Abdelqader

Signature:

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Date:

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Name of the Head of Quality Assurance Committee/ School or Center

Dr. Asmaa Al-Bakri

Signature:

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Date:

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Name of the Dean or the Director

Prof. Ayed Al-Abdallat

Signature:

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Date:

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