1	**Course title**	Genetic Improvement of Farm Animals
2	**Course number**	0602361
3	**Credit hours**	3
	Contact hours (theory, practical)	2, 1
4	**Prerequisites/corequisites**	Sheep Production (602214)
5	**Program title**	B. SC. Animal Production
6	**Program code**	602
7	**Awarding institution**	The University of Jordan
8	**School**	School of Agriculture
9	**Department**	Department of Animal Production
10	**Course level**	third year
11	**Year of study and semester (s)**	2021-2022/2nd semester
12	**Other department (s) involved in teaching the course**	None
13	**Main teaching language**	English
14	**Delivery method**	☒Face to face learning ☐Blended ☐Fully online
15	**Online platforms(s)**	☒Moodle ☒Microsoft Teams ☐Skype ☐Zoom ☐Others
16	**Issuing/Revision Date**	24/2/2022

17. Course Coordinator:

Name: Prof. Mohammad Jihad Tabbaa **Office number:** 157 **Email:** MJTabbaa@ju.edu.jo **Phone number:** 22388	**Contact hours:** 12:00 – 1:00 S, T, T Students are also welcomed at any time but they are encouraged to schedule meetings with me a few hours or 1-2 days in advance.

19. Course Description:

> Application of genetic principles to improve animal performance are stressed. Emphasis is given to development of effective breeding plans for various species of farm animals, based on genetics, economics, and markets.

20. Course aims and outcomes:

A- Aims:

- To understand the basics of inheritance in livestock animals.
- To comprehend the processes that control and regulate important traits and their inheritance.
- To help students gain a strong understanding of the basic principles of methods identifying superior animals, selection schemes and mating systems.
- To integrate the knowledge of animal breeding in applying principles of genetics for designing a breeding program.

B- Intended Learning Outcomes (ILOs):

Upon successful completion of this course, students will be able to:

PLOs / ILOs of the course	PLO (1)	PLO (2)	PLO (3)	PLO (4)	PLO (5)	PLO (6)	PLO (7)	PLO (8)
1. Exhibit knowledge concerning the inheritance of different traits in the farm animals.	X							
2. Be able to apply their knowledge and reasoning skills to genetic and breeding issues involving the farm animals.		X						
3. Be able to understand and analyze the statistical and biological procedures that can be applied to improve performance traits in the farm animals.		X	X	X				
4. Be able to solve problems in farm animal production based on genetic and breeding knowledge.		X	X	X				

* Program ILOs:

ILO (1): Demonstrate a deep understanding of the basic principles in the various areas of livestock production; including nutrition, physiology, genetics, health and management.

ILO (2): Apply the acquired knowledge in various areas of livestock production.

ILO (3): Utilize critical thinking and logical reasoning in addressing issues related to livestock production.

ILO (4): Communicate effectively with a wide range of related stakeholders and provide appropriate extension services.

ILO (5): Apply the principles of public safety and environmental protection.

ILO (6): Acquire and apply practical skills along with keeping up with recent advances in livestock production.

ILO (7): Identify basic principles of research methodology and evidence-based decision making.

ILO (8): Abide by the professional, ethical and legal considerations relevant to the livestock production.

21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods**	Resources
1	1.1	**What is the "Best" Animal?**	1	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter1**
	1.2	**How are Population Improved**	1	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter2**
	1.3	No lab this week		Face to Face	MS Teams + Moodle	Synchronous		
2	2.1	**Mendelian Inheritance**	1	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter3**
	2.2	**Genes in Populations**	1,2	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter4**
	2.3	**Animal breeding terms and concepts**	1,2	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 1

3	3.1	**Simply Inherited and Polygenic Traits**	1,2	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 5**
	3.2	**Selection for Simply Inherited and Polygenic Traits**	1,2	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 6**
	3.3	**Genotypes and Phenotypic Expression with Mendelian Inheritance**	2,3	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 2
4	4.1	**Genetic model for quantitative traits**	1,2	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter7**
	4.2	**Genetic model for quantitative traits**	2,3	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter7**
	4.3	**Types of Gene Action with Mendelian Inheritance**	2,3.4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 3
5	5.1	**Statistics and Their Application to Quantitative Traits**	1,2,3	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 8**
	5.2	**Exam 1**		Face to Face	MS Teams + Moodle	Synchronous		
	5.3	**Calculating Gene Frequencies**	2,3	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 4
6	6.1	**Heritability And Repeatability**	1,2	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 9**

	6.2	**Factors Affecting the Rate of Genetic Change**	1,2,3	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 10**
	6.3	**Statistical Measures - Probability, Mean, Variance**	3,4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 5
7	7.1	**Genetic Prediction**	1,2,3	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 11**
	7.2	**Large Scale Genetic Evaluation**	1	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 12**
	7.3	**Statistical Measures - Correlation, Regression**	3,4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 6
8	8.1	**Large Scale Genetic Evaluation**	1,2,3	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 12**
	8.2	**Correlated Response to Selection**	1,2,3	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 13**
	8.3	**Heritability, Repeatability**	1,2,3	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 7
9	9.1	**Correlated Response to Selection**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 13**
	9.2	**Multiple Trait Selection**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter14**
	9.3	**Single Trait Selection, Genetic Change Genetic Prediction**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 8

10	10.1	**Multiple Trait Selection**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 14**
	10.2	**Selection for Simply Inherited Traits**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 15**
	10.3	**Mating Systems - Inbreeding, Genetic Relationships**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 9
11	11.1	**Selection for Simply Inherited Traits**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous		**Bourdon Chapter15**
	11.2	**Mating Strategies Based on Animal Performance: Random and Assortative Mating**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 16**
	11.3	**Mating Systems - Outbreeding and Hybrid Vigor**	2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 10
12	12.1	**Exam 2**		Face to Face	MS Teams + Moodle	Synchronous		
	12.2	**Mating Strategies Based on Pedigree Relationship – Inbreeding and Outbreeding**	1,2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter17**
	12.3	**Mating Systems - Outbreeding**	4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 11

		and Crossbreeding						
13	13.1	**Mating Strategies Based on Pedigree Relationship – Inbreeding and Outbreeding**	2,3,4		Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 17**
	13.2	**Mating Strategies Based on Pedigree Relationship – Inbreeding and Outbreeding**	1,2,3,4		Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 17**
	13.3	**Performance Testing - Beef Cattle**	3,4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual 2
14	14.1	**Hybrid Vigor**	1,2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 18**
	14.2	**Hybrid Vigor**	1,2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 18**
	14.3	**Discussing the final Homework**	4	Face to Face	MS Teams + Moodle	Synchronous	Homeworks + Exam	Lab manual
15	15.1	**Crossbreeding systems and Synthetic breeds, combining ability**	1,2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 19**
	15.2	**Crossbreeding systems and Synthetic breeds,**	1,2,3,4	Face to Face	MS Teams + Moodle	Synchronous	Exam	**Bourdon Chapter 19**

		combining ability						
	15.3	Review		Face to Face	MS Teams + Moodle	Synchronous		Lab manual

- Teaching methods include Synchronous lecturing/meeting; Asynchronous lecturing/meeting
- Evaluation methods include Homework, Exam, …etc

22. Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Homeworks	20%	Different topics of the course	See the students learning outcomes (SLOs) table	Throughout the semester	Face to Face
2 Midterm Exams	30%	Topics covered until the weeks 5 & 12		(14-4-2022) (12-5-2022)	Face to Face
Final Exam	50%	All covered topics		16 (According to admission and registration unit)	Face to Face

23. Course Requirements

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

24. Course Policies:

A- Attendance policies:

Each student is expected to take their own notes (part from the exam) and to attend class. Absence from lectures shall not exceed **15%**. Students are expected to attend all lectures but if a student is absent from class, it is his responsibility to get the material that was missed. You must get any handouts or notes from your classmates.

B- Absences from exams and submitting assignments on time:

Exams will consist of **some Essay and Calculation questions**. Exams will cover all material presented for each section. Make-up exams will only be provided for students with an excused

absence and supporting documentation. The questions and/or format of any make-up exam may differ from that of the original exam. Scheduling of a make-up exam will vary depending upon available dates/times but **MUST** occur before the next-scheduled exam date.

C- Health and safety procedures:

Students should follow the Jordanian government guide

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Academic dishonesty will **NOT** be tolerated. This includes cheating, fabrication or falsification, plagiarism, abuse of academic materials, complicity in academic dishonesty, falsifying grade reports, and misrepresentation to avoid academic work. For this course, evidence of any form of academic dishonesty will result in all involved students receiving zero points for any associated exam, or assignment

E- Grading policy:

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

Two one-hour exams:	**30 %**	
Homeworks Reports	**20 %**	
Final exam:	**50 %**	**Registration**

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

Students account on E-learning, and Microsoft teams

25. References:

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

1. Understanding Animal Breeding, 2nd edition by R M Bourdon, Prentice Hall, 2000.
2. Lab Manual for The Class of Genetic improvement of Farm Animals (602361)

٣. غزال، نجيب توفيق؛ تربية وتحسين حيوانات المزرعة. الموصل: جامعة الموصل، مؤسسة دار الكتب للطباعة والنشر، ١٩٨١.

B- Recommended books, materials, and media:

4. Breeding and Improvement of Farm Animals, 8th edition by J. E. Legates and Everett J. Warwick. McGraw-Hill, 1990.
5. Lasley, John F.; Genetics of Livestock Improvement. Fourth Edition, Prentice-Hall, New Jersey, 1987.
6. Animal Breeding: An Introduction. Rodner B. Harrington. Interstate Publishers, Inc 1995, Danville, IL

26. Additional information:

- 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**

Name of Course Coordinator **Prof. Mohammad J Tabbaa**-----Signature: ------------------ Date: ------------

Head of Curriculum Committee/Department: ---------------------------- Signature: -------------------------

Head of Department: -- Signature: ----------------------

Head of Curriculum Committee/Faculty: -------------------------------------- Signature: -------------------

Dean: -- Signature: ---