

1	Course title	Feeds Analysis
2	Course number	632483
3	Credit hours	2
	Contact hours (theory, practical)	(1,1)
4	Prerequisites/co-requisites	Principles of Animal productions (0602382)
5	Program title	B.Sc. Animal Production
6	Program code	602
7	Awarding institution	The University of Jordan
8	School	Agriculture
9	Department	Animal Production
10	Course level	4 th year
11	Year of study and semester (s)	2 nd semester 2021/2022
12	Other department (s) involved in teaching the course	None
13	Main teaching language	English
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
15	Online platforms(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
16	Issuing/Revision Date	January, 2022

17. Course Coordinator:

Name: **Prof. Hosam Titi**
Office number: 2 - Green house
Email: htiti@ju.edu.jo
Phone number: 22384

Contact hours: **10.30 – 14.30 (Sun, Tue, Thu).**
Students are also welcomed at any time but they are encouraged to schedule meetings.

18. Other instructors:

Name:
Office number:
Phone number:
Email:
Contact hours:

19. Course Description:

The course is designed to provide the students the fundamental principles of feed chemistry and analysis methods. This includes Proximate analysis, Detergent fiber analysis (VanSoest method: Neutral detergent fiber, Acid detergent fiber, lignin), and Photometry and Atomic absorption. In addition, Data reliability and analysis of results, Sampling procedure, Gross energy determination, and Digestibility and markers will be covered. Finally the course will also include other methods used for moisture, lipid, and protein, wet ashing determination methods. Feed evaluation using digestibility coefficients, protein value, energy value, and systems of expressing the energy value of feeds will be discussed.

20. Course aims and outcomes:

A- Aims:

The aim of this course is to present an understanding of feed analysis and metabolism, and to distinguish clearly between ruminant and non-ruminant animals regarding feeds and feeding.

Course outcome

- 1- Learn how to read and interpret analysis data.
- 2- Acquire knowledge relating to proper feed sampling procedures.
- 3- Knowledge of the basic chemical methods for feed analysis (Proximate, Detergent, Wet ashing).
- 4- Get familiar with the spectro- methods in feed analysis.
- 5- Understanding the different aspects of digestibility trials and digestibility coefficients.
- 6- Understanding the different energy systems and components.
- 7- Know how to link and apply it to feed quality.

B- Students Learning Outcomes (SLOs):

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

Course SLOs	Program ILOs*						
	ILO (1)	ILO (2)	ILO (3)	ILO (4)	ILO (5)	ILO (6)	ILO (7)
1. Learn how to read and interpret analysis data.		x				x	
2. Acquire knowledge relating to proper feed sampling procedures.			x	x		x	x
3. Knowledge of the basic chemical methods for feed analysis (Proximate, Detergent, Wet ashing).		x	x		x	x	x
4. Get familiar with the spectro methods in feed analysis.		x	x	x			
5. Understanding the different aspects of digestibility trials and digestibility coefficients	x	x	x	x		x	x
6. Understanding the different energy systems and components.	x	x	x	x		x	
7. Know how to link and apply it to feed quality.			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 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	Personal Safety & Precautions to be taken Analysis of results data	2, 5, 6	Face to Face	MS Teams	Synchronous	Assignments & quizzes	Chap. 2/1
2	2	Sampling procedure: taking, dividing, sealing, and fastening of samples.	3, 4, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 1, 2/2 Lab Manual SHO
3	3	Moisture & DM determination.	2, 3, 5, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 3/1
4	4	Crude protein determination: Macro and micro-Kjeldahl.	2, 3, 5, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 5
5	5	Crude fat determination: Ether extraction: Official method, Fast method (Tecator).	2, 3, 5, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 4
6	6	Crude fiber determination.	2, 3, 5, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 7/2

7	7	Ash determination (wet and dry ashing): Ca & P determination.	2, 3, 5, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 4/2
8	8	Mid –Term Exam		Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	
9	9	Detergent fiber analysis (VanSoest method): NDF, ADF, ADL	2, 3, 5, 6, 7	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 7/2
10		Photometry Spectroscopy & Atomic absorp (AA). Infrared & Emission	2, 3, 4	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 9/2
11		NIR & NMR	2, 3, 4	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 9/2
12		Energy determination Bomb Calorimeter	2, 3, 4	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap
13		Digestibility.	2, 3, 4	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap
14		Understanding forage quality and value.	2, 3, 4	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap
15		Microscopic feed analysis.	2, 3, 4	Face to Face	MS Teams + Moodle	Synchronous	Assignments & quizzes	Chap 1/4
16		Final Exam						

22. Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
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Lab work	30%	Weekly Experiment report as planned Homework assignments Quizzes	See the students learning outcomes (SLOs) table	Throughout the semester	Face to Face
Midterm Exam	20%	Topics covered until the end of Proximate Analysis		9 th week	Face to Face
Final Exam	50%	All covered topics		16 th week	Face to Face

23. Course Requirements

Students should have a computer, webcam, internet connection, 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 **Essay questions and some multiple choice**. 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:

Lab work: Reports, Quizzes and HW	30%
Mid-exam	20%
Final Exam	50%
Total Points	100%

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:

- Class material notes.**
- Nielsen, S. 2017. Food Analysis, 3rd ed. Aspen Publication. Inc.
- N.T. Faithfull. 2002. Methods in agricultural chemical analysis.
- Khajarearn J. 1987. Manual of feed microscopy and quality control American Soybean Association

B- Recommended books, materials and media:

Zaklouta M., Hilali M., Ne fzaoui A. and Haylani M. 2011. Animal nutrition and product quality laboratory manual. ICARDA

Internet publications

26. Additional information:

Name of Course Coordinator: Dr. Rabie Irshaid		Signature: -----	Date: 13/12/2021
Head of Curriculum Committee/Department: -----		Signature: -----	
Head of Department: -----		Signature: -----	
Head of Curriculum Committee/Faculty: -----		Signature: -----	