



Department of Animal Resources

College of Agricultural Engineering Sciences

Salahaddin University-Erbil

Subject: Animal fibers

Course Book (Year 4)

Lecturer's name: Dr.Kasim O. Aziz (Professor)&

Dr.Abdulqader A. Hussein (Assist Professor)

Academic Year: 2023/2024

Course Book

1. Course name	Spring/Second Semester
2. Lecturer in charge	Dr.Kasim O. Aziz & Dr.Abdulqader A. Hussein
3. Department/ College	Animal Resources/ Agricultural Engineering Sciences.
4. Contact	e-mail: kasim.aziz@su.edu.krd Tel: (0750 4652234) & e-mail : abdulqader.hussein@su.edu.krd Tel: (0750 4623947)
5. Time (in hours) per week	Theory: 2
6. Office hours	Available each day after 08:30 AM.
7. Course code	
8. Teacher's academic profile: 1- Dr.Kasim O. Aziz	<p style="text-align: center;"><u>PERSONAL DATA</u></p> <ul style="list-style-type: none"> • Date of Birth:1955 • Nationality: Iraqi-Kurdish. • Marital Status: Married. <p style="text-align: center;"><u>EDUCATION</u></p> <ul style="list-style-type: none"> • B.Sc.: 1977/Agriculture-Farm Management/ Baghdad, Iraq. • Grad. Diploma: 1981/Wool & Pastoral Science/ N.S.W., Australia. • Ph.D.: 1985/Wool Technology/ N.S.W., Australia. <p>Since 1986 I have been working as a teaching staff at the University of Mosul (6 years) & at Salahaddin University - Erbil/Iraq; involving in teaching under & post graduate students, doing researches and publishing papers (14) in the national and international Journals. Also, supervising post graduate students (5), in addition to contribution in many scientific & administrative committees. I got a full Professor degree in 2009. Further, I wrote a book and a number of scientific articles and submitted many projects to FAO Erbil Sub-Office (2001/2002) in the field of Animal production. I was given Award USA; Fulbright Visiting Scholar Program for Iraq (capacity building on best practice in Agriculture), 2011.</p>
2- Dr.Abdulqader A. Hussein	<p style="text-align: center;"><u>PERSONAL DATA</u></p> <ul style="list-style-type: none"> • Date of Birth:1983 • Nationality: Iraqi-Kurdish. • Marital Status: Married.

	<p style="text-align: center;"><u>EDUCATION</u></p> <ul style="list-style-type: none"> • 2004-2005 BSc in Animal Resources, Uni. of Salahaddin-Erbil. • 2005-2007 Demonstrator at Animal Resources Dept., Uni. of Salahaddin-Erbil. • 2007-2010 MSc in Wool Science & Technology, Uni. of Peoples Friendship University of Russia. • 2010-2014 Assit. lecturer at Animal Resources Dept., Uni. of Salahaddin-Erbil. • 2014-2017 PhD in Animal Nutrition, University of Harper-Adams. • 2017- Present Lecturer in Animal Nutrition, Uni. of Salahaddin-Erbil.
<p>9. Keywords</p>	<p>Fleece biology, fiber structure, physical & mechanical properties, textile processing, carpet & local wool, mohair & cashmere.</p>
<p>10. Course overview:</p> <p>The producer of synthetic fibers can easily outdo the woolgrower in many traits except the two most important traits, which are a combination of unusual mechanical properties coupled with the ability to absorb large quantities of moisture, due to the unique microfibril/matrix composition of animal fibers. It is perhaps not surprising, as humans wear animal fibers, especially wool offers outstanding comfort properties.</p> <p>The production of animal fiber is of economic importance, especially fine fibers (e.g. Cashmere). Therefore, part of the income of the grower depends on the quantity and quality of fiber produced. In addition, our country is suitable for breeding farm animals such as sheep and goats, especially as there are Maraz goats, which utilize their fleece in the manufacture of Kurdish national costume. Therefore, the importance of the study of animal fiber lies by increasing the production. Thus means increasing the income of grower and consequently their subsequent effects on national income.</p> <p>Moreover, it is a guide for graduate who is looking for specialized knowledge and on the light of the needs of labor market in the area for improving animal fiber production quantitatively & qualitatively, thus will contribute to the completion of the steps aim to achieve further progress in the field of animal resources in the country.</p>	
<p>11. Course objective:</p>	

This course is to deal with principles of Animal fibers and their applications in agricultural farms and related activities. Graduates should have the ability to:

- 1- Identify the animal fiber position from the rest of textile fibers.
- 2- State the economic importance of animal fibers.
- 3- Know the biology of fleece; the development of follicles and their impact on the production of animal fiber.
- 4- Diagnose compositional differences between animal and synthetic fibers.
- 5- Study the physical characteristics of animal fibers and factors affecting them.
- 6- Realize the technological importance of animal fibers and characteristics of their end products.

12. Student's obligation

The role of students & their obligations throughout the academic Semester will be: the attendance, scientific discussion, completion of all tests, exams, reports.

13. Forms of teaching

Power point & Data show, Hand out papers.

14. Assessment scheme

- Time of exam: Quiz = 10 Minutes. Monthly = 1 hour. Final = 2 hours.
- The distribution of degrees:
 - Pre-final exam:** 50% (15% theoretical + 35% practical) +
 - Final exam:** 50% (theoretical) =
 - Final mark** (100%).
- Date: 1st month exam = 7th week.
2nd month exam = last week of the semester.

15. Student learning outcome:

At the end of course graduates should be familiar with fleece biology, fiber structure, physical & mechanical properties, textile processing, carpet & local wool, mohair & cashmere. In addition to advice growers to improve production efficiency quantitatively & qualitatively and product development suitable for processors desires. Further knowledge should be obtained in terms of local and main international carpet and cashmere breeds. This will be a guide for graduate who is looking for specialized knowledge in terms of setting proposals and initiating projects for the development of the fiber productivity of local sheep and Maraz goats.

Graduates should utilize all the above knowledge to take care of sheep and goats fleeces in order to improve production quantitatively and qualitatively. Thus will be worthwhile for the future development of the growers in the region.

16. Course Reading List and References:

- 1- Onions W.J.(1962). Wool. An Introduction to its Properties, Varieties, Uses and Production. Interscience Publishers. New York.
- 2- Ryder, M.L. and Stephenson, S.K. (1968).Wool Growth. Academic Press Inc. London.
- 3- Thomas Harmsworth and Graham Day (1979). Wool & Mohair. Intaka Press. Melbourne.
- 4- D'Arcy, J.B.D. (1979). Sheep management and wool technology. N.S.W. Univ. Press. Australia.
- 5- Ensminger, M.E. and Parker, R.O. (1986). Sheep & Goat Science. 5th Edition. The Interstate Printer & Publishers, Inc. Illinois.
- 6- Sandra G. Solaiman (2010). Goat Science and Production. Blackwell Publishing. USA
- 7- Scientific Journals:
 - 1- Animal Breeding Abstracts.
 - 2- Animal Science.
 - 3- Livestock production Science.

17. Theoretical Topics:

Lecturer's name

Syllabus:

<u>Week</u>	<u>Course Description</u>	<u>Aim</u>
1	- Textile fibers identification. - The economic importance of animal fibers.	- To state animal fiber position from the rest of textile fibers.
2-3	- Fleece biology: (Skin structure, follicle types &	- Diagnosis of obstacles to the development of follicles &

Lecturer's name:
Dr.Kasim
O. Aziz &
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Abdulqader A.
Hussein
(2 hrs)

	ratio, nutrition & follicle number.	factors affecting them.	
4-5	- Wool fiber structure: (Morphological, histological and chemical).	- Diagnosis of compositional differences bet. animal fibers & synthetic fibers.	
6-8	- The physical properties of wool: (fleece weight, yield, fineness, staple length, fiber strength, crimps & color) & factors affecting them.	- Advice to growers to improve production efficiency quantitatively & qualitatively.	
9	- Mechanical properties: - Moisture absorption ability. - Tensile properties (Strength, elongation, stiffness) & Felting.	- to know mechanical differences bet. animal fibers & Synthetic fibers.	
10	- Carpet wool: (Statement of good carpet wool, Lines classification & producing countries).	- To know the properties of international carpet wool.	
11	- Local wool: (Description, disadvantages in terms of production, development & improvement, processing & marketing).	- the opportunity to improve the production quantitatively & qualitatively.	
12	- Mohair and cashmere: (Origin, famous goat breeds, fleece description & grades).	- suggestions to develop the productivity of Maraz goat fibers.	
13	- Wool value: - Wool Grades & the price.	- Encouraging the producer for a profitable price upon crop sale.	

<p>14-15 - Wool processing: - To state technological (Textile systems/processing stages, importance of animal fibers. Effects of the physical characteristics - Familiarity of the producer on the processing). to the demands of manufacturer.</p>	
<p>18. Practical Topics:</p>	
<p>Practical course book will be submitted separately.</p>	<p>Lecturer's name: Mr. Samer Sadun (2hrs)</p>
<p>19. Examinations: <u>Samples of questions & answers (Theory):</u> Q 1/ Explain/ why/justify/ Give the reason(s) for: Washing yield from Merino sheep is less than their counterparts producing carpet wool. A1 / Due to the fact that the number of secondary follicles per primary follicle (S/P Ratio) in Merino sheep about 20 while in carpet wool sheep are lower, ranging between 3-5 and this explains the increase in wax glands in Merino sheep, which means more grease and consequently more suspended dust & sand and thus affects negatively on yield. Q 2/ Define/what is: Cashmere. A2 / are those fine fibers that grow from secondary follicles of undercoat from some types of goat to protect them from the cold winter, which usually shed in the spring of each year. Q 3/ Compare between primary and secondary follicles. A3 / Primary follicles are usually large and produce coarse fibers and contain all accessory structures (sebaceous gland, sweat gland & erector muscle) whereas, secondary follicles are smaller and produce fine fibers and have only a sebaceous glands which are small. Q4 / Numerate three factors causing: 1- Fleece tenderness. 2- Fleece discoloration.</p>	

A4 /1- Fleece tenderness:

- 1 - Malnutrition or lack of it, especially at the stage before and after birth.
- 2 - Weather conditions: sudden changes in climate and shearing in winter.
- 3 - Diseases: any disease that can cause animal disturbance and thus a rise in temperature resulting disturbance in the Metabolism. Internal & external parasites have similar effects.

A4 /2- Fleece discoloration:

- 1- Bacterial multiplication within the fleece. e.g. the yellow : brown coloration associated with fleece rot.
- 2- Photochemical decomposition, e.g. the damage and yellowing caused by sunlight to staple tips.
- 3- Staining due to a pigment in the suint, which is responsible for "Canary" stain.

Q5 / Complete the following:

- 1- Medullated fibers are desirable in -----, while undesirable in -----.
- 2 - After 6 years of age wool production will reduce because: 1- ---- & 2- -----.

A5 / 1- Medullated fibers are desirable in carpet manufacture , while undesirable in textile industry.

2 - After 6 years of age wool production will reduce because:

- 1- **reducing follicle efficiency**. 2- **low feed intake**.

20. Extra notes:

Advice: understanding the question = half the answer.

21. Peer review