**The University of Jordan**

**Department of Animal Production**

**Faculty of Agriculture**

**Master Program: Animal Production**

**Course Title: Range Animal Nutrition (602704)**

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| **Credit hours** | **Level** | **Prerequisite** |
| **3** | **Master** |  |

**Course Description**

This course includes limitations to forage intake by grazing animals, dynamics of key nutrients in range plants, grazing and ingestive behavior, plant selection in grazing, and investigating the functional relationship between range plants and animal performance.

#### Learning Outcomes

1. Provide students with major nutritional differences between feedlot and range animals.

2. Highlight the factors affecting the concentration of nutrients and secondary chemical compounds in forage.

3. Discuss the chemical and physical factors influencing herbage intake by grazing animals.

4. Acquaint students with the techniques for quantifying the diets of grazing animals.

5. Explain the techniques for monitoring the nutritional status of grazing animals.

6. Learn students about the strength and shortcomings of range animal nutrition research in the WANA region.

7. Train students on the basics for developing a nutritional program for range animals in arid regions.

**Intended Learning Outcomes (ILOs):**

**A. Knowledge and Understanding:**

**A1.** Student learns about the basics of animal nutrition.

**A2.** Student learns about the concentration and dynamics of nutrients in rangeland forage plants.

**A3.** Student comprehends the impact of physical and chemical attributes of range plants on forage intake and nutrition of range animals.

**A4.** Student learns about the methodologies for the evaluation of range animal nutrition with emphasis in arid regions.

**A5.** Student grasps the pros and cons of range animal nutrition research in arid regions.

**B. Intellectual and Cognitive Skills:**

**B1.** Student can relate the nutrition of grazing animals to the biophysical characteristics of the grazing ecosystem**.**

**B2.** Student knows about the common methodologies for nutritional assessment of grazing animals.

**C. Subject-Specific Skills:**

**C1**. Student has the ability to evaluate the nutrition of grazing animals.

**C2.** Studenthas the ability to predict the performance of grazing animals based on the productivity and diversity of rangeland forage plants.

**D. Transferable Key Skills:**

**D1.** Student has the ability to develop a sound nutritional program for animals grazing in a certain rangeland.

**D2.** Student has the ability to develop and conduct a research on the nutrition of grazing animals.

**ILOs: Learning and Evaluation Methods**

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| **ILOs** | **Learning Methods** | **Evaluation Methods** |
| A. Knowledge and Understanding (A1-A5) | Lectures, Discussions, Presentations | Exams and Participation |
| B. Intellectual and Cognitive Skills (B1-B2) | Lectures, Discussions, Presentations | Exams and Participation |
| C. Subject-Specific Skills (C1-C2) | Lectures, Discussions, Presentations, Case Studies | Exams and Participation |
| D. Transferable Key Skills (D1-D2) | Lectures, Discussions, Presentations, Case Studies | Exams and Participation |

**Course Contents**

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| **No. of Lectures** | **Week** | **Subject** | **Reading Assignment** | **ILOs** |
| **2** | **1** | **1. An Overview of Range Animal Nutrition*** Range nutrition versus classical animal nutrition
 | Ch 7, P 219-255 (**R1**)Ch 11, P 286-330 (**R2**) | A1 |
| **2** | **2** | **2. Grazing and Herbivore Nutrition*** Ruminants versus cecal herbivores
* Factors affecting nutrient requirements
 | Ch 5, P 105-136 (**R3**) | A1 |
| **2** | **3** | **3. Range Plants*** Nutritive quality of forage
* Range nutrition and its application to management**.**
 | Ch 4, P 65-90 (**R4**)Cook, P 1-16 (**R5**) | A2, B1, B2 |
| **2** | **4** | **4. Secondary Chemical compounds*** Tannins
* Myco-toxins
* Oestrogenic substances
* Organo-fluorine compounds
* Oxalate
 | Ch 5, P 91-120 (**R4**) | A2, B1, B2 |
| **4** | **5-6** | **5. Limitation to Intake*** Physical characteristics of vegetation
* Chemical composition of vegetation
* Animal factors affecting feed intake
 | Part 4, P 153-166 (**R6**)Part 4, P 167-182 (**R6**)Part 4, P 183-198 (**R6**) | A3, B1, C2 |
| **2** | **7** | **6. Diet Selection by Grazing and Browsing Animals*** Optimal foraging
* Plant defenses
 | Ch 6, P 121-132 (**R4**)Ch 19, P 796-827 (**R7**) | A3, B1, C1, C2, D2 |
| **4** | **8-9** | **7. Monitoring Grazing Animal Nutrition*** Sampling forage
* Feed intake
* Nutrient concentration in diet
 | Ch 5, P 137-142 (**R3**)Several articles | A4, C1, C2, D1, D2 |
| **4** | **10-12** | **8. Nutrition of Sheep and Goats on Forage Shrubs*** Chemical composition of fodder shrubs
* Shrubs & feeding calendar of small ruminants
 | Several articles | A4, A5, C1, C2, D1, D2 |
| **4** | **13-14** | **9. Supplemental Nutrition Management** * Role of feed blocks
 | Several articles | A4, A5, D1, D2 |
| **4** | **15-16** | **10. Range Animal Nutrition Research in the WANA region*** Classical
* Biotechnology
 | Several articles | A4, A5, C1, D2 |

### Evaluation Methods:

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| **Evaluation** | **Points** |
| 1st Exam | 15 |
| 2nd Exam | 15 |
| 1st Term Paper/Presentation | 10 |
| 2nd Term Paper/Presentation | 10 |
| Case Study Presentation | 10 |
| Final Exam | 40 |
| **Total** | 100 |

**References:**

|  |  |
| --- | --- |
| **No.** | **Title** |
| R 1 | Range Management by L. A. Stoddart, A. D. Smith and T. W. Box, 1975. |
| R 2 | Range Management: Principles and Practices by J. L. Holechek, R.D. Pieper and C.H. Herbel, 1998. |
| R 3 | Grazing Management by J. F. Vallentine, 1990. |
| R 4 | The Nutrition of Herbivores by and J.H. Ternouth, 1987. |
| R 5 | Range Nutrition and its Application to Management by C. W. Cook, 1995**.** |
| R 6 | Nutritional limits to animal Production from Pastures by J. B. Hacker, 1982. |
| R 7 | Forage Quality, Evaluation, and Utilization by G. C. Fahey, 1994. |