**ANS 2104 ANIMAL NUTRITION**

**LECTURERS:** Prof. F.B.Bareeba (B.Sc. Agric., M.Sc. Agric., Ph.D)

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**Course type: Core (B.Sc. Agric. II, B.Sc. FST II)**

**1. COURSE DESCRIPTION**

**Course credits (CU):**  3 CU i.e. 45 contact hours per semester.

**Course duration:** 15 weeks (45 hours) 30 LH, 30PH

**COURSE DESCRIPTION**

Definition: Routine analysis of feeds; Water and its physiological role; Digestion and digestibility trials; Measures of energy value of feeds and energy partitioning; Carbohydrates: Classification, digestion and rumen metabolism; Proteins: Classification, digestion and metabolism; Measures of protein quality; Lipids: Classification, digestion and metabolism; Minerals: Classification, Physiological functions, and deficiency symptoms including disorders specific to lactation; Vitamins: Classification, physiological functions and deficiency symptoms; Physiological processes requiring energy: Feed efficiency; Regulation of voluntary feed intake.

**2. COURSE OBJECTIVES**

The course integrates the digestive and metabolic events in animals from feed prehension to partitioning of nutrients for the various physiological processes.

When the student has completed ANS 2104, the student will be able to:

i) Have complete understanding of the current knowledge regarding nutrients

ii) Define the processes of digestion in animals

iii) Describe the digestion and metabolism of each nutrient class

**3. RECOMMENDED REFERENCES FOR READING**

1. Pond, W.G., Church D.C. and Pond K.R. 1995. Basic Nutrition and Feeding. 4th John

 Wiley and Sons, New York.

2. McDonald, P., Edwards, R.A and Greenhalgh, J.F.D. 1987. Animal Nutrition. 4th

Edition. Longman group.

3. Maynard, L.A., Loosli, J.K., Hintz, H. F. and Warner R.G. 1987 Animal Nutrition 7th

edition. McGraw-Hill, Inc. NY

4. Church D.C. 1988. The Ruminant Animal. Digestive physiology and Nutrition.

Waveland Press, Inc., Prospects height, IL. USA

5. McDowell, L.R. 1992 .Minerals in Animal and Human nutrition. Academic Press, San

Diego.

**4. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT**

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| TOPIC | CONTENT | METHOD OF INSTRUCTION/Time allocated | TOOLS/equipment needed |
| 1. Nutrition and nutrients | * Introduction
* Definition
* Proximate analysis of feeds
* Van Soest scheme of forage fibre analysis
* Other methods
* Expression of nutrient composition
 | Interactive lecture(2 hrs) | Chalk/BBMarkers/Flip chart |
| 2. Water  | * Body water and turnover
* Physiological role
* Sources to animal
* Restriction and intoxication
* Requirements
 | Interactive lecture 2 hrsLaboratory practicalas (moisture and DM) 3 hrs | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 3. Process of Digestion | * Digestive processes
* Digestive systems
* Digestive sites
* Digestion in ruminants
 | Interactive lecture2 hrsLaboratoryPracticals(chromic oxide) 3 hrs | Chalk/BBMarkers/Flip chart/LCDLaboratory equipment |
| 4. Digestibility | * Definition
* Apparent and true digestibility
* Methods of determining digestibility-in vivo and in vitro methods
 | Interactive lecture2 hrsLaboratory practical (crude fibre) 3 hrs | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 5. Energy | * Systems of measuring energy in feeds
* TDN
* SE
* PFV
* Caloric
* Energy partitioning
* BMR and heat production
* Energy retention measurement
 | Interactive lecture3 hrsLaboratory practical ( energy)3 hrs | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 6. Carbohydrates | * Introduction
* Classification
* Digestion and absorption
* Digestion by ruminants
 | Interactive lecture2 hrsLaboratory practicals (ADF and NDF) 3 hrsNotes on comparative digestive physiology of ruminants vs non-ruminants | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 7. Proteins | * Structure and classification
* Amino acids
* Digestion and absorption
* Factors affecting protein utilization; deficiency, toxicity, antagonism
* Waste N elimination
* Protein quality
* Bioassays: BV, NPU, PRV, PER. NPR
* Chemical methods
 | Interactive lecture3 hrsLaboratory practical (Crude protein) 3hrs | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 8. Lipids | * Structure and function
* Classification
* Fatty acids; essential fatty acids
* Digestion and absorption
 | Interactive lecture2 hrsLaboratory practical (Ether extract) 3 hrs | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 9. Minerals  | * Macro minerals: functions and deficiency signs: Ca, P, Mg, S, Na, Cl, K
* Micro minerals: functions and deficiency: Co, Zn, Mn I, Fe, Cu, F, Se, Mo
 | Interactive lecture4 hrsLaboratory practicals (Calcium) 3 hrs | Chalk/BBMarkers/Flip chartLaboratory equipment |
| 10. Vitamins | * Definition
* Functions and deficiency signs of Fat soluble vitamins: A, D, E, K
* Functions and deficiency signs of water soluble vitamins:
* B1, B2, Niacin, B6, pantothenic acid, Boitin, Folic acid, B12, ascorbic acid
 | Interactive lecture4 hrsLaboratory practicals (Phosphorus) 3 hrs | Chalk/BBMarkers Flip chart |
| 11. Physiological functions | * Maintenance
* Synthetic processes
* Growth
* Fattening

Feed efficiency  | Interactive lecture2 hrsLaboratory practical ( Ash and nitrate test)3 hrs | Chalk/BBMarkers /Flip chart |
| 12. Regulation of voluntary feed intake  | * Definitions
* Factors: internal; Physiological state; Dietary factors; Environmental factors
 | Interactive lecture 2 hrs | Chalk/BBMarkers /Flip chart |

**5. SUMMARY OF TIME NEEDED**

Interactive lectures covering theory 30 hrs

Laboratory practicals 30 hrs

**6. OVERALL COURSE EVALUATION**

Continuous Assessment Examination 20%

Laboratory Practicals 20%

Final Examination 60%