AnSc 318—*ANIMAL FEEDS AND FEEDING*—Lecture Syllabus
Fall 2017

Instructor: Dr. Gordon E. Carstens; 845-5081; g-carstens@tamu.edu; Room 230 Kleberg

Prerequisite: AnSc 303 (Principles of Nutrition)

Course Description: Scientific approaches associated with precision feeding and diet formulation to match nutrient availabilities of feedstuffs with requirements of various classes of livestock species; Emphasis on cost-effective feeding strategies to optimize animal productivity, and end-product quality and safety, while mitigating environmental impacts and enhancing animal health and welfare

Course Objectives:

1. Review principles of nutrition with focus on comparative animal nutrition of ruminant, non-ruminant and hind-gut fermentors
2. Learn methodologies (e.g., chemical analyses; near infrared spectroscopy) to characterize and quantify nutritional value of feeds
3. Gain knowledge of factors that impact animal's nutrient requirements and feed intake
4. Gain understanding of the impact of new technologies (e.g., anabolic implants, growth hormone, beta agonists) on nutrient requirements of livestock
5. Apply precision-diet formulation methods to create economical feeding programs for (a) beef cattle, (b) swine, (c) dairy cattle, (d) sheep & goats, and (e) horses
6. Develop feeding strategies specific to species and physiological status to optimize animal productivity and health, and minimize environmental consequences
7. Learn about laws and regulations that govern the feed industry

Reference Materials for AnSc 318:

1. National Research Council (**NRC**) publications: Beef Cattle (1996), Swine (2012), Dairy (2001), Small Ruminant (2007), and Equine (2007).
2. *Feedstuffs*. Weekly publication covering livestock nutrition and the feed industry. *Feedstuffs* has kindly agreed to provide free access to their website (see WebCT).
3. *Livestock Feeds and Feeding* (**6th** edition; 2009).

Grading: 66% [**660 of 1000 Total Points**] of your grade will be based on your performance in lecture [lecture exam = 600 Pts; lecture quizzes = 30 Pts; Nutrition summary paper = 30 Pts], and 34% [**340 of 1000 total Pts**] of your grade will be based on your performance in lab.

Attendance Policy: Attendance in lecture is mandatory. A copy of a letter from the appropriate faculty member, or appropriate person(s) describing reason for excused absence must be presented.

The final exam is **optional,** and the score may be **substituted** for the lowest lecture exam score, for those students with ≤ **2** unexcused absences. For students with more than **2** unexcused absence, the final exam is **mandatory**, and the average of the 4 lecture exams used to determine the total lecture exam points.

Examinations: There will be **3** lecture exams during the semester and a final exam (**200 Pts)**. The final exam will be comprehensive.

Two Technical Writing Assignments (30 Pts): Details to be provided in class.

Lecture Quizzes: 3 on-line lecture quizzes (**30 Pts**) will be assigned via eCampus.

Lecture Topics and Schedule.

Week	*Day*	*Date*	*Lecture Topic*
1	**Tues**	29-Aug	Introduction
	Thurs	31-Aug	Review of Nutrients and Digestion: I
2	**Tues**	5-Sep	Review of Nutrients and Digestion: II
	Thurs	7-Sep	Evaluation of Feeds: I. Chemical analyses
3	**Tues**	12-Sep	Evaluation of Feeds: II. Digestibility of nutrients
	Thurs	14-Sep	Evaluation of Feeds: III. Feed energy
4	**Tues**	19-Sep	Evaluation of Feeds: IV. Feed protein
	Thurs	21-Sep	Evaluation of Feeds: V. Feeding standards
5	**Tues**	26-Sep	Evaluation of Feeds: VI. Ration formulation concepts
	Thurs	28-Sep	**Exam I**
6	**Tues**	3-Oct	Feedstuffs Characteristics: I. Concentrate feedstuffs
	Thurs	5-Oct	Feedstuffs Characteristics: II. Forage feedstuffs
7	**Tues**	10-Oct	Feedstuffs Characteristics: III. Silage feedstuffs
	Thurs	12-Oct	Feedstuffs Characteristics: IV. Forage Toxicity Problems in Texas
8	**Tues**	17-Oct	Beef Cattle Nutrition and Feeding: I. Cow/calf
	Thurs	19-Oct	Beef Cattle Nutrition and Feeding: II. Cow/calf
9	**Tues**	24-Oct	Beef Cattle Nutrition and Feeding: III. Feedlot cattle
	Thurs	26-Oct	Beef Cattle Nutrition and Feeding: IV. Feedlot cattle
10	**Tues**	31-Oct	**Exam II**
	Thurs	2-Nov	Dairy Cattle Nutrition and Feeding: I.
11	**Tues**	7-Nov	Dairy Cattle Nutrition and Feeding: II.
	Thurs	9-Nov	Dairy Cattle Nutrition and Feeding: III.
12	**Tues**	14-Nov	Equine Nutrition and Feeding: I.
	Thurs	16-Nov	Equine Nutrition and Feeding: II.
13	**Tues**	21-Nov	Swine Nutrition and Feeding: I
		23-Nov	**Thanksgiving Holiday**
14	**Tues**	28-Nov	Swine Nutrition and Feeding: II
	Thus	30-Nov	Sheep and Goat Nutrition and Feeding
15	**Tues**	5-Dec	**Exam III**
	Mon	11-Dec	**Final Exam @ 1-3:00 pm**

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Laboratory Syllabus & Information

TA:	Jessica Baber	Lydia Forehand	Erin Posey
Office:	Kleberg 017B	Kleberg 232	Kleberg 308
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TA:	Caitlyn Cagle	Lauren Fontenot	Colton Oney
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Problem Sets: Problem sets are designed to present new material during each lab. Assigned homeworks and laboratory quizzes will reflect learning objectives presented in the problem sets.

Laboratory Quizzes: There will be 4 regular laboratory quizzes during the semester, and a final comprehensive quiz at the end of the semester ***(45 points per quiz).*** The score on the final quiz can be used to replace your lowest laboratory quiz. ***Total Laboratory Quiz Points = 225***.

Homeworks: Homeworks are designed to provide examples of problems that will be on the laboratory quizzes. There will be 10 homeworks during the semester—***10 points per homework***. Additionally, there will be 5 points awarded for the forage analysis assignment, and 10 points awarded for the field trip.

Total Laboratory Points = 340 *(34% of total course points)*

Late Homework and Quiz Policy: If deadlines for graded homeworks or quizzes are missed due to an absence from a lab session, you will have 7 days to turn them in for full credit.

Score Card:

Lecture Grades		**Laboratory Grades**			
Exam 1 *(200 Pts)*	____	Lab QZ 1 *(45 Pts)*	____	HMWK 1 *(10 Pts)*	____
Exam 2 *(200 Pts)*	____	Lab QZ 2 *(45 Pts)*	____	HMWK 2 *(10 Pts)*	____
Exam 3 *(200 Pts)*	____	Lab QZ 3 *(45 Pts)*	____	HMWK 3 *(10 Pts)*	____
Lecture QZ's *(30 Pts)*	____	Lab QZ 4 *(45 Pts)*	____	HMWK 4 *(10 Pts)*	____
Nutrition Papers *(30 Pts)*	____	Final QZ *(45 Pts)*	____	HMWK 5 *(10 Pts)*	____
		Field Trip *(10 Pts)*	____	HMWK 6 *(10 Pts)*	____
				HMWK 7 *(10 Pts)*	____
				HMWK 8 *(10 Pts)*	____
				HMWK 9 *(10 Pts)*	____
				HMWK 10 *(10 Pts)*	____
				Forage analysis *(5 Pts)*	____
Total Lecture *(660 Pts)*	____	**Total Lab** *(340 Pts)*	____		

*Final Grade (%) = [[total lecture Pts + total lab Pts] ÷ 1000] * 100*

Laboratory Topics and Schedule.

Week	*Date*	*Laboratory Topic*	*PS*	*HW*	*QZ†*	*EXM*
1	28-Aug	***Laboratory Introductions***	1	--	--	
2	4-Sep	***Nutrient Composition of Feeds: I. Feed composition tables.***	2	1	--	
		Calculate diet nutrient densities on as-fed & dry-matter basis				
3	11-Sep	***Nutrient Composition of Feeds: II. Chemical analyses & digestibility.***	3	2	--	
		Prepare hay samples; Conduct protein and dry matter analyses				
4	18-Sep	***Nutrient Requirements of Animals.***	4	3	1 [1-2]	
		Learn to use Beef, Horse, Swine, Dairy and EcoFeed computer programs				
		Conduct NIR analysis of hay sample (Work on Forage Worksheets)				
		Demonstrate assays used to measure crude fat & ash content				
5	25-Sep	***Ration Formulation Techniques: I.***	5	4	--	I
		Learn to use pearson square, substitution & modified algebraic methods				
		Conduct ISDMD of hay samples using cannulated steers				
6	2-Oct	***Ration Formulation Techniques: II.***	6	5	2 [3-4]	
		Learn to use simultaneous equations method				
		Learn to formulate trace mineral, vitamin and drug premixes				
7	9-Oct	***Beef Cow/Calf Ration Formulation.***	7	6	--	
		Learn to use OSU cowculator program				
		Field Trip: Office of Texas State Chemist (Analytical Services Lab)				
8	16-Oct	***Feedlot Cattle Ration Formulation.***	8	7	3 [5-6]	
		Learn to use Agri-data to formulate least-cost rations for feedlot cattle				
9	23-Oct	***Dairy Cattle Ration Formulation.***	9	8	--	
		Learn to use Agri-data to formulate least-cost rations for dairy cattle				
10	30-Oct	***Field Trip: Moore Feed Company and Genetic Development Center***		--	--	II
11	6-Nov	***Horse Ration Formulation.***	10	9	4 [7-8]	
		Learn to use Agri-data to formulate least-cost rations for horses				
12	13-Nov	***Pig Ration Formulation.***	11	10	--	
		Learn to use Agri-data to formulate least-cost rations for pigs				
13	20-Nov	***Thanksgiving Holiday - No laboratory classes***	--	--		
14	27-Nov	***Final Laboratory Quiz***	--	--	5 [1-10]	
15	4-Dec	***No Laboratory Activities***				III

†Number(s) in [] indicate homework problems that will be covered on quiz.

Americans with Disabilities Act (ADA) Policy Statement:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity and Honesty:

It is the *personal responsibility of each student to maintain the highest level of scholastic integrity* at the university by refusing to participate in or tolerate any form of scholastic dishonesty. Additional information may be obtained from the Student Handbook (website: http://www.tamu.edu/aggiehonor/philosophy.php). Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information, please visit: www.tamu.edu/aggiehonor/.

Plagiarism:

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

Aggie Honor Code:

"An aggie does not lie, cheat or steal or tolerate those who do."