ARNR 521 ADVANCED RUMINANT NUTRITION
FALL 2012

Class: 2:10 to 3:00, Monday and Wednesday, ABB 136
Lab Friday 2:10 to 4:00, ABB 136 and various locations

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Assigned Reading: Book chapters, journal articles, lab procedures, and other material will be assigned or provided. The reading assignments posted in this syllabus are not complete. Other reading assignments for both lecture and lab will be assigned when appropriate.

Lecture notes, reading assignments, and questions are online at desire2learn
*Must be registered for ARNR 521 and have a MSU student (not employee) acct.
*Problems with passwords and login?   http://password.montana.edu/
*Still having problems? Call ITC 994-5050
*Burns Tech center (994-6550) or email ecat@montana.edu
*We cannot help you with your student acct or login or password
*All posted readings, texts, and lecture material will be in pdf form

**Goals: ***Introduce students to the scientific principles of ruminant nutrition.
      *Develop an advanced understanding and knowledge of ruminant nutrition
      *Gain hands-on experience with ruminant research techniques and lab procedures.
      *Develop skills in conducting, analyzing, and writing a scientific paper.

Note: ARNR 521 is a graduate-level course in the department of Animal and Range Sciences. Students are assumed to have the academic skills or course background to be successful. If this is not the case, let us know ASAP and we can help you identify reading material that will provide the basis for this class.

Students are expected to come prepared for each class and lab. When a reading assignment is given (in class or lab) expect a short quiz at the beginning of the next class or lab over the assigned reading. If you are late to class you will not be allowed to take the quiz and your grade will be recorded as a 0.

Lectures: Scheduled lecture sessions will be a mix of discussion, question and answer, and traditional lecture

Lab: Labs are designed to help students learn and apply procedures used to expand knowledge of ruminant nutrition. Labs are hands-on with instructional guidance. Although the labs will help you begin assignments, do not expect that you can always finish all of your required elements during the lab period. During the semester you will be responsible for sheep in a digestion trial. Student responsibilities for animal care and data collection will require working outside the scheduled lab times including evenings, early mornings, and weekends. The paper that you write will be formatted as a WSASAS proceedings. Papers must follow JAS style and form (http://jas.fass.org/misc/ifora.shtml). Students must also have access to SAS to complete the project. A more detailed guideline will be provided.

Grades (estimated points) :

Lecture
Lecture quizzes @ 5 to10 pts each
Homework assignments @ 5 to 10 pts each
3 Exams (lecture and lab material) includes reading assignments @ 100pts
Lab
Homework assignment/quizzes/attendance@ 5 to10pts each
Study = participation grade
WSASAS paper first draft = 75 pts, final draft = 50 pts

A = 100 to 90%, B = 89 to 80%, C = 79 to 70, D = 69 to 60%

Missed assignments

Makeup quizzes and assignments will only be allowed if the student is absent because of their research, illness, or personal or family emergency. To be allowed to make up a quiz or assignment, you must notify the instructor **prior** to your absence via email (in case of emergency, you may call their office number any time and leave a voice mail message). Makeup quizzes must be completed within five school days of the missed quiz. It is the student's responsibility to contact the instructor to schedule a make up assignment. There are no make up labs. Although we will allow make up quizzes because of research, if we deem that you are missing too much of the course, we reserve the option of not allowing make up assignments and/or suggesting that you reschedule the course when your research schedule allows more time to focus on course work.

521 TENTATIVE LECTURE SCHEDULE

Inst.	Date	Day	Lecture	Reading (NOTE: Not all reading assignments are listed. Syllabus will be updated and readings provided as the semester progresses.
PH	Aug 27	Mon	Intro to Course	
PH	Aug 29	Wed	Intro to ruminant nutr	Van Soest chpt 1 and 2
PH	Sept 3	Mon		
PH	Sept 5	Wed	Anatomy and function	Hofmann chpt
PH	Sept 10	Mon		
PH	Sept 12	Wed	Ruminant forestomach	Van Soest chpt 15
PH	Sept 17	Mon	Ruminant lower GI tract	
PH	Sept 19	Wed	Plant cell wall	Van Soest Chpt 17
CY	Sept 24	Mon	Carbohydrates	Readings will be assigned provided on D2L
CY	Sept 26	Wed	Carbohydrates	
PH	Oct 1	Mon	**1st exam**	
PH	Oct 3	Wed	1st exam review	
PH	Oct 8	Mon	Lignin	Van Soest chpt 11 and articles
PH	Oct 10	Wed	Lignin	
CY	Oct 15	Mon	Rumen microbiology (Intro)	
CY	Oct 17	Wed	Rumen microbiology	
CY	Oct 22	Mon	Rumen microbiology	
CY	Oct 24	Wed	Rumen microbiology	Readings will be assigned and provided on D2L
CY	Oct 29	Mon	Protein	
CY	Oct 31	Wed	Protein	
CY	Nov5	Mon	Lipids	
CY	Nov 7	Wed	**2nd exam**	
	Nov 12	Mon	**VETERANS DAY**	
CY	Nov14	Wed	2nd exam review	
PH	Nov 19	Mon	Digestibility	Van Soest chpt 22 and articles
PH	Nov 21	Wed	Digestibility	
PH	Nov 26	Mon	Thanks giving holiday begins	
PH	Nov 28	Wed	Intake	Van Soest chpt 21and articles
PH	Dec 3	Mon	Intake	
PH	Dec 5	Wed	Acidosis, bloat and Nitrates	
PH	Dec 14	Fri	**3rd exam 8 to 10**	

ARNR 521 TENTATIVE SCHEDULE LAB SCHEDULE Reading assignments when applicable will be handed out on in class or available on line. Expect a quiz at the beginning of lab on the reading assignment or homework assignment given for a particular lab

This project will be presented at the 2013 Nutr conference with all students as authors. We will ask for a volunteer to make the poster and present. If more than one is interested we will have a drawing. This paper will also be submitted as a WS and presented at the 2013 meetings held in Bozeman. The manuscript will also be submitted for publication in a peer reviewed journal with all students as authors

Date	Day	Lab	Reading
Aug 31	Fri	Project and paper overview. Rumen sample collections. Grind feed, Start lambs on treatment diets. Set up student schedule for animal care and data collection	
Sept 7	Fri	Place lambs in metabolism crates with fecal bags. Start adaptation Intro to intake records, fecal bags, sample preservation and data collection	To be assigned
Sept 14	Fri	Digestive anatomy Sorenson in second floor lab Begin study	To be assigned
Sept 21	Fri	End study Collect rumen fluid samples for micro work Weigh animal, sample fecal out/animal, feed refusals, feed records, clean up facility and equipment Get samples in cooler and into drier on Wednesday	
Sept 28	Fri	Sample processing and management	
Oct 5	Fri	Intro to Nutrition lab and basic lab procedure review Process samples	Lab manual
Oct 12	Fri	Intro to micro lab and basic lab procedures Start micro work Develop spread sheet of intake, fecal output, and digestion data	
Oct 19	Fri	Run DNA extraction and 16S PCR analysis	
Oct 26	Fri	Confinement study data analysis @computer lab Statistical analysis including micro (in lab) Table construction Western section paper format	Western section completion evaluation Example paper JAS style and form
Nov 2	Fri	Students hand in SAS output Outline study specific content of paper in class Review tables	
Nov 9	Fri	"Free" ungraded review in lab. All students must show a draft of their paper First draft of paper due by noon via email Tuesday Nov 13	
Nov 16	Fri	Hand back first draft – review	
Nov 23	Fri	Thanks giving No class	
Nov 30	Fri	Wool growers convention no lab, but final WS papers submitted via email	
Dec7	Fri	Papers returned and review	