Animal Science 101
Principles of Animal Science
SPRING 2009

Instructor: Wes Schager
Email: wschager@csuchico.edu
Office: Plumas 203A
Phone: 898-6250

Class Schedule: TR 9:30-10:20 – Lecture
Lab Schedule: Section 2: T 11:15 – 1:50
3: T 2:15 – 4:50
4: R 11:15 – 1:50
Room: PLMS 205 (lecture only)
Location: FARM 003 (Unless alternate location announced.) See attached directions to University Farm.

Office Hours: Tues./Thurs. 8:00 – 9:30 am or by appointment.


Laboratory Manual: Lab handouts will be posted on Vista prior to lab. **Students are expected to download and bring lab handouts to each lab.**

Course content: An overview of principles of Animal Science and the interrelationships of domestic animals and mankind. The course introduces some basic biology of animals including cell function, genetics, anatomy and physiology, reproduction, nutrition, animal health and disease, animal products, and animal behavior. The laboratory component will provide hands-on animal experiences to complement the lecture.

Statement of Student Learning Objectives/Outcomes (SLO’s)

Area B2 Goals (*from EM 99-05)*:
1. Students must demonstrate an introductory understanding of fundamental concepts of life science as illustrated in plants and animals, or the course must emphasize these concepts in a study of some specific part of the life sciences. Examples are:
   a. students will be able to describe the basic cell function
   b. students will be able to describe basic cell division
   c. students will be able to understand basic genetic theory
   d. students will be able to understand basic concepts in gene expression
2. Students must have a laboratory component or similar activity in the life science and inquire into the life forms of the universe.
   Students will demonstrate understanding and appreciation of the methodologies of the natural science as investigative tools and the limitation of scientific inquiry.
   a. students will be able to demonstrate basic techniques in biotechnology
   b. students will be able to demonstrate basic techniques in hematology
   c. students will be able to demonstrate basic microbiological techniques
d. students will be able to demonstrate basic techniques in small animal restraint  
e. students will be able to demonstrate basic data collection procedures  
f. students will be able to demonstrate basic skill in live and post-mortem animal evaluation  
g. students will meet (at minimum) the GE writing requirements

**Grading**

Quizzes (50 pts each: 7 will be taken: no make-ups) 350  
- Quizzes will be given during lab  
- Quizzes will cover two weeks of material/including lab material and reading  
Laboratory exercises (completed during each lab session) 140  
Research Project Work  
(Preliminary writing assignments, paper, participation) 150  
Attendance (Quizzes; Homework Assn.) 100  
No Comprehensive Final – last quiz given at scheduled final

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<tr>
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<th>A ≥ 93%</th>
<th>B ≥ 83%</th>
<th>C ≥ 73%</th>
<th>D ≥ 60%</th>
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<tr>
<td>A-</td>
<td>≥ 90%</td>
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<td>F &lt; 60%</td>
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<td>B+</td>
<td>≥ 87%</td>
<td>≥ 77%</td>
<td>D+ ≥ 67%</td>
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Remember—students earn grades, teachers merely assign them, do your best at all times.

**Ground Rules**

**Students must complete reading assignments before lecture.**

Quizzes will be given at the beginning of each lab session and will cover the previous two week’s lecture and laboratory information. Punctuality is important to ensure that each student has the maximum amount of time to complete the quiz. Makeup-quizzes will be at the discretion of the Professor, and under most circumstances will not be granted.

If there is evidence that you have been involved in any form of academic dishonesty, you will receive an “F” grade for the course, and a report will be provided to Student Judicial Affairs for further action.

If a student feels an error in grading has been made, the student has one week from the time of the assignment is returned to them (or the grade is posted on the web, whichever is later) to request a review of the grade. The request must be in writing – attached to the original assignment—and must include a specific statement as to what is in error, how it
should be corrected, and what supporting evidence is available.

# Expected Student Behavior in the Classroom

- **Students are expected to turn off all pagers, cell phones and other electronic devices during class time** (taking notes directly into a laptop computer is acceptable). Use of a cell phone will be grounds for dismissal from class for the remainder of the day with no make up work allowed.
- Students are expected to pay attention and participate in class meetings.
- Students may not read other materials (newspapers, magazines) during class.
- Students are to remain in class during the entire session with the exception of breaks. Students are not allowed to come and go during the class session.
- All class participants are expected to exhibit respectful behavior to other students and the instructor.
- All students have the right and privilege to learn in the class, free from harassment and disruption.
- Inappropriate or disruptive behavior will not be tolerated, nor will lewd or foul language.
- The class follows the standards set in the *Code of Students Rights and Responsibilities (EM 96-38)* and students are subject to disciplinary action for violation of that code.
- Be respectful and considerate of other students
- Be respectful and considerate of the instructors
- Be respectful and considerate of the animals
Paper Assignment: Due April 30th, 2009
*Due dates are subject to change

Purpose: The purpose of this assignment is to familiarize students with experimental methodology and critical thinking. Students will learn to write in a scientific format where all statements must be validated by fact. Writing style, grammar, and sentence structure will be an important component of this assignment.

Method: A hypothesis will be provided to the class for discussion. From this hypothesis, students will develop an experimental design to test the hypothesis in the absence of environmental or genetic variables that may alter or bias the data. Over the course of several weeks students will participate in every aspect of the experiment, including: 1) implementation of experimental protocol; 2) collection of research data; 3) summary, analysis and interpretation of research data; 4) development of a scientific paper in journal format.

Research Paper Format:

I. Introduction: Introduce the problem. This is the literature review section where the subject matter is introduced and some general background information is provided. The introduction will require the use of library resources to locate related research papers that discuss similar subject matter. Students will summarize a minimum of four outside studies (preferably journal/peer reviewed) as they relate to the class project. The objective of the study is clearly stated at the end of the introduction.

II. Methods: Explain how the trial was conducted to meet the needs of the objectives. Include dates, feed, housing, breeds, age, sex, experimental design, treatments, anything related to the setup and execution of the study.

III. Results: Report the data in a manner that is easy to understand. Graphs, charts or table formats are required.

IV. Discussion: Discuss the data as it relates to the hypothesis, i.e., do results from this study prove or disprove your hypothesis? Were the methods adequate to test the hypothesis? How does your data compare to the literature described in the introduction?

** Results and discussion may be combined into a single section. If not, the results section should not contain discussion of previously published work (from your library research). Results and references to tables and figures already described in the results section should not be repeated in the discussion section.

V. References: Site your references in the format used in the Journal of Animal Science

VI. Learner Outcomes: Describe in some detail what you have learned from this exercise, i.e., were you aware of the precision required for scientific discovery or did you learn to look more critically at information reported as “new scientific findings”? 
Final Paper Grading will be as follows:

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<th>Points:</th>
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<tbody>
<tr>
<td>1. Presentation: Organization/neatness/grammar</td>
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<tr>
<td>2. Introduction:</td>
</tr>
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<td>3. Materials &amp; Methods:</td>
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<td>4. Results &amp; Discussion:</td>
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<td>5. Literature cited: At least 4 solid references in journal format.</td>
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<td>6. Learner Outcomes: What did you learn from this exercise?</td>
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Total: 100 pts.

Schedule of Events (tentative):

1. Project begins: week of 2/24
2. Library research Lab: collect literature in lab week of 3/10
3. Rough drafts of sections due: TBA
4. Data collection complete: in lab week of 4/16
5. Final paper due: Thursday 4/30 by 5 pm.

What you should take from this exercise:

i. An appreciation for scientific research. As a class, we conduct a very simple study that quickly becomes complicated by outside variables which need to be controlled, mitigated or evenly distributed among all subjects.

ii. Learn scientific method and terms/definitions

iii. Learn how to use library databases

iv. Discover the body of knowledge available in the peer reviewed literature.

v. Learn the difference between good research and bad research

vi. Critically evaluate statements made in print – are they justified in making specific statements.

vii. Synthesize information from multiple sources and discuss their similarities or differences as it relates to our hypothesis.
## Lecture and Assigned Reading Schedule

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<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
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<tr>
<td></td>
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<td><strong>LAB:</strong> <a href="#">Introduction to the Livestock Units and the University Farm</a>: Lab safety procedures. Students will become familiar with terminology and tour production units on the University Farm to achieve an overall perspective of facilities and animal production practices.</td>
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<td><strong>LAB:</strong> <a href="#">Animal Products</a>: Students will become familiar with products that are produced by animals for human use. Students will also become familiar with measures to ensure product safety including HACCP.</td>
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<tr>
<td>3</td>
<td>2/10-2/12</td>
<td><strong>Basic Cell Physiology: WebCT for reading assignment.</strong> Basic features of cell structure and function. Differences between prokaryotic and eukaryotic cells. Structural comparisons between mammalian and plant cells.</td>
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<td><strong>LAB:</strong> <a href="#">Cell Components/Hematology</a>: Students will use this laboratory to reinforce theory of the cell cycle. Cells will be collected from the blood sampling of sheep. Blood samples will be analyzed for white blood cell count, packed cell volume and for total protein. <a href="#">Quiz 1: COVERS WEEKS 1 &amp; 2</a></td>
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<tr>
<td>4</td>
<td>2/17-2/19</td>
<td><strong>Fundamentals Principles of Genetics: Chapter 8 pages 136-144:</strong> Chromosomes, cell division, mitosis and meiosis. DNA structure and function.</td>
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<td><strong>LAB:</strong> <a href="#">Biotechnology/DNA Extraction</a> Students will become familiar with the use of DNA technology in animal agriculture. DNA will be extracted from blood cells and quantified. <strong>LAB will be held on campus in Plumas hall – Room TBA.</strong></td>
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<td>5</td>
<td>2/24-2/26</td>
<td><strong>Fundamentals Principles of Genetics: Chapter 8 pages 144 – 154:</strong> Genetic code and control of gene function. Segregation and recombination of genes. Phenotypic expression of genes. Dominance, recessiveness, lack of dominance, partial dominance, overdominance, epistasis, sex-linked inheritance, sex-influenced inheritance, sex-limited traits. Basic problem sets will be assigned.</td>
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<td><strong>LAB:</strong> <a href="#">Scientific Methods/ Research Project</a>: Students will learn about the scientific method and begin student research project: Weigh and collect data on experimental animals: Week 1 of research project. <a href="#">Quiz 2: COVERS WEEKS 3 &amp; 4</a></td>
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<tr>
<td>6</td>
<td>3/3-3/5</td>
<td><strong>Biotechnology and Genetic Engineering: Chapter 10 pages 196 – 210</strong> Biotechnology, genetic engineering, transgenesis and recombinant DNA technology. Applications to agriculture.</td>
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<td><strong>LAB:</strong> <a href="#">Biotechnology/DNA Fingerprinting</a> Students will use restriction enzymes to fingerprint DNA. DNA will be separated by gel electrophoresis and stained for analysis. Week 2 of research project. <strong>LAB will be held on campus in Plumas hall – Room TBA.</strong></td>
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Animal Nutrition The six major classes of nutrients will be covered (water, carbohydrate, fat, protein, vitamins, minerals) and how they are important to animals. Discuss the importance of a balanced diet. Different digestive tracts of species covered.

LAB: Library Database Search/Paper Writing Laboratory: **This lab will be held on campus in Tehama 131. Lab will start on the hour. (Not 15 min after).

a. Students learn to search library databases for scientific information. Further discuss paper expectations. Demonstrate the use of Excel for data analysis. Week 3 of research project. Make preliminary paper assignment. Quiz 3: COVERS WEEKS 5 & 6 will be given in LECTURE Tuesday, March 10th.

SPRING BREAK

Principles of Selecting and Mating Domestic Animals: Chapter 9 pages 159-181. Hitting the highlights of animal breeding. Selection of superior breeding stock. Predicting the amount of progress possible through selection. Mating systems for livestock improvement.

a. LAB: Animal Selection: Students will apply information regarding phenotypic and genotypic selection to groups of domesticated livestock selected for specific production traits: Weigh and collect data on experimental animals: Week 4 of research project.


a. NO LAB TUES OR THURS due to Cesar Chavez holiday being observed on Tuesday, Mar. 31st.


a. LAB: Reproductive physiology of the male. Testicular dissections, breeding soundness examinations and semen evaluation. Week 5 of research project.

Anatomy and Physiology of Domestic Animals: Reading assignment on WebCT. The circulatory system. The respiratory system. The urinary system.

a. LAB: Reproductive physiology of the female: Students will compare reproductive tracts from several species and participate in the process of artificial insemination of a domestic species. Pregnancy evaluation will also be conducted using ultrasound technology. Week 6 of research project. Quiz 5: COVERS WEEKS 10 & 11

Anatomy and Physiology of Domestic Animals: Reading assignment on WebCT. The digestive system. The muscular-skeletal system.

a. LAB: Growth Laboratory: Students will evaluate chick embryos for prenatal growth and development. To study postnatal growth, students will use their growth project. Week 7 and final week of research project.

Ethology and Animal Behavior: Chapter 13 pages 251-272. Areas of study in animal behavior. Communication, aggression, social structure, sexual behavior, maternal behavior, etc.
Students will learn the difference between innate and learned behavior. Livestock behavior as it relates to handling and animal welfare.

a. **LAB**: Anatomy & Physiology: Students will evaluate circulatory and respiratory tissue of various livestock species. Heart and lung tissue will be examined.

15 5/5-5/7  **Animal Disease and the Health of Humans: Chapter 14 pages 275-284**. Disease and health, types of diseases and pathology. The resistance of animals and people to pathogens.

   a. **LAB**: Animal health: Discussion will focus on disease, disease organisms, symptoms, transmission and treatment. Students will learn the process of temperature, pulse and respiration (TPR). Students will perform basic bacteriology techniques on a milk sample collected from a normal healthy cow and one from a cow suffering from mastitis to determine the identity of the infective organism. In addition, students will perform an antibiotic sensitivity test. **Quiz 6: COVERS WEEKS 12, 13 & 14**


   a. **LAB**: Health and Disease 2 and semester recap: Bacteriology plates from last week will be read and interpreted. Semester recap and evaluation.

17 5/19 - Tuesday at 12:00 – 1:50 pm  **Final – Quiz 7: COVERS WEEKS 15 & 16**

**General Lab Instructions:**

- Students are expected to observe all normal safety precautions as outlined by the instructor. All students are expected to participate in "hands-on" activities with the animals.
- Students will be provided with laboratory exercises that will be completed and scored during each lab session.
- Students will be responsible for the collection weekly weight recordings from their assigned animals and are expected to participate in the feeding and care for the animals as assigned.
Where is the FARM 003 classroom at the University Farm?

- Once you get to the University Farm’s main entrance, go south on the main road and turn right on the first paved road to the west (by the Dairy Unit). *If you drove over the speed bumps, you missed the road…*

- Drive past the large yellow pavilion (which you will see on the left) and turn left at the first paved road.

- The FARM classrooms are next to the yellow pavilion, turn in and park in the large gravel parking lot. Find our classroom, FARM 003.

- There are several restrooms adjacent to our classroom and the pavilion.

- Speaking of parking, try to carpool if you can to save on fuel. Many of you will need your own vehicle to get back to campus for classes but do what you can to carpool. It’s a great way to meet your classmates and develop study groups.

- Play close attention to the weather forecast: we will be working outside so it will either be really hot (fall semester) or really wet and cold (spring semester). Wear appropriate attire, what I call “grubbies”, clothes you don’t mind getting wet, dirty or muddy. Bring sunscreen or a raincoat, whichever is more appropriate for your semester.

- Bring drinking water since there is not a drinking fountain nearby and consider bringing your lunch or a snack. There is no food or drink allowed in the FARM classrooms but you are welcome to eat outside in the parking area.

**Labs start at :15 past the hour** so don’t get a speeding ticket trying to get to the University Farm. Watch out for trains. DO NOT try to beat the train or drive around the railroad arms, your life is too precious to risk it. Besides, the CA Highway Patrol and Butte County Sheriff patrol these back roads a lot so watch out because they’re watching for you.

> **Remember the University Farm is a working farm with slow-moving heavy equipment, livestock, and many other lab activities so be alert, watch your speed, and drive safely at all times.**
Expectations for a Learning Community

Expectations of Faculty
Faculty are role models for the behavior and accomplishments of students. They inspire in students an excitement about learning through a high level of professionalism and commitment to their discipline.

Rigorous faculty
- demonstrate high expectations of the course through a demanding syllabus, well-prepared classes, staying current through research and professional activities;
- offer conscientious advising and predictable availability;
- fully involve students in the learning experience by providing prompt, frequent feedback and developing rigorous testing methods;
- develop approaches and strategies geared to diverse talents and ways of learning, while maintaining high standards of accountability;
- seek to eliminate opportunities to engage in academic dishonesty;
- actively contribute to their disciplines.

Expectations of Students
An effective education is vigorous, demanding, deeply satisfying and requires behavior conducive to achieving excellence. College is a fundamental asset in building a student’s character, citizenship, and employment future.

Rigorous students
- set high personal standards, develop a strong sense of purpose, come to class well-prepared, and complete assignments on time;
- make the most of faculty advising and mentoring;
- treat fellow students and the classroom environment with complete respect; give each class full attention and participation; do not miss class, arrive late, or leave early;
- accept responsibility for learning and grades earned;
- approach each class in a professional manner;
- recognize that a full-course load is equivalent to full time work and spend no less time on it;
- demonstrate complete honesty and integrity.

Expectations of the University
University policies, procedures and programs are intrinsic to the ability of students and faculty to operate in an atmosphere that is conducive to learning and high standards. It is the responsibility of campus administration to ensure that instruction takes place in an environment that promotes, honors, and supports academic rigor.

A rigorous university
- provides the atmosphere, the means, and the time for faculty to sustain efforts for creative work, consulting, grant-getting, scholarship and publications;
- expects that faculty continuously uphold their expertise via a full range of professional and creative output;
- sets minimum qualifications for training and supervision of anyone who instructs students in a classroom setting;
- enforces academic policies consistently;
- maintains and rewards a highly qualified, professional support staff
- provides sufficient high quality equipment and technological infrastructure;
- provides adequate library hours, services, and access to materials;
- provides adequate study space for students;
- provides informal gathering places where students and faculty can interact.