

# Animal Anatomy & Physiology

## COURSE OUTLINE

**1. Course Title: Animal Anatomy & Physiology**

**2. CBEDS Title: Animal Anatomy & Physiology**

**3. CBEDS Number: 4020**

**4. Job Titles:**

Livestock Handler, Milker,  
Inseminator, Auctioneer, Vet  
Aide, Pet Care, Ranch Laborer,  
Brand Inspector, Farm Hand,  
Pest Control  
Veterinary Technician

**5. Course Description:**

*This course will provide the student with principles in Animal Sciences along with Anatomy and Physiology focusing on the areas of mammalian production, anatomy, physiology, reproduction, nutrition, respiration, and genetics. This course is intended to successful prepare students for entry level employment after high school, as well as those students who plan on majoring in Agricultural Sciences at a post secondary institution.*

**Student Outcomes and Objectives:**

**Students will:**

1. Assemble and use laboratory apparatus, tools and materials in a skillful manner, giving attention to accident prevention and safety.
2. Gather the qualitative and quantitative information needed for developing and testing inferences and hypotheses by making purposeful, objective observations of things and events.
3. Describe basic animal science, including domestication, animal behavior, genetics, nutrition and animal health.
4. Describe the make up of the body and its functions.
5. Apply the knowledge of heredity and genetics to mammalian production.
6. Describe evolution and natural selection and how it relates to production agriculture.
7. Record observations accurately and organize data and ideas in ways that enhance their usefulness.
8. Communicate with others (oral and written) in a manner that is consistent with the knowledge of scientific conventions, and facilitates the learning of the listeners or readers.
9. Use the metric system effectively in measuring and quantifying substances.
10. Identify career opportunities and requirements for successful employment.

*Integrated throughout the course are career preparation standards, which include basic academic skills, communication, interpersonal skills, problem solving, workplace safety, technology, and employment literacy.*

## Pathway

Recommended Sequence	Courses
<b>Introductory</b>	Agriculture Science Basic Core
<b>Skill Building</b>	<b>Animal Anatomy &amp; Physiology</b> or Ornamental Horticulture or Floriculture
<b>Advanced Skill</b>	Supervised Agricultural Experience Project

**6. Hours:** *Students receive up to 180 hours of classroom instruction*

**7. Prerequisites:** Agriculture Science Basic Core.

**8. Date (of creation/revision):** July 2011

## 9. Course Outline

<b>COURSE OUTLINE</b>				
Upon successful completion of this course, students will be able to demonstrate the following skills necessary for entry-level employment.				
<b>Instructional Units and Competencies</b>	<b>Course Hours</b>	<b>Model Curr. Standards</b>	<b>CA Academic Content Standards</b>	<b>CAHSEE</b>
<p><b>I. CAREER PREPARATION</b></p> <p><b>A. Career Planning and Management.</b></p> <ol style="list-style-type: none"> <li>1. Know the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers.               <ol style="list-style-type: none"> <li>a. Students will identify skills needed for job success</li> <li>b. Students will identify the education and experience required for moving along a career ladder.</li> </ol> </li> <li>2. Understand the scope of career opportunities and know the requirements for education, training, and licensure.               <ol style="list-style-type: none"> <li>a. Students will describe how to find a job.</li> <li>b. Students will select two jobs in the field and map out a timeline for completing education and/or licensing requirements.</li> </ol> </li> <li>3. Know the main strategies for self-promotion in the hiring process, such as completing job applications, resume writing, interviewing skills, and preparing a portfolio.               <ol style="list-style-type: none"> <li>a. Students will write and use word processing software to create a resume, cover letters, thank you letters, and job applications.</li> <li>b. Students will participate in mock job interviews.</li> </ol> </li> <li>4. <i>Develop a career plan that is designed to reflect career interests, pathways, and postsecondary options.</i> <ol style="list-style-type: none"> <li>a. <i>Students will conduct a self—assessment and explain how professional qualifications affect career choices.</i></li> </ol> </li> <li>5. <i>Understand the role and function of professional organizations, industry associations, and organized labor in a productive society.</i> <ol style="list-style-type: none"> <li>a. <i>Contact two professional organization and identify the steps to become a member.</i></li> </ol> </li> <li>6. <i>Understand the past, present and future trends that affect careers, such as technological developments and societal trends, and the resulting need for lifelong learning.</i> <ol style="list-style-type: none"> <li>a. <i>Students will describe careers in the agriculture industry sector.</i></li> <li>b. <i>Students will identify work-related cultural differences to prepare for a global workplace.</i></li> </ol> </li> </ol> <p><b>B. Technology.</b></p> <ol style="list-style-type: none"> <li>1. Understand past, present and future technological advances as they relate to a chosen pathway and on selected segments of the economy.</li> <li>2. Understand the use of technological resources to gain access to, manipulate, and produce information, products and services.</li> <li>3. Use appropriate technology in the chosen career pathway.</li> </ol> <p><b>C. Problem solving and Critical Thinking.</b></p> <ol style="list-style-type: none"> <li>1. Understand the systematic problem-solving models that incorporate input, process, outcome and feedback components, and apply appropriate problem-solving strategies and critical thinking to work-related issues and tasks.</li> </ol>	<p>10</p> <p>Additional hours are integrated throughout the course.</p>	<p>Transportation Industry Sector, Model Curriculum Standards</p> <p>3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0</p>	<p><u>Language Arts</u> (8) R 1.3, 2.6 W1.3, 2.5. LC 1.4,1.5 1.6 LS1.2, 1.3, (9/10) R2.1,2.3,2 W2.5 LC1.4 LS 1.1, 2.3 (11/12) R2.3 W2.5 LC1.2 <u>Math</u> (7) NS1.2, 1.7 MR 1.1,1.3 2.7,2.8, 3.1</p>	<p>Lang. Arts R 8.2.1  (9/10) R 2.1, 2.3 W2.5  Math (7) NS 1.2, 1.3, 1.7 MR 1.1, 2.1, 3.1</p>

<p>2. Use and apply critical thinking and decision making skills to make informed decisions, solve problems, and achieve balance in the multiple roles of personal, home, work and community life.</p> <p>D. Health and Safety.</p> <ol style="list-style-type: none"> <li>1. Know policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.</li> <li>2. Understand critical elements of health and safety practices related to a variety of business environments.</li> </ol> <p>E. Responsibility &amp; Flexibility.</p> <ol style="list-style-type: none"> <li>1. Understand the qualities and behaviors that constitute a positive and professional work demeanor.</li> <li>2. Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles and how individual actions can affect the larger community.</li> <li>3. Understand the need to adapt to varied roles and responsibilities.</li> </ol> <p>F. Ethics and Legal Responsibilities</p> <ol style="list-style-type: none"> <li>1. Know the major local, district, state, and federal regulatory agencies and entities that affect the industry and how they enforce laws and regulations.</li> <li>2. Understand the concept and application of ethical and legal behavior consistent with workplace standards. <ol style="list-style-type: none"> <li>a. <i>Contact a business and obtain a copy of their rules for employment.</i></li> <li>b. <i>Role play difference ethical scenarios.</i></li> </ol> </li> <li>3. Understand the role of personal integrity and ethical behavior in the workplace.</li> </ol> <p>G. Leadership and Teamwork.</p> <ol style="list-style-type: none"> <li>1. Understand the characteristics and benefits of teamwork, leadership, citizenship in the school, community, and workplace settings for effective performance and attainment of goals.</li> <li>2. Understand the ways in which professional associations, such as FFA, and competitive career development activities enhance academic skills, career choices, and contribute to promote employability.</li> <li>3. Know multiple approaches to personal conflict resolution and understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others.</li> </ol>				
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Instructional Units and Competencies	Hours	Model Curr. Standards.	CA Academic Standards	CAHSEE
1. Economic Impact a. Content and methodology b. Demographics c. Social economic balance d. Plant and animal balance e. Human health and nutrition	10	Agriculture & Natural Resources Industry Sector Animal Science Pathway	H/SC. 12; Econ.; 12.2.1 & 12.2.2 ELA. 9-10; R. 2.3, 2.8 ELA. 11-12; W; 1.7, 1.8 S. 9-12; Biology; 1, 2, 4, 8 9a,f & I, 10	<b>(10)WA1.1</b> <b>(10)R2.5, 2.7, 2.8</b> <b>(10)WS 1.1,1.2,1.3,1.6</b>
2. Domestic Animals and Production a. Animal domestication b. Animal protein c. Growth hormones d. Animal production	20	D1.0, 1.1 1.2, 1.3, 1.4 D2.0, 2.2, 2.4 D4.0, 4.1, 4.2, 4.4 D5.0, 5.4, 5.5 D6.0, 6.1, 6.2 Animal Science Pathway C4.0		<b>(6)P2.5, P3.5</b> <b>(7)AF1.5</b>
3. Animal Behavior and Biology a. Species b. Nomenclature c. Animal behavior d. Dam/offspring interaction e. External anatomy f. Conception/gestation g. Parturition h. Cell structure and function i. Plant & animal cells j. Hormones and meat production k. Natural selection	30			
4. Animal Phenotypic Selection and Evaluation a. External anatomy b. Skeletal identification and position c. Muscle volume d. Fat deposition e. Productivity and performance	15			
5. Animal Breeding and Genetics a. Process of mitosis and meiosis b. Cell theory of inheritance c. Heritability percentage of traits d. Fertilization e. Genotype and phenotype f. Dominant and recessive genes g. Mutation h. Artificial insemination i. Embryo transplants	20			
6. Animal Nutrition and Feeds a. Classes of nutrients and requirements b. Animal nutrient requirements c. Feed composition d. Carbohydrates and fats e. Analysis of macro and micro minerals and vitamins f. Feed additives g. Nutrient deficiencies h. Balancing rations and feed practices i. Feed preparation	20			

7.	Animal Health a. Animal health: whose responsibility is it? b. Animal health evaluation c. Veterinary medicine glossary d. Normal temperature, pulse and respiration e. Factors affecting animal health	20			
	f. Vaccination and administration of biologic agents g. Development and types of immunity				
8.	Livestock Pests a. Common internal parasite lifecycles b. Common external parasite lifecycles	10			
9.	Livestock Tools, Equipment, and Restraint a. Livestock tools and equipment b. Livestock restraint	2			
10.	Small Animal Production a. Types of small animals b. Small animal production and marketing	3			
11.	Common Integument and Its Derivation a. Epithelium, Mesothelium and Endothelium b. Skin and its function c. Mammary glands d. Physiology of lactation	3			
12.	The Nervous System a. The brain and its function b. The spinal cord c. The peripheral nervous system d. The autonomic system	33			
13.	Respiratory System and Respiration a. Structure of mammalian respiratory system b. Physiology of respiration c. Mechanics of breathing d. Plant respiration	3			
14.	Animal Research and Presentation a. Current animal research and investigation b. Data presentation c. Summarization and conclusion	2			
15.	Professional Opportunities in Animal Science a. Animal research fields b. Other related animal science fields	2			
16.	Agricultural Inter-Personal and Leadership Development a. Completion of a Supervised Agricultural Experience Program and Data Collection b. Development of listening, speaking, writing and reading skill activities c. Critical thinking and group team building activities d. Agriculture presentations	13			

10. Additional recommended/optional items
- a. Articulation: None
  - b. Academic credit: Science Elective Credit
  - c. Instructional strategies:
    - Methods of Instruction:
      - a. Lecture
      - b. Audio visual materials
      - c. Computer simulations
      - d. Group and individual activities
      - e. Laboratory investigations

- f. Discussion
  - g. Reading and writing assignments
  - h. Homework assignments
  - i. Written examinations
- d. Instructional materials: Text: Modern Biology (2004). Holt, Rinehart & Winston Publishers.  
Modern Livestock Production  
Scientific Farm Animal Production. Robert E. Taylor & Thomas Field, Prentice Hall.
- e. Certificates: None