Modesto Junior College
Course Outline of Record

ANAT 125

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

ANAT 125—HUMAN ANATOMY **4 UNITS**

36 Lecture Hours, 108 Lab Hours , 72 Outside-of-Class Hours = 216 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete BIO 116.*

Study of human body structures including organ, tissue and cellular interrelationships in health and disease. Involves extensive use of models, specimens, histological material, and dissection. Cadaver materials and demonstrations are used. This course is primarily intended for Nursing, Allied Health, Kinesiology, and other health related majors. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: BIOL 10; BIOL 60 + BIOL 10 = ANAT 125 + PHYSO 101) (C-ID: BIOL 110B)**General Education:** (MJC-GE: A) (CSU-GE: B2, B3) (IGETC: 5B, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

This course focuses on the structure of the human body in health and disease, at the cellular, tissue, organ, and system level. All topics are presented from a clinical perspective and incorporate discussions of normal and abnormal structure. Attention is directed to showing how abnormal anatomical structures are associated with certain diseases.

A. Introduction

1. Body planes
2. Body cavities
3. Anatomical positions and terminology
4. Levels of organization

B. Cells

1. Generalized cell
2. Plasma membrane
3. Cytoplasm
4. Organelles
5. Cell division

C. Tissues

1. Basic microscopy
2. Epithelial and connective tissues
3. Membranes
4. Muscle and nervous tissues
5. Embryonic tissues

D. Integumentary System

1. Skin
2. Hair follicles and glands

E. Skeletal System

1. Bones
2. Histology
3. Bone growth
4. Joints

F. Muscular System

1. Muscle
2. Histology
3. Muscle contraction
4. Action of muscles

G. Cardiovascular System

1. Overview
2. Heart
3. Blood vessels
4. Histology
5. Blood cells and platelets

H. Lymphatic system

1. Microcirculation
2. Lymphatic vessels and nodes

I. Nervous System

1. Overview
2. Histology
3. Spinal cord and nerves
4. Brain and nerves
5. Senses and central pathways
6. Autonomic nervous system

J. Endocrine System

1. Overview
2. Endocrine glands
3. Histology
4. Hormones

K. Respiratory System

1. Overview
2. Airways and lungs
3. Histology
4. Mechanics of breathing

L. Digestive System

1. Overview
2. GI and accessory organs
3. Histology

M. Urinary System

1. Overview
2. Kidney, ureter and bladder
3. Histology

N. Reproductive System

1. Overview
2. Reproductive organs
3. Histology

4. Menstruation
5. Embryologic development

O. Relation of abnormal anatomical structure to disease

1. Abnormal anatomical structure causes disease
2. Diseases cause abnormal anatomical structure

2. <u>Required Lab Content:</u>

The laboratories parallel the course content listed above and provide hands-on experience with cadaver and other dissected materials, models and histological slides. The laboratories provide unique opportunities to show and discuss normal and abnormal anatomy, and the relationship between abnormal anatomical strucutre and disease.

A. Introduction

1. Body planes
2. Body cavities
3. Anatomical positions and terminology
4. Levels of organization

B. Cells

1. Generalized cell
2. Plasma membrane
3. Cytoplasm and organelles
4. Cell division

C. Tissues

1. Basic microscopy
2. Epithelial and connectibe tissues
3. Membranes
4. Muscle and nervous tissues
5. Embryonic tissues

D. Integumentary System

1. Skin
2. Hair follicles and glands

E. Skeletal System
   1. Bones
   2. Histology
   3. Bone growth
   4. Joints

F. Muscular System
   1. Muscle
   2. Histology
   3. Muscle contraction
   4. Actions of muscles

G. Cardiovascular System
   1. Overview
   2. Heart
   3. Blood vessels
   4. Histology
   5. Blood cells and platelets

H. Lymphatic system
   1. Microcirculation
   2. Lymphatic vessels and nodes

I. Nervous System
   1. Overview
   2. Histology
   3. Spinal cord and nerves
   4. Brain and nerves
   5. Senses and central pathways
   6. Autonomic nervous system

J. Endocrine System
   1. Overview
   2. Endocrine glands

3. Histology
4. Hormones

K. Respiratory System

1. Overview
2. Airways and lungs
3. Histology
4. Mechanics of breathing

L. Digestive System

1. Overview
2. GI and accesso ry organs
3. Histology

M. Urinary System

1. Overview
2. Kidney, ureter, bladder
3. Histology

N. Reproductive System

1. Overview
2. Reproductive organs
3. Histology
4. Menstruation
5. Embryologic development

O. Diseases associated with abnormal anatomy

1. Abnormal anatomical structure causes disease
2. Diseases cause abnormal anatomical structure

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete BIO 116.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Name and describe major organ systems and their corresponding organs and explain the relationships between organs, tissues and cells.

B. Use the language of biology and anatomy as it relates to orientation and direction, planes and sections, cavities, and surface anatomy.

C. Use the language of biology and physiology as it relates to homeostatic mechanisms.

D. Describe general cell structure and explain the organization and anatomical inter-relationships of major membranous and non-membranous organelles.

E. Describe and explain general cell functions, including cellular communication, cellular movement, membrane transport, metabolism, and protein synthesis.

F. Describe and explain the role of DNA and gene expression in the function and action of cells.

G. Name and describe the major categories of tissues and explain the relationship between cells and tissues.

H. Use the scientific process in problem solving.

I. Use binocular compound and dissecting microscopes.

J. Make and label accurate drawings of items observed.

C. HOURS AND UNITS

4 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	108	2.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Demonstrations
3. Laboratory activities
4. Use of audio/visual material

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study weekly histological and/or specimen drawings for lab practicums.

B. Use drawings, study guide materials, and textbook to identify and rehearse anatomical features and structural interrelationships on a daily basis.

C. Study for weekly quizzes and bimonthly lecture exams and lab practicums in group work outside of class.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

1. In the laboratory and in exams, students are given anatomical specimens to compare and evaluate variations in anatomical structure.

Example: In the laboratory students are given a prosection of a cadaver arm and asked to distinguish the muscles that extend the pollex (thumb) from the muscles that abduct the thumb, and to explain why these muscles have different actions.

2. In the laboratory and in exams, students are given questions to explain how anatomical structure serves the functional purposes of the various organs.

Example: In an exam students are asked to identify layers of skin, identify the tissues found in these layers and explain the purpose of these tissues. In the laboratory practicum portion of an exam, microscopes are set up with pointers on specifc layers of skin. "Name the layer of skin at the tip of the pointer in the right eyepiece." "Name the tissue or tissues found in this layer of skin." In the scantron portion of the corresponding exam questions are asked such as, " Stratified squamous epithelia function to A) provide a strong barrier, B) protect the body from external contaminants, C) support blood vessels, D) A and B, E) All of the above.

3. In the laboratory and in exams, students discuss how anatomical structure relates to clinical problems that are based on anatomy.

Example: In an exam students are asked, "Explain how loss of vision in the right visual field of each eye could be related to a tumor of the pituitary gland."

4. In the laboratory and in exams, students predict the functional limitations of the body based on an analysis of structure.

Example: In the laboratory students are given several bones of the appendicular skeleton and asked to identify which joints allow flexion anteriorly and which joints allow flexion posteriorly.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Saladin (2013). *Human Anatomy* (4/e). Des Moines, Iowa McGraw Hill.
2. Manual: David Ward. Atlas of Anatomy for Allied Health. Blue door ISBN 9781599847184
3. Manual: Ward, David. Instructor generated lab manual for Human Anatomy, ANAT 125. Modesto Junior College duplicating

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Define the levels of structural organization that make up the human body.

b. Explain the structure and functions of the plasma membrane.

c. Describe the structure and functions of the cellular organelles.

d. Identify the distinguishing characteristics of the different types of tissue.

e. List the various layers of the skin and describe the epidermal derivatives.

f. Identify the bones of the skeleton and the major markings associated with each.

g. Describe the histological features of compact and spongy bone tissue.

h. Compare and contrast the structural and functional classification of joints.

i. Compare and contrast the histology and function of the three types of muscle tissue.

j. Identify the skeletal muscle in various regions of the body.

k. Identify the external and internal anatomy of the heart.

l. Describe the flow of blood through systemic and pulmonary circulations.

m. Compare and contrast arteries, arterioles, capillaries, venules and veins.

n. Describe the components of the lymphatic system and list their functions.

o. Identify the principal parts of the spinal cord and brain.

p. Identify the cranial nerves by name, number, function and location.

q. Locate and describe the receptors and structures associated with special senses.

r. Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system.

s. Describe the location, histology, and blood and nerve supplies of endocrine glands.

t. Identify the organs of the respiratory system.

u. Compare and contrast the functional histology of different regions of respiratory system.

v. Describe the histological structure of the gastrointestinal tract.

w. Identify the organs of the gastrointestinal tract and explain their functions.

x. Identify the organs of the urinary system.

y. Describe the external and internal gross and microanatomy of the kidney.

a`. Describe the location, structure, histology and function of the sexual organs.

aa. Describe the major stages of embryologic development.

ab. Name the principal regions of the body that are examined in surface anatomy.

ac. Compare and contrast normal versus abnormal and/or diseased anatomical structures.

ad. Identify and use anatomical concepts and vocabulary in a clinical setting.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Identify using slides and models the histology and structures of skin.

2. Learn to use the microscope, identify the parts and their functions.

3. Identify organelles on models and recognize stages of mitosis.

4. Compare and contrast various epithelial and connective tissue histology.

5. Identify the various bones and their bone markings of the entire skeletal system.

6. Identify location, origin, insertion and action of the major muscles of the body using models and the cadaver.

7. Locate major parts of the heart on models and on a pork heart dissection.

8. Locate and name major arteries and veins and their histological parts.

9. Identify the various components of blood and their functions.

10. Identify lymphatic system organs and structures.

11. Identify respiratory histology and major organs on models and the cadaver.

12. Name parts of the spinal cord, spinal nerves, brain, and cranial nerves on models and specimens.

13. Distinguish the differences between neurons and neuroglia and identify the parts of a general neuron.

14. Perform dissections of sheep brains and compare features to human brains.

15. Identify anatomy of eye and ear; draw histology of the eye and ear.

16. Identify on slides the pancreas, adrenal gland, thyroid gland and pituitary gland.

17. Describe the major structures of the digestive system on models and the cadaver.

18. Illustrate the histological structures of the digestive system using microscope and models.

19. Assess the differences in the structures of the male and female reproductive systems using models and cadavers.

20. Identify the histological and macroscopic structures of the urinary system.

21. Identify the major stages of embryologic development.

22. Compare and contrast normal versus abnormal and/or diseased anatomical structures.

23. Identify and use anatomical concepts and vocabulary in a clinical setting.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Feedback on student drawings in the laboratory of anatomical structures
2. Examinations with objective and written components
3. Lab practical examinations

B. SUMMATIVE EVALUATION

1. Comprehensive final examination with objective and written components

ANAT - 125: Human Anatomy

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe key structural features of different human cells and major types of tissues.
2. Identify and describe the anatomy of the systems of the human body.
3. Relate structure and function, at the cellular through system levels of organization, of human body systems.
4. Describe structural or anatomical changes that occur in disease, injury or aging of the human body systems.

Modesto Junior College
Course Outline of Record

ANAT 126

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANAT 126—PROBLEM SOLVING SKILLS FOR HUMAN ANATOMY **1 UNITS**

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in ANAT 125.*

Designed to supplement ANAT 125 with problem solving skills, nomenclature and additional support with models, specimens and cadavers. Field trips might be required. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction

1. Reinforcement of anatomical vocabulary

B. Cells

1. Cellular structure
2. Cellular function

C. Tissues

1. Reinforcement of histological identification and differentiation
2. Tissue function

D. Integumentary system

1. Structural components
2. Histological features
3. Pathologies

E. Skeletal system

1. Bone formation and development

2. Histology
3. Reinforcement of anatomical structures

F. Muscular system

1. Contraction
2. Differentiation of muscle type and histologies
3. Identification and action of select muscles

G. Cardiovasculature

1. Identifying blood components and function
2. Structure
3. Blood flow
4. Blood vessels and pathways
5. Lymphatic system
    a. Local microcirculation
    b. Lymphatic pathways

H. Nervous system

1. Functional organization
2. Nervous tissue
3. Atonomic nervous system

I. Endocrine system

1. Hypothalamic pituitary interactions
2. Major glands
3. Histological structures
4. Hormones

J. Respiratory system

1. Upper and lower respiratory anatomy
2. Histology of lung tissue
3. Ventilation

K. Digestive system

1. Digestion
2. Absorption
3. Histology

L. Urinary system

1. Filtration
2. System structure

M. Reproductive system

1. Differentiation of functions between male and female
2. Hormone regulation
3. Reproduction
4. Embriological development

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in ANAT 125.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Use a microscope.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0

Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)
Instructors of the course might conduct the course using the following method:

1. Lecture
2. Demonstration
3. Use of models
4. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Preparation for weekly quizzes

B. Weekly readings of textbook material

C. Applications of histology

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Identify the defining characteristics of human bones.

B. Compare and contrast agonist and antagonist muscles that flex the forearm.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Instructor handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Describe the structure and function of cells.

b. Describe the structure and function of tissues.

c. Describe the structure and function of organ systems.

d. Understand the clinical applications of anatomical structures.

e. Relate organ systems to normal and abnormal body function.

f. Identify and correctly describe histological specimens at low and high power on microscopes.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Exams
2. Feedback on student drawings

B. SUMMATIVE EVALUATION

1. Comprehensive final exam

ANAT - 126: Problem Solving Skills for Human Anatomy

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe and detail the major components of the tissues, organs, and organ systems as pertaining to ANAT 125.

Modesto Junior College
Course Outline of Record

ANSC 207

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

ANSC 207—EQUINE SCIENCE **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

A survey of the equine industry: selection, feeding, breeding, facilities, handling, and health management will be emphasized to ensure scientifically-based management decisions. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. History and development of the horse industry
   1. Evolution and domestication of the horse
   2. Historical and cultural uses
   3. Economic importance

B. Horse breeds and classes
   1. Origin and adaptation
   2. Classes
   3. Major uses

C. Equine selection
   1. Functional anatomy
   2. Selection
   3. Evaluation of unsoundness
   4. Vices

D. Breeding and reproduction
   1. Stallion management
   2. The mare
   3. Gestation

4. Foal management

E. Feeding and nutrition
   1. Digestion and utilization of feed
   2. Dental health
   3. Nutrient requirements
   4. Pasture management

F. Disease and parasites
   1. Common equine health problems
   2. Parasite control
   3. Health programs

G. Equine facilities and equipment
   1. Ranch layout
   2. Facilities
   3. Equipment and identification

H. Basic horsemanship
   1. Finances of keeping a horse
   2. Ground safety
   3. Basic horse handling
   4. Equine Behavior
      a. Normal vs Abnormal
      b. Special Circumstances

2. <u>Required Lab Content:</u>

A. Demonstration of grooming, handling and leading a horse
   1. Basic knot tying
   2. Identification of grooming equipment including use for each tool
   3. Demonstration of proper haltering and safe rope handling when leading

B. Demonstration of ground safety techniques for horses
   1. Catching and releasing horses

2. Proper and improper places to stand while holding a horse

C. Identification of various feed items

1. Grasses and legumes
2. Grain products
3. Vitamin & mineral suppliments
4. Speciality suppliments

D. Anatomy and Physiology

1. Skeletal identification
2. Muscular identification
3. Locomotion

3. Recommended Content:

A. Observation of equine industry events

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Use of PowerPoint, films to supplement lectures, videos, and problem-solving
3. Discussion periods related to class demonstrations
4. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Daily reading of texts

B. Preparation for weekly quizzes

C. Weekly internet research to complete assignments

D. Weekly assignments relating to course outline

E. Periodic reports

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Choose a breed that you have never heard of and research it.

1. Give a ten-minute report for the class on that breed and include the following details: origin, use, typical size, characteristics, world numbers.

B. Typical assignment: Conformation Assignment

1. Relate form to function and explain the following with at least one complete paragraph per question:

    a. Advantages and disadvantages to shoulder angle

    b. The length of a horse's back as it relates to appearance and riding use

    c. The correct placement of legs under the body

    d. Way of traveling as it affects "wear and tear"

    e. Appearance vs. productivity

2. Give a short description of a conformationally correct horse for a given discipline. Example: Jumping horses should have short backs and be cow hocked…

3. Extra Credit: Describe your (a) horse's conformational qualities and tell why they are an advantage or disadvantage to him/her.

    a. Include pictures

    b. Breed description

    c. Ideal conformation for your horse's breed

C. Typical exam question: Which is the oldest living ancestor of the horse?

1. Eohippus

2. Przewalski's Horse

3. Zebras

4. Arabian horses

D. Typical exam question: The definition of a bay horse is which of the following?

1. Any variation of brown including those with pigmented skin

2. Tan, brown, reddish brown body w/ a black mane and tail

3. "Plain brown wrapper"
4. The most common color of a horse

E. Typical exam question: The oldest known ancestor of the horse is:

1. Eohippus
2. Mesohippus
3. Pilocene Epoch
4. Merychippus

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Rick Parker (2012). *Equine Science* (4th/e). Thompson Del Mar.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Explain the evolution and domestication of the horse as it pertains to the modern horse industry.

b. Describe a disease and parasite prevention program for equines based on knowledge of geographical, seasonal and age factors.

c. Design equine handling facilities and explain basic housing requirements.

d. Describe safety techniques in addition to demonstrating ground safety around horses.

e. Explain the unique adaptations of the equine's digestive system and describe a sound feeding program that is modified to best fit the digestive adaptations.

f. Demonstrate knowledge of equine reproduction as it pertains to sound management.

g. Design equine handling facilities and explain basic housing requirements for horses in the local region.

h. Identify basic grooming practices, including tools, techniques and benefits of grooming.

i. Identify eight common breeds of horses and assess the selective breeding practices that were used in the development of individual breeds.

j. List common infectious diseases and vaccination practices common to a given demographic.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate basic grooming practices including tool identification.
2. Demonstrate basic ground safety around horses, including leading.
3. Select various feed components based on their nutritional value.

4. Relate form to function with regards to conformation.
5. Demonstrate a basic understanding of equine behavior in various surroundings.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Laboratory participation and skills demonstration and evaluation
2. Quizzes-weekly assessment of lecture material
3. Breed Project
4. Facilities Project
5. Exams-Midterm (objective and essay)

B. SUMMATIVE EVALUATION

1. Final exam including comprehensive evaluation
2. Lab Practical including skills evaluation

ANSC - 207: Equine Science

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe methods and standards involved in raising, handling, and caring for equines.
2. Treat and provide prevention protocols for major equine diseases.
3. Describe various feeding programs and how those programs will be modified depending on the developmental stage of the animal.

Modesto Junior College
Course Outline of Record

ANSC 209

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 209—EQUINE BREEDING & REPRODUCTION **3 UNITS**

54 Lecture Hours , 108 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete ANSC 207.*

An advanced level course designed for students interested in learning more about equine reproduction and management. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Physiology of reproduction
   1. Stallion
      a. Anatomy
      b. Sperm production
      c. Physiology
      d. Behavior
      e. Stallion management
      f. Reproductive health
   2. Mare
      a. Anatomy
      b. Physiology
      c. Hormones of reproduction
      d. Hormonal cycles
      e. Breeding habits
      f. Fertilization
      g. Sterility
      h. Pregnancy checking
         i. Ultrasonography

ii. Palpation

iii. Fetal Sexing

B. Care and management of the stallion

1. Methods of mating
2. Reproductive soundness exam
3. Routine management

C. Care of the pregnant mare

1. Care at foaling time
2. Signs of impending parturition
3. Labor and parturition
4. Dystocia
5. Postpartum foal/mare care

D. Artificial insemination

1. Collection methods
2. Semen analysis
3. Transport

E. Embryo transfer

1. Synchronization of donor and recipient mare
2. Embryo flushing
3. Embryo transfer

F. Care of the foal

1. Foal milestones
2. Foalhood disease
3. Orthopedic disease
4. Nutrition

G. Reproductive technology

1. Fetal sexing
2. Sexed semen

3. Cloning

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete ANSC 207.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Identify basic equine reproductive anatomy and physiology.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture material pertaining to current reproductive methods and technology
2. Use of anatomical models
3. Industry simulation and problem solving situations
4. Use of current veterinary and medical articles for evaluation and analysis

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written assignments including lecture outlines, in class and take home quizzes and exams.

B. Weekly problem-solving assignments designed to help students analyze critical situations.

C. Term assignments will include research papers, case studies, and model development.

D. Prepare for midterm exam.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Explain how specific hormones affect differing reproductive organs during various times in the reproductive cycle.

B. Using journal entries, explain why various reproductive techniques require differing safety procedures and what those procedures entail.

C. Describe in essay format the basic understanding of foal development milestones and neonatal disease.

D. Given a fictional case of a mare with reproductive challenges, formulate, explain and suggest a reproductive program using the latest in equine reproductive technology.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Parker (2015). *Equine Science* (4th/e). Thompson.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. List and identify the major parts of the stallion and mare reproductive systems.

b. List the hormones and discuss hormonal cycles important in reproduction.

c. Identify fertility problems in mares and stallions.

d. Explain stages in gestation and parturition.

e. Discuss and describe methods of artificial insemination, embryo transfer and estrus detection.

f. Discuss mare and stallion management prior to, during, and after the breeding season.

g. Describe normal behavior in a foal and possible diseases that may affect foal development.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Midterm
2. Weekly journal assignments
3. Weekly written assignments
4. Weekly article summary

B. SUMMATIVE EVALUATION

1. Final exam
2. Model design
3. Research project evaluation

ANSC - 209: Equine Breeding & Reproduction

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe common breeding techniques within the equine industry.
2. Explain the reproductive cycle of mares.
3. Explain how hormones affect the cycle of a mare.
4. Describe reproductive anatomy in stallions and mares.

Modesto Junior College
Course Outline of Record

ANSC 210

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 210—LIVESTOCK SELECTION & EVALUATION **3 UNITS**

18 Lecture Hours, 108 Lab Hours , 36 Outside-of-Class Hours = 162 Total Student Learning Hours

Detailed analysis of various visual and physical methods of appraising beef, sheep, swine, and goats concerning functional and economic value. Written and oral summaries of evaluation will be required. Specific reference will be made to performance data and factors determining carcass value. Four completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction to evaluation

1. Importance to rancher or farmer
2. Importance to the feedlot operator
3. Importance to the meat buyer
4. Importance to 4-H leader and FFA advisor

B. Growth, development, and fattening of meat animals

1. Define stages of growth
2. The growth curve
3. Growth and development of bone, fat, and muscle
4. Physiological age
5. Effects of size, body type and sex on growth
6. Relative lean-to-fat ratio by species and sex
7. Criteria used to evaluate growth

C. Livestock improvement through selection

1. Major factors affecting rate of improvement

a. Heritability
b. Accuracy of records
c. Selection of differential selection systems
d. Tandem
e. Independent culling
f. Selection indices

D. Supplement aids in livestock evaluation

1. Weight
2. Frame size
3. Linear measurements
4. Body type score
5. Performance testing
6. Contemporary index or ratios
7. Backfat probe and ultrasonic instruments

E. Live market hog evaluation

1. Terms
2. Percentage carcass muscle
3. Live hog grading
4. Pork carcass evaluation
5. Yield of lean cuts

F. Breeding swine evaluation

1. Skeletal correctness
2. Size and scale
3. Capacity
4. Muscle and leanness
5. Underlines and sex character

G. Live market cattle evaluation

1. Terms

2. Weights and dressing percentage
3. Fat thickness
4. Ribeye area
5. Quality grades
6. Yield grades
7. Market classes and grades of cattle

H. Evaluation of beef cattle performance data

1. Reproductive performance
2. Mothering ability
3. Conformation score

I. Visual evaluation of breeding beef cattle

1. Structural correctness
2. Sex and breed character
3. Size and scale
4. Muscle
5. Capacity and condition

J. Live market lamb and goat evaluation

1. Terms
2. Weights and dressing percentage
3. Fat thickness
4. Quality grades
5. Yield grades
6. Market classes and grades
7. Determination of maturity and classes

K. Evaluation of sheep and goat performance data

1. Ewe and lamb index
2. Growth rate
3. Wool production

L. Visual evaluation of breeding does and breeding sheep

1. Skeletal correctness
2. Frame
3. Capacity
4. Body composition
5. Head, neck, and shoulders
6. Breed character and fleece

2. Required Lab Content:

A. Appropriate terminology for market and breeding livestock
B. Livestock handling skills
C. Evaluation of market livestock

1. Beef
2. Sheep
3. Hogs
4. Meat goats

D. Evaluation of breeding livestock

1. Beef
2. Sheep
3. Hogs
4. Meat goats

E. Development and presentation of oral reasons
F. Evaluation of livestock production records

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	108	2.00
Discussion	0	0

Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures and discussions
2. Livestock industry speakers
3. Instructor-led problem-solving activities
4. Demonstrations of how to present oral reasons
5. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study for weekly oral quizzes

B. Practice 5-10 hours a week for oral reasons presentations

C. Study for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical final practical exam question: Based on the evaluation of performance data and visual appraisal, align the four animals according to industry standards.

B. Typical practical exam question: Given 4 live animals, estimate their carcass yield and quality grades.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Compilation of relevant information and resources for students to improve students' ability in livestock evaluation.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify common breeds of livestock.

b. Discuss the process of meat animal growth, development, and finishing.

c. Determine traits needing improvement in a breeding herd.

d. Demonstrate how to combine subjective evaluation with objective methods of evaluation (production records, etc.).

e. Identify traits most economically important.

f. List traits that can be altered through selective breeding.

g. Illustrate an animal's performance potential and select the most efficient animals for marketability.

h. Identify the factors that affect carcass quality and yield grades.

i. Describe and compare animals with proper livestock terminology in both oral and written form.

j. Develop and hone the power of observation and memory.

k. Organize classes of live animals based on economically important traits.

l. Identify external, anatomical features of livestock.

m. Identify anatomical points on the live animal analogous to the areas of the carcass.

n. Discuss the importance of livestock evaluation within various career opportunities.

o. Practice verbal reasoning presentations to become more articulate and precise.

p. Improve analytical skills in utilizing indices, performance data and differential selection systems in the evaluation of breeding/replacement stock.

q. Improve evaluative skills for all species of livestock.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Identify conformation traits that need improvement in a specific group of animals and explain problems associated with the particular characteristic.

2. Compare and contrast animals using appropriate livestock terminology.

3. Analyze and evaluate market ready livestock using terminology related to USDA carcass grading standards.

4. Present oral reasons to a single judge or a group of people regarding the placement of a particular set of livestock.

5. Demonstrate the use of appropriate animal handling techniques in the evaluation of livestock.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation in livestock evaluation and competitive events
2. Written and oral evaluation of concepts taught in class
3. Presentation of oral reasons to a judging official

B. SUMMATIVE EVALUATION

1. Final practical exam
2. Successful participation in competitive events related to livestock evaluation

ANSC - 210: Livestock Selection & Evaluation

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Evaluate and place a class of each major livestock species using current commercial standards.
2. Provide an oral argument for the placement of a class of livestock.
3. Compare and contrast the relationship between carcass yield and quality grades for all major species of commercial livestock.
4. Evaluate performance data on all livestock species as it relates to the intended purpose of the animal.

Modesto Junior College
Course Outline of Record

ANSC 212

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

ANSC 212—ADVANCED LIVESTOCK SELECTION AND CARCASS EVALUATION 3 UNITS

18 Lecture Hours, 108 Lab Hours , 36 Outside-of-Class Hours = 162 Total Student Learning Hours

Advanced study of animal conformation as related to its various functions. Evaluation of beef, sheep and swine species using performance and carcass data as well as live animal observation. Oral interpretation of these evaluative criteria. Formal reasoning presentations required. Two completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Meat types as related to conformation

B. Use of comparative and descriptive terminology

C. Selection of livestock on a visually comparative basis

D. Evaluation of carcass data and relative value to type selection

E. USDA carcass grading

1. Determine yield grades for beef, sheep, and swine
2. Determine quality grades
3. Carcass selection

F. Analysis and evaluation of expected progeny differences as they relate to given scenarios

G. Oral interpretation of the above evaluative criteria

2. Required Lab Content:

A. Appropriate terminology for market and breeding livestock

B. Evaluation of market livestock- beef, sheep hogs and meat goats

C. Evaluation of breeding livestock- beef, sheep, hogs and meat goats

D. Presentation of oral reasons of all livestock species

E. Evaluation of livestock production records

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	108	2.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures and discussions
2. Use of PowerPoint presentations
3. Use of video clips to supplement lectures
4. Use of filmstrips and videotapes
5. Instructor-led problem-solving scenarios
6. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly oral presentations emphasizing livestock evaluation.

B. Participation in local, regional, state and national judging competitions.

C. Preparation for midterm and final exams.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical judging assignment: Writing assignments emphasizing descriptive, analytical, and evaluative skills.

B. Preparation and delivery of oral reasons for classes of livestock judged.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Schaake, Scott (2005). *Principles of Livestock Selection and Judging* (1/e). -.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify desirable/undesirable traits of livestock as related to genetic improvement and industry

production standards (field trip).

b. Evaluate breeding/market classes of livestock as related to livestock improvement practices (field trip).

c. Interpret orally, using critical reasoning, the comparison of animals in formal classes of livestock including performance and carcass data.

d. 2nd Completion

e. Identify genetic type and selection criteria for livestock performance evaluation (field trip).

f. Identify, describe, and evaluate USDA carcass grading systems for all classes of livestock.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Identify conformation traits that need improvement in a specific group of animals and explain problems associated with the particular characteristic.

2. Compare and contrast animals using appropriate livestock terminology.

3. Present oral reasons to a single judge or a group of people regarding the placement of a particular set of livestock.

4. Student participation in livestock evaluation and competitive events.

5. 2nd completion

6. Demonstrate the use of appropriate animal handling techniques in the evaluation of livestock.

7. Analyze and evaluate market ready livestock using terminology related to USDA carcass grading standards.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly oral presentations emphasizing livestock evaluation
2. Quizzes
3. Participation in developing and coordinating local livestock judging events
4. Midterm exam

B. SUMMATIVE EVALUATION

1. Class discussion and participation
2. Participation in livestock judging contests
3. Final exam

ANSC - 212: Advanced Livestock Selection and Carcass Evaluation

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and explain the adverse consequences of common structural defects of livestock.
2. Place classes of livestock based upon the assessment of performance data and phenotype.
3. Deliver a logical oral argument to justify the placing of a class of livestock.

Modesto Junior College
Course Outline of Record

ANSC 214

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

ANSC 214—LIVESTOCK FEEDING AND NUTRITION **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

The science of animal nutrition; the fundamentals of digestion and absorption in both ruminants and non-ruminants are discussed. The nutritive value of feedstuffs as they relate to the formulation of livestock rations will be emphasized. Laboratory required. Field trips are required. Not repeatable. (A-F Only)
Transfer: (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction to Animal Nutrition

B. Nutrients and Their Functions

1. Protein
2. Carbohydrates
3. Fats
4. Vitamins
5. Minerals
6. Water

C. Digestive System Anatomy & Physiology

1. The Non-Runimant (Monogastric) Digestive System
2. The Ruminant Digestive System
3. The Avian (Poultry) Digestive System

D. Evaluations and Classification of Feedstuffs

1. Physical Evaluation
2. Proximate Analysis

3. Estimation of Feed Energy
4. Interpreting a Feed Tag
5. NRC Classification of Feedstuffs

E. Feeding Behavior

1. Factors Affecting Feed Intake

F. Feed Manufacturing and Processing

G. Diets and Ration Formulation

1. Pearson Square
2. Least Cost Ration Formulation
3. Basic Livestock Feeding Practices and Dietary Guidelines

2. <u>Required Lab Content:</u>

A. Feedstuff Identification and Composition

1. Physical appearance
2. Classification by nutritional value
    a. Carbonaceous
    b. Nitrogenous
    c. Mineral
    d. Vitamins

B. The Gastrointestinal Tract

1. Types of G.I.T.
    a. Ruminant
    b. Monogastric
    c. Modified monogastric
    d. Non-functional ruminant
2. The role of G.I. secretions in the digestive process
3. Digestion and absorption

4. Transport of nutrients after catabolism
5. Fecal and urinary excretions

C. Applied nutrition

1. Feeding standards and productivity
2. Feedstuffs
3. Preparation and processing
4. Ration formulations
5. Non-caloric performance enhancers

D. Feeding practices

1. Beef cattle
2. Dairy cattle
3. Sheep
4. Swine
5. Horses

E. Ration Formulation

1. Daily nutrient balancing - NRC
2. Least cost ration formulation

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture and discussion
2. Laboratory demonstrations and hands-on activities.
3. Use of audio-visual materials
4. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written laboratory reports.

B. Study for weekly quizzes.

C. Preparation of a written report, and development of PowerPoint presentation for livestock feed trial.

D. Study for midterm, comprehensive final exam and laboratory final.

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Students will design, develop and carry out a feed trial using the scientific method, then will analyze data and present a report using PowerPoint format.

B. Identify 40 - 50 livestock feeds and give a typical ration that each ingredient might be used in.

C. Analyze a feed ingredient tag, explain the guaranteed analysis and identify the species that the ration would be fed to.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Richard O. Kellems & David C. Church (2010). *Livestock Feeds and Feeding* (6th/e). Prentice Hall.

2. Other: Instructor generated handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Explain the role of nutrition in animal performance and food production.

b. Determine nutritional requirements based on animal purpose and changes in physiological development.

c. Identify the anatomical features of the ruminant, mono-gastric, and avian digestive systems.

d. List factors influencing animal feeding behaviors.

e. Utilize the Pearson Square method for ration formulation.

f. Evaluate economic factors and trends in feeding.

g. Identify and classify common feedstuffs.

h. Explain common feed processing techniques and their relative advantages.

i. Analyze and comprehend various procurement strategies for feedstuffs.

j. List and define the six categories of nutrients.

k. Discuss the various methods of feed analysis commonly utilized in the animal nutrition industry.

l. Interpret National Research Council (NRC) nutrition tables and apply the relevant information to the formulation of livestock rations.

m. Interpret the components of the guaranteed analysis found on a feed tag.

n. Outline basic feeding practices for ruminant, mono-gastric, and avian species.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Given a specific livestock production scenarios, evaluate various feed options for: Palatability, Nutritional Value, Economic Feasibility.

2. Use technology as a feed management tool.

3. Perform feed component analysis.

4. Calculate rations.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Comprehensive quizzes and exams
2. Written critical thinking scenarios
3. Problem analysis and solution
4. Research and term papers
5. Laboratory skill validation by observation
6. Laboratory reports
7. Laboratory research projects and reports
8. Laboratory skill practicum exams

B. SUMMATIVE EVALUATION

1. Comprehensive final exam
2. Laboratory practical final exam

ANSC - 214: Livestock Feeding and Nutrition

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and describe the function of each anatomical feature of the digestive systems of livestock.
2. Explain the importance of livestock comfort to efficient nutrient utilization.

Modesto Junior College
Course Outline of Record

ANSC 215

I. OVERVIEW

The following information will appear in the 2013 - 2014 catalog

ANSC 215—ANIMAL HEALTH AND SANITATION **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Common livestock diseases and fundamentals of immunity. Includes coverage of the livestock worker's role in promoting animal health and the foundation of disease control programs. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction and overview

1. Historical concepts
2. Causative agents of disease
3. Methods of transmission
4. Principles of prevention
    a. Disinfecting
5. Body defense mechanisms
6. Immunity—classified
7. Predisposing disease factors

B. Anatomy and physiology

1. Body system and primary system disease
    a. Endocrine
    b. Reproductive
    c. Digestive
    d. Circulatory

e. Urinary

f. Respiratory

C. Nutrition and Animal Health

1. Nutrition requirements of animals
2. Nutritional deficincies & toxicities

D. Parasitology

1. Symptoms, life cycles, and controls

a. Enteroparasites

b. Ectoparasites

E. Restraint

1. Restraint types

a. Passive restraint

b. Active restraint

F. Vaccination Programs

1. Types of immunity
2. Biological agents
3. Immunizing agents

G. Miscellaneous Diseases of Farm Animals

1. Generalized diseases
2. Metabolic and deficiency diseases
3. Localized diseases of the skin and extremities
4. Plant and chemical poisonings

H. Biosecurity Programs

1. HACCP - Hazardous and Critical Control Points
2. Livestock Identification Program
3. Facility and equipment sanitation practices

2. Required Lab Content:

A. Anatomy and physiology

1. Body system and primary system disease

a. Endocrine
b. Reproductive
c. Digestive
d. Circulatory
e. Urinary
f. Respiratory

B. Parasitology

1. Symptoms, life cycles, and controls

a. Enteroparasites
b. Ectoparasites

C. Restraint

1. Restraint types

a. Passive restraint
b. Active restraint

D. Vaccination Programs

1. Types of immunity
2. Biological agents
3. Immunizing agents

E. Miscellaneous Diseases of Farm Animals

1. Generalized diseases
2. Metabolic and deficiency diseases
3. Localized diseases of the skin and extremities

4. Plant and chemical poisonings

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Class lecture with a reinforcement of concepts during laboratory experiences.
2. Powerpoint presentations, microscope slides, videos, living and preserved specimens as well as handouts will be used to supplement lecture material.
3. Student should have reasonable accommodations made to perform all learning objectives regardless of physical and/or learning disabilities.
4. Field trips to local livestock producers and pharmaceutical companies.
5. Attendance at local livestock seminars presented by the cooperative extension.
6. Guest speaker presentations.

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Prepare for bi-weekly quizzes

B. Weekly laboratory reports

C. Per term, "Ride along" with a local large animal veterinarian

D. Per term, prepare animal health program assignment and presentation

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. You are given the following scenario: You find a week old lamb that appears to be dehydrated, weak and has difficulty standing. Describe possible problems, a prognosis and a possible treatment.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Kahn, C; Line,S (2010). *The Merck Veterinary Manual* (10th/e). Merck.
2. **Book:** nancy Jackson, William Greer, and James Baker (2000). *Animal Health* (3rd/e). Danville, IL Interstae Publishers.
3. Other: Instructor-generated handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Define the importance of promoting livestock health.

b. Identify career opportunities and interpret formal and informal educational experiences leading to successful employment.

c. Demonstrate and describe the role animal behavior plays in individual and herd health.

d. Identify those diseases which have economical treatments.

e. Identify the cultural influences that have led to animal health advancements.

f. Collect and categorize data to identify disease grouping and identify causative agents.

g. Differentiate between pathogenic and non-pathogenic disease.

h. Identify environmental factors contributing to disease.

i. Appraise and identify physiological changes which alter susceptibility to various health problems.

j. Name equipment commonly used to humanely confine, treat or protect livestock.

k. List regulations of transport for health.

l. Analyze an operational scenario and formulate a preventative program.

m. List common diseases in U.S. livestock production and established control programs.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Explain problems, processes and procedures encountered by large animal veterinarians as experienced during the student's required "ride along" lab activity.

2. Recognize normal structures in the following body systems: Reproductive, Respiratory, Circulatory, Digestive and Excretory.

3. Explain the purpose of the UC Davis large animal diagnostic laboratory.

4. Design and create a "Health Program" presentation for an identified livestock species.

5. Explain the significance of local pharmaceutical companies to the livestock industry.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Bi-weekly quizzes

2. Weekly laboratory reports

3. Veterinarian "Ride-Along" report and activity
4. Report on the CA State Veterinarian guest speaker's presentation.
5. Field-trip or lab research projects and reports.

B. SUMMATIVE EVALUATION

1. Midterm Exams
2. Comprehensive final exam
3. Livestock species health program - project and presentation

ANSC - 215: Animal Health and Sanitation

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and describe the location and function of the major body organ systems of livestock.
2. Explain common biosecurity procedures used in the livestock industry to prevent the spread of disease.
3. Create and implement a "Health Program" for an identified livestock species.

Modesto Junior College
Course Outline of Record

ANSC 220

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

ANSC 220—DAIRY INDUSTRY/DAIRY SCIENCE **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

History, development, and projections of the dairy industry. General information on the economics of dairying, facts, trends, selection, culling, fitting, showing, judging, pedigrees, feeding, and basic management skills; employment opportunities and requirements. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU, UC) (C-ID: AG-AS 112L)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction to the dairy industry

1. History of dairying including the contributions of ethnic groups
2. Economic importance to agriculture
3. Past, present, and future trends in the dairy industry
4. Milk and by-product consumption and trends
5. Inventions and new discoveries

B. Opportunities and careers in the dairy industry

1. Employment in production, processing, and marketing
2. Degree and skill development requirement

C. Dairy breeds, origin, and adaptation

1. Bos Taurus and Bos Indicus
2. Production of each breed
3. Rank in popularity and demand
4. Advantages and disadvantages of each breed

D. Development of a dairy herd

1. Developing a dairy enterprise

2. Selecting a breed
3. Locating a market for milk
4. Milk pricing strategies: quota, base, and overbase

E. Managing a dairy herd
1. Selecting animals
2. Understanding pedigree and production records
3. Feeding dairy animals
4. Dehorning, vaccinating, castrating, teat removal and other treatment skills
5. Observe various facilities and the relationship to profit

F. Reproductive management
1. Advantages and limitations
2. Synchronizing cows and heifers
3. Using a bull in natural service
4. Embryo transfer

G. Care and management of calves
1. Prenatal care
2. From birth to weaning
3. Feeding, vaccinating, and general

H. Genetics
1. Phenotype versus Genotype
2. Heritabilities and trait correlations
3. Evaluation of traits to select for

2. <u>Required Lab Content:</u>

A. Application of techniques discussed and observed to halter train cattle
B. Demonstration of fitting, grooming, and showing cattle
C. Identification of procedures used by cattle photographers
D. Application of the PDCA scorecard to several classes of dairy animals
E. Identification of basis of mating programs, phenotype correlations and plan matings
F. Participation in the manufacture of specialty ice creams for a public social

G. Detection and evaluation of reproductive and mammary organs and tissue with an emphasis on quality

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Use of audio-visual materials
2. Demonstration
3. Lecture and discussion
4. Field trips and hands-on activities working with animals
5. Presentations by industry specialists

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments

B. Periodic article review reports

C. Career industry research project

D. Preparation of heifer for showmanship contest

E. Weekly lab reports

F. Preparation for exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Evaluate potential herd replacement animals for conformation, health, productive potential, and herd contribution value. Place numeric values as to a quality score, price willing to pay, and how many you would purchase given the set presented.

B. After evaluating over 50 different parts of the dairy animal (heifer) as learned in class, decide and assign upon a DMS code to 5 different animals and select the appropriate mates (bulls) which have been coded by approved analyzers, by balancing the codes.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Howard D. Tyler & M.E. Ensminger (2016). *Dairy Cattle Science* (4th/e). Columbus, Ohio Pearson Prentice Hall.

2. Other: Readings from monthly dairy industry magazines and journals: Agribusiness Dairyman, Hoards Dairyman, Holstein World, Holstein International, Jersey Journal, Progressive Dairyman and Western Dairy Business.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Discuss the historical development of the dairy industry.

b. Explain the importance of the dairy industry in California and the United States.

c. Identify dairy breeds, origin, adaptation, and production.

d. Analyze production, breeding, and management records.

e. Identify the parts of the cow and their relationship to form and function.

f. Define the nutritional needs and proper feeding techniques.

g. Demonstrate grooming, fitting, and showmanship skills.

h. Practice selection and judging skills.

i. Discuss career opportunities and requirements for successful employment.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Work with and handle cattle safely due to an understanding of the visual impairments and flight zones of cattle.

2. Observe the phenotype of an animal and determine production potential, showing ability, and reproductive soundness.

3. Determine and rank from high to low, a group of animals in a class or group using a scorecard, or criteria set by a dairy producer.

4. Recognize various facilities and environments that are conducive to profitable production.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation in classroom presentations that emphasize the understanding of milk production components

2. Lab reports written for each lab to include introduction, report, summary and conclusion

3. Class participation involving written critiques and community event involvement

4. Active participation in laboratory and industry settings

B. SUMMATIVE EVALUATION

1. Final exam, practical
2. Final exam, written
3. Midterm practical exam

ANSC - 220: Dairy Industry/Dairy Science

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Discuss the history and principles of the dairy industry.
2. Identify and discuss the various attributes of recognized U.S. dairy breeds.
3. Identify various aspects of the daily operations on a dairy.
4. Discuss nutritional programs that would be commonly used at a dairy based on its location.

Modesto Junior College
Course Outline of Record

ANSC 221

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 221—DAIRY CATTLE SELECTION & EVALUATION **3 UNITS**

18 Lecture Hours, 108 Lab Hours , 36 Outside-of-Class Hours = 162 Total Student Learning Hours

Selection of dairy cattle on type conformation and the correlation between type and production. Pedigree evaluation, animal analysis, linear classification, and body condition scoring. Written and oral evaluation on selection. Two completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction to evaluation

1. Importance to the industry
2. Importance to the producer
3. Importance to related careers
4. Career enhancement

B. Dairy anatomy

1. Major external anatomical traits
2. Physical strengths and weaknesses
3. Location and characteristics of each part
4. Function of traits

C. Type of evaluation

1. Dairy type scorecard
2. Dairy versus beef
3. Round and flat bone
4. Angularity and openness

D. Pedigree evaluation

1. Pedigree terminology

2. Type classification
3. Predicted transmitting abilities
4. Evaluating individual pedigrees

E. Body conditioning

1. Dairy conditioning scorecard
2. Condition scoring of lactating and dry cows
3. Relationship of condition to conception and pregnancy
4. Managing the growth of heifers

F. Linear evaluation

1. Linear descriptive traits
2. Type classification
3. Numerical ratings
4. Linear values in mating

G. Animal analysis

1. Relationship to type evaluation
2. Analyzing programs
3. Choosing a system
4. Selection of bulls

H. Oral and written evaluation

1. Organization of presentation
2. Written evaluation
3. Oral evaluation
4. Power of expression

I. Acquisition and marketing of dairy animals

1. Selecting dairy animals
2. Animal appraisal
3. Registered vs. grade animals
4. Benefits of type and production information

2. <u>Required Lab Content:</u>

A. Observing and learning the names of the dairy cows' anatomical parts.

B. Applying the scoring system to "judging classes" or individual evaluations, in determining the official class placing or value.

C. Learning and discussing the variations of the body parts in relationship to the scorecard and milk production.

D. To orate the student placing, using the MJC/Cornell Notes outline, to guest judges for performance and accuracy scoring in a contest format.

E. At field trip opportunities, participating with guest presenters to discussing the different opinions of specific parts values.

F. Learning the correlation values of phenotype to milk production and including them in evaluation processes.

G. Critical thinking, poise, personal presentation and leadership control at all lab activities and field trips to enhance marketability.

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	108	2.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture, discussion, demonstration, and audio-visual materials.
2. Presentations by industry professionals on field trips.
3. Classroom discussion with the aid of PowerPoints to develop problem-solving skills.
4. Instructor will facilitate analysis of the content of the course textbook readings.
5. Instructor will provide written assignments that include problem-solving, ranking by evaluation, decision-making and justification by oral reasoning.
6. Instructor will supervise practical application in judging dairy cattle and giving oral reasons.

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly practice incorporating the explanation and use of the PDCA scorecard and oral reasons

B. Preparation for bi-weekly quizzes

C. Internet search for current dairy show winners and production records

D. Preparation for discussion and evaluation in relation to scorecard judging, the prior lab's class placings

E. Use of lecture content transformed to lab use when evaluating dairy classes

F. Field trip participation for additional student growth and development in relation to the dairy industry

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Evaluation, placing, and discussion of various dairy breeds formal judging classes of, heifers and/or cows. Beginning of semester 20 minutes allowed to complete class, working down to 12 minutes by the end of the semester.

B. Officiate a small contest for 4-H or FFA Dairy contestants supplying the official placings, cuts and listening or oral reasons.

C. Give constructive criticism to participants for improvement of dairy cattle judging and oral interpretation as well as providing a scoring value.

D. Explain your placing of a class of dairy animals to a group of contestants using the scorecard, proper format, correct terminology, while using correct voice tones, enunciation and fluctuation.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Kelli Dunklee, Jill Nelson, Sandy Cordes, Traci Loonstra, Samantha Stoddard, Michele Ruby (2012). *Dairy Judging Workbook* Brattleboro, Vermont Holstein Foundation.

2. Other: Readings from dairy industry monthly magazines and journals such as: Hoards Dairyman, Holstein World, Jersey Journal, Dairy Herd Management, and Western Dairy Business.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify the major dairy breeds.

b. Identify the anatomical features of the dairy animal.

c. Evaluate and illustrate the use of the dairy scorecard for type selection, linear evaluation, body conditioning, animal and pedigree analysis.

d. Describe the ideal physical traits of the cow as related to form and function.

e. Describe and compare dairy animals with proper terminology in both oral and written evaluation.

f. Select classes of animals appropriate for learning development.

g. Demonstrate critical thinking, communication and leadership skills.

h. Demonstrate confidence and memory for articulation of oral reasons in evaluation.

i. Discuss the importance of dairy selection and evaluation to career opportunities.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Move and observe cattle safely and correctly for the best view of various traits being evaluated.

2. Accurately measure, compare and evaluate in accordance to the official PDCA scorecard, the many traits that are included in the measuring process during a competitive and timed event.

3. Use critical reasoning, interpret orally, and evaluate others' opinions in regards to the interpretation of students use of the PDCA dairy scorecard on a class for class basis.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. In class objective examinations that test for the understanding of major concepts in the PDCA scorecard.

2. Class participation involving discussions, evaluations, formal oral reasons, and critiques.

3. Periodic evaluation in actual competitions at Dairy Judging contests; e.g., Great Western, U.C. Davis, and State Holstein/Jersey Show.

4. Supplemental activities including participation in classroom and community activities that emphasize milk production technology, participation during field trips and group projects.

B. SUMMATIVE EVALUATION

1. Final exam for all lecture and laboratory materials presented, discussed and applied.

2. All American Holiday Dairy Judging Finals competition.

ANSC - 221: Dairy Cattle Selection & Evaluation

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify, describe, and evaluate dairy cattle based on the official dairy cattle scorecard.
2. Rank several classes of dairy animals using the PDCA Dairy Cattle Scorecard.
3. Describe why they would choose a certain placement of cattle in a dairy judging class.

Modesto Junior College
Course Outline of Record

ANSC 222

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 222—MILK PRODUCTION & TECHNOLOGY **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Milk and milk product consumption and the economics of milk production. The mammary system anatomy, the physiology of milk secretion, the composition and the properties of milk including factors of production. Evaluation of milking parlors and equipment, systems analysis, and operation is also included. Milk testing, sanitation, quality control, udder health, and treatment as well as dairy mathematics. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Development of the dairy industry

1. Historical development
2. Inventions in production and processing
3. Impact on the dairy industry
4. Contribution to society

B. Economics of milk production

1. The scope of the dairy industry
2. Milk producing regions
3. Milk and milk products produced
4. Impact on animal agriculture

C. Udder anatomy and physiology

1. Anatomy of the udder
2. Physiology of milk production
3. Hormones affecting milk secretion
4. Factors affecting milk quality

D. Consumption and marketing trends
    1. Milk and milk products consumed
    2. Trends in production consumption
    3. Relationship between sales and quality
    4. Milk as a source of food

E. Milk composition and properties
    1. Chemical composition of milk
    2. Importance of milk solids to qualify
    3. Properties found in milk
    4. Calculating milk components

F. Milk testing
    1. Types of services available
    2. Management information from testing
    3. Effects on breeding and marketing animals
    4. Analyzing test data and records

G. Milking facilities and equipment
    1. Types of milking facilities
    2. Selection of equipment
    3. Costs of building and purchasing equipment
    4. Techniques in maintaining and operating a system

H. Milk processing
    1. Regulations for shipping and processing milk and milk products
    2. Bacteria and somatic cell counts
    3. Pasteurizing, homogenizing, and standardizing milk
    4. Processing dairy products

I. Udder health and drugs
    1. Mastitis control
    2. Understanding degrees of infection
    3. Identifying classes and use of drugs
    4. Analyzing the effects of residues in milk

J. Government regulations

1. Sanitation requirements
2. Standards for bacteria counts
3. Requirements for cleaning and sanitizing
4. State and county inspections

K. Marketing and research

1. Developing new products
2. Packaging and distributing
3. Sales promotion and research
4. Quality control and food safety

L. Careers in the dairy industry

1. Opportunities for employment
2. Preparing for a career in milk processing
3. Careers in related areas
4. Future employment trends

2. Required Lab Content:

A. Understanding the importance of milk in society.

B. Explanation of the anatomy and physiology of the mammary gland.

C. Analysis of chemical components of milk and how they are evaluated.

D. Attendance at a dairy equipment and technology fair to observe and discuss components of milking parlors, herd health, cow comfort, and udder care products.

E. Observation and discussion of the evaluation of mechanical efficiency of a milking barn.

F. Participation in tours of manufacturing of various dairy plants.

G. Visitation to various dairies to compare dairy styles, milk flow, and facilities.

H. Recognition and recommendations for treatment of mammary gland diseases.

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0

Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture and discussion
2. Demonstration
3. Field trips to various industry farms
4. Presentations by industry specialists
5. Use of audio-visual materials

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study for weekly glossary and chapter quizzes

B. Reading periodical reports from magazines pertinent to the dairy industry

C. Weekly laboratory reports detailing the subject for the week

D. Interpretation and preparation of reading assignments for discussion and quizzes

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Describe the process and path of a milk droplet from its formation point to the teat sphincter.

B. Evaluate milk records from a herd of cows and determine which cows to cull from the herd based on high levels of SCC, CMT, or other measurable bacteria.

C. After visiting several dairies and learning about cow comfort, make recommendations to an older style dairy in regards to facility upgrades to improve production.

D. Visit and evaluate the milking routine at 2-3 dairies and compare the quality of let down based on the routine.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Howard D. Tyler and M.E. Ensminger (2006). *Dairy Cattle Science* (4th/e). Pearson Prentice Hall.
2. Other: Readings from dairy industry monthly magazines and journals: Hoards Dairyman, Holstein World, Jersey Journal, Progressive Dairyman and Western Dairy Business.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Describe the history and development of the milk industry.

b. Analyze the composition and properties of milk.

c. Explain udder anatomy, physiology, and factors affecting the production and composition of milk.

d. Discuss milking equipment, facilities, operation, and proper milking procedures.

e. Explain the food value and uses of milk and milk products.

f. Discuss the principles of marketing milk and milk products, the consumption trends and the importance of product research.

g. Identify the pricing structure and government regulation as it affects supply and demand of dairy products.

h. Interpret the importance and proper use of drugs and the effects of residues in milk.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Describe from the mammary dissection laboratory the tissue components and the flow of milk in the mammary gland from the alveolus to the teat end.

2. Understand the workings of a milk component evaluation and recording laboratory.

3. Comprehend the various components of a milking parlor systems and understand the importance of maintenance, sanitation, and timing precision.

4. Identify, describe and recognize treatments for multiple mammary infectious diseases and bacteria.

5. Discuss and describe the operations of milk plants, butter plants, ice cream plants and various other dairy products manufactured in our local area.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. In class objective examinations that test for the understanding of major concepts.

2. Out of class writing assignments that include analysis of laboratory activities, periodical summaries and activity summaries.

3. Laboratory notebook consisting of weekly laboratory activities and analysis of presentations.

4. Supplemental activities including participation in classroom activities that emphasize milk production technology, participation in field trips and group projects.

5. Class participation involving oral presentations, written critiques and community event involvement.

B. SUMMATIVE EVALUATION

1. Midterm and/or final examinations.

2. Comprehensive written report from attending various dairy industry milk product plants.

ANSC - 222: Milk Production & Technology

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify the major parts of the bovine mammary gland and discuss the function of each.
2. Discuss milk contamination, infections of the mammary gland.
3. Discuss the chemical composition of milk.
4. Describe the health management of the dairy cow.
5. Describe proper milking techniques and procedures.

Modesto Junior College
Course Outline of Record

ANSC 224

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

ANSC 224—DAIRY FEEDS & FEEDING **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Fundamentals of nutrient digestion and absorption in ruminants. The nutritive value of feeds as they relate to the formulation of dairy rations will be emphasized with the inclusion of various plant tissue commodities by-product feeding. Term project and field laboratories required. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Concepts of nutrition

1. Historical advancements in dairy nutrition
2. Dairy nutrition and its role in society
3. Importance of proper dairy nutrition
4. Principles of the scientific method

B. Feed analysis and source

1. Protein
2. Carbohydrates
3. Fats
4. Vitamins
5. Minerals
6. Water

C. Dairy animal growth, composition and variability

1. Water
2. Energy
3. Proteins
4. Inorganic elements

5. Vitamins

D. Gastrointestinal tract

1. Types of gastrointestinal tracts
2. Role of gastrointestinal secretions in the digestive process
3. Digestion and absorption
4. Transport of nutrients after metabolism
5. Fecal and urinary excretions

E. Nutrient metabolism

1. Maintenance, growth, fattening, reproduction and milk production
2. Water
3. Carbohydrates
4. Lipids
5. Proteins and amino acids
6. Inorganic materials
7. Vitamins

F. Applied dairy nutrition

1. Feeding standards and productivity
2. Feedstuffs
3. Preparation and processing
4. Ration formulations
5. Non-caloric performance enhancers

G. Daily feeding practices

1. Calves
2. Young heifers
3. Bred heifers
4. Lactating cows
5. Dry cows
6. Bulls

2. <u>Required Lab Content:</u>

A. Procedures to weigh and measure heifers, score body condition, and evaluate growth trends to known acceptable values.

B. Identification by sight and smell the various commodities used to feed dairy cattle and understand their classification, economic value, and numeric nutritional values.

C. Identification of various types of forage, determine the observed quality levels, particle size and distribution, and rank the forages from high to low, explaining why.

D. Attendance at field trips to feed mills, firms conducting analytical evaluations of feeds, and dairies to see how feed is processed, scored, and consumed by cattle

E. Participation in laboratories with instruction in basic metabolism, digestion and absorption to further understand the importance of particle size, density, and moisture content.

F. Calculation of the net energy requirement for milking cows and heifers, meeting the needs for production, growth and maintenance.

G. Balance of various rations for all the nutritive needs of high production cows and growthy heifers while maintaining the proper calcium-phosphorous ratios.

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Dicussion
3. Demonstration
4. Use of audio-visual materials including “virtual tours” on CD, website research and analysis
5. Field trips, feed trials and balancing rations
6. Classroom discussion and analysis of the course textbook readings
7. Presentations by industry specialists

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments

B. Periodic article review reports

C. Weekly glossary words

D. Preparation and development of balanced rations

E. Preparation of weekly lab reports

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. After participating in various laboratories and developing an understanding of the nutritive values relative to feeds, the student will build a balanced, palatable, economic and production maintaining ration that will meet the needs for maintenance, growth, production and reproduction of a high production dairy cow.

B. After listening and watching a presentation about rumen development, observing several samples of rumen tissues, and reading suggested articles, the student will be able to dissect a freshly processed bovine rumen and determine the development stage of the rumen.The student will also be able to identify, using scientific methods, various microbes, measure micro-flora concentrations, ph and particle size.

C. Prepare a comprehensive laboratory notebook which includes critical analysis, conclusion, and summary of all weekly laboratory activities.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Ensminger, M., & Tyler, H. (2006). *Dairy cattle science* (4th /e). NJ Prentice Hall.

2. **Book:** Jurgens, M., & Bregendahl, K. (2012). *Animal feeding and nutrition* (11th/e). IA Kendall Hund Publishing Com..

3. Other: Hoard's Dairyman (periodical)

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify requirements and potential opportunities that will lead to a career in the area of dairy nutrition.

b. Identify cultural inputs that have shaped the dairy nutrition industry.

c. Apply changing nutritional requirements based upon animal physiological development.

d. Identify differences in the digestive anatomy of the dairy animals that may dictate feeding practices based on age and/or rumen development.

e. Identify the major parts of the ruminant gastrointestinal track including the accessory organs involved with the ruminant digestive process.

f. Analyze the principles of ruminant digestion, absorption and assimilation of feeds.

g. Explain in a verbal and written format the role of nutrition in dairy animal health and food safety.

h. Identify common commodities used in dairy cattle feeding and have knowledge of the nutritive value of those feeds.

i. Identify quality feeds and calculate their relative value.

j. Use the scientific method to collect and calculate data used in dairy cattle ration formulation.

k. Formulate dairy cattle rations with economic feasibility.

l. Identify various primary and by-product feeds, forms and processing techniques used in dairy cattle feeding.

m. Evaluate economic factors and trends in feeding dairy cattle.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Complete a comprehensive lab notebook.

2. Identify and explain the various parts of the gastrointestinal tract as discussed in class of the mature bovine, then explain the importance of each part in the performance of health and high production.

3. Discuss and justify 15 different feeds included in a dairy diet listing the purpose and benefits of each.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Lecture and laboratory examinations
2. Written assignments
3. Laboratory notebook and weekly laboratory reports
4. Participation in hands-on laboratory activities utilizing the scientific method
5. Quizzes and unit exams
6. Balancing feed rations for dairy heifers and dairy cows
7. Midterm exam

B. SUMMATIVE EVALUATION

1. Final exam
2. Laboratory participation, skills and projects
3. Group and individual field projects

ANSC - 224: Dairy Feeds & Feeding

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe the nutrient needs for the various ages of dairy cattle.
2. Formulate a dairy cow ration that will meet the requirements for protein, energy, calcium and phosphorus.
3. Explain the importance of dairy cattle comfort and nutrient utilization.

Modesto Junior College
Course Outline of Record

ANSC 226

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 226—DAIRY BREEDING & SELECTION **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

The study of basic genetic principles with the study of the anatomical and physiological aspects of reproduction as they relate primarily to the bovine. Genetic principles to be emphasized include basic inheritance, selection techniques, mating systems, heterosis, and performance evaluation. Reproductive aspects to include endocrinology, estrous cycles, mating behaviors, gametogenesis, conception, gestation, parturition, and maternal behaviors. Artificial insemination, embryo manipulation, and current innovations in reproductive biotechnology will also be examined. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Historical background of animal breeding

B. Anatomy of the bovine

1. Female reproduction system
2. Male reproduction system
3. Physiology of the female reproduction system
4. Physiology of the male reproduction system

C. Gametogenesis

1. Sex determination

D. Fertilization and prenatal development

1. Fertility and sterility

E. Methods used in breeding cattle

1. Breeding management practice

2. Artificial insemination

    a. Importance

    b. Methods

    c. Procedures

3. Collection, handling, and evaluation of semen

F. Pregnancy and parturition

1. Abnormal parturition and problems concerned with parturition
2. Diseases concerned with or following parturition

G. Mechanism of heredity

1. Background of heredity
2. Physical basis of heredity
3. Laws of heredity
4. Lethal effects of genes

H. Systems of breeding

1. Inbreeding, outbreeding, crossbreeding, and linebreeding

I. Principles of selection

1. Phenotype, genotype, and performance

J. Selecting dairy cattle (term problem required)

1. Conformation (judging, classification and analysis a.A.a.)
2. Pedigree
3. Bloodlines, cow families, etc.
4. Performance

2. <u>Required Lab Content:</u>

A. Reproductive female anatomy

1. Physiology of female reproduction
2. Reproductive anatomy/physiology of the male

B. Cytology-meiosis and mitosis

C. Reproductive aids

D. Embryology and fetal development

E. Embryo transfer procedures

1. Observation of an embryo transfer

F. Introduction to dairy cattle evaluation

G. Introduction to dairy cattle genetics

H. Pregnancy diagnosis

I. Semen collection and evaluation

J. Artificial insemination procedures

K. Parturition and dystocia births

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Discussion
3. Demonstration
4. Instructor-supervised "hands-on" activities
5. Field trips
6. Presentations by industry professionals

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study and preparation for weekly quizzes

B. Study and preparation for midterm and final exam

C. Weekly field trip laboratory reports

D. Reading and homework assignments requiring research and analysis

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Prepare a comprehensive laboratory notebook which includes critical analysis, conclusion, and summary of all weekly laboratory activities.

B. Evaluate and discuss published industry articles on selected or related topics.

C. Students will provide interpretations of textbook reading assignments.

D. Study and discuss the principles of hereditary relevant to dairy cattle and USDA evaluations for genetic improvement.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: H. Joe Bearden, John W. Fuquay, Scott T. Willard (2004). *Applied Animal Reproduction* (6th/e). Pearson.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify and explain the physiological functions of the major anatomical points of the male and female reproductive tracts.

b. Describe the origin and function of the major hormones, both male and female, involved in reproduction.

c. Describe the correct fetal position, delivery process, approximate timeline and maternal behaviors for a normal parturition.

d. Explain the process of collecting, handling, freezing, and evaluating semen.

e. Compare and contrast artificial insemination to natural mating.

f. Explain the advantages and limitations of artificial insemination.

g. Explain the mating concepts of inbreeding, linebreeding, outcrossing, and crossbreeding.

h. Describe the ideal dairy type and practice dairy selection.

i. Describe the effect of heritability on selection progress for individual traits.

j. Identify and treat common reproductive diseases.

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Physically identify all female reproductive parts; observe, describe and evaluate several bovine reproductive tracts and their differences to determine the stage of estrous, gestation, infection or other abnormalities

2. Diagram the hormones of the reproductive tract in a parallel line graph that shows the fluctuation intensity levels throughout the estrous cycle and gestation.

3. Describe and discuss the differences between genotype and phenotype, while showing the relationships and correlations found in pedigree data from breed association data that can predict phenotypes.

4. Identify and explain the various stages of mitosis and meiosis and be able to explain their importance in livestock production.

5. Describe and discuss from the point of copulation to parturition of a bovine, gametogenesis, fertility, fetal development, gestational development, sterility issues and forms of dystocia.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly quizzes
2. Homework assignments
3. Laboratory reports
4. Periodical reviews
5. Midterm exam

B. SUMMATIVE EVALUATION

1. Final exam
2. Laboratory practical exam
3. Analysis and discussion of various scenarios as presented on reproductive problems such as conception problems, dystocia and performance evaluations.

ANSC - 226: Dairy Breeding & Selection

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Discuss the reproductive process in livestock.
2. Describe genetic principles including basic inheritance and selection techniques.

Modesto Junior College
Course Outline of Record

ANSC 227

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 227—ADVANCED DAIRY CATTLE SELECTION & EVALUATION **3 UNITS**

Formerly listed as: *ANSC - 227: Advanced Dairy Cattle Selection & Eval*
36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Advanced study of dairy conformation as related to the function of milk production. Evaluation of dairy cattle using production data, pedigrees and live animal evaluation. Particular emphasis will be placed on linear classification and selective mating. Oral interpretation of these evaluative criteria and formal reasoning presentations will be required. Evaluation of milk and milk products will be required as well. Two completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Dairy type as related to milk production

B. Use of comparative and descriptive technology

C. Selection of dairy cattle on a visually comparative basis

D. Evaluation of production data and relative value of type selection

E. Linear evaluation of dairy cattle

F. Analysis and evaluation of dairy cattle pedigree as a selection tool

G. Oral interpretation of the above evaluative criteria

2. Required Lab Content:

A. Applying linear scores on dairy cows for each of 18 traits

B. Applying the scoring system to judging classes to determine the official class placing

C. Orating the student placing using the MJC/Cornell Notes outline to guest judges to score the students, contest style

D. Discussing the interpretation of the body parts to the scorecard and their weightings

E. At field trip opportunities, participating with guest presenters to different ways of evaluating specific parts

F. Identifying the correlation values of phenotype to milk production and include them in evaluation processes

G. Critical thinking, poise, personal presentation and leadership control at all lab activities and field trips to enhance marketability

3. Recommended Content:

A. Milk quality and dairy products evaluation

1. Identify off-flavors of milk and milk products
2. Differentiate between real and artificial dairy products
3. Identify and grade different varieties of cheese
4. Ability to grade fluid processed milk
5. Enhance by supervised repetition and practice within class periods
6. Active participatory experience in individual study or group assignments is the basic means by which earnings are obtained.

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Information and concepts presented through lectures, demonstrations, visual aids and workbook.
2. Small group discussion upon completion of evaluating a class or animal using the scorecard.
3. Application of various methods of notetaking, and oral set-up procedure for reason giving.
4. Field trips to observe the varying degrees of traits and applying the evaluation to a judging scorecard.
5. The use of industry experts in guest lectures furthering advanced knowledge of both phenotype and genotype.

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly practice including scorecard and oral reasons

B. Preparation for bi-weekly quizzes

C. Internet search for current dairy show winners

D. Preparation to discuss and evaluate in relation to scorecard judging, the prior lab's class placings

E. Use of lecture content transformed to lab use when evaluating dairy classes

F. Field trip participation for additional student growth and development in relation to the dairy industry

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Evaluate, place, and discuss classes of various dairy breeds, heifers and cows. Beginning of semester 20 minutes allowed to complete classes, working down to 12 minutes by the end of the semester.

B. Officiate a small contest for 4-H or FFA Dairy contest supplying the official placings, cuts and listening to reasons.

C. Give constructive criticism to participants for improvement of dairy cattle judging and oral interpretation as well as providing a scoring value.

D. Explain your placing of a class of dairy animals to a group of contestants using the scorecard, proper format, correct terminology, and voice tone and fluctuation.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Manual: Dr. George Heersche, Jr.. Dairy Judging Workbook. Holstein Foundation

2. Other: Other materials as acquired by the instructor from the Holstein and Jersey National Associations, U.S.D.A. materials, and other relevant information published in industry periodicals.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify desirable/undesirable traits of dairy cattle as related to genetic improvement and industry production standards.

b. Evaluate replacement dairy heifer classes as related to potential improvement in milk production.

c. Interpret orally, using critical reasoning, the comparison of dairy animals in formal classes of dairy including performance data and pedigree evaluation.

d. Identify, evaluate, and describe dairy cattle based on the official dairy cattle scorecard.

e. Identify genetic type and selection criteria for dairy cattle performance evaluation.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Move and observe cattle safely and correctly for the best view of various traits being evaluated.

2. Accurately measure, compare and evaluate in accordance to the official scorecard the many traits that are included in the scoring process in a competitive environment.

3. Use critical reasoning, interpret orally, and evaluate others' opinions in regards to the interpretation of student's use of the dairy scorecard on a class for class basis.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Quizzes and practical examinations from lecture and laboratory assignments.
2. Daily participation in lecture and laboratory activities.
3. Periodic evaluation in an actual competition at a Dairy Judging contest; e.g., Great Western, Fresno State, and State Holstein/Jersey Show.

B. SUMMATIVE EVALUATION

1. Final exam for all lecture and laboratory materials presented, discussed and applied.
2. Evaluation of performance at CalPoly State Dairy Judging Finals competition.

ANSC - 227: Advanced Dairy Cattle Selection & Evaluation

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify, describe, and evaluate dairy cattle based on the official dairy cattle scorecard.
2. Evaluate replacement dairy heifers as related to potential herd improvement for milk production and/or type.

Modesto Junior College
Course Outline of Record

ANSC 228

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 228—DAIRY MANAGEMENT **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete ANSC 220 and satisfactorily complete ANSC 224 and satisfactorily complete AGEC 200.*

Economics of dairying; milk production and marketing and their relationship to income; computing production costs; analyzing dairy enterprises; business planning; farm selection; management problems relating to feeding, labor, replacements, cow comfort, breeding, work simplification and record keeping. Term problem and field laboratories required. Field trips are required. Not repeatable. (A-F Only)
Transfer: (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Evaluating your current operation

1. What it's all about
2. Where you are today

B. Strategy development

1. Determinination of increasing herd size if you modernize
2. How to make a business
3. Business planning

C. Facility Planning

1. Money available
2. Dairy management system selection
3. Size and type of milking facility
4. Parlor complex and freestall barns arrangement
5. Handling manure
6. Feeding cows

7. Freestall bedding material
8. How and where animals will be handled
9. Parts of the existing facilities used and for what purposes

D. Animal handling needs
   1. Methods and locations of animal handling
   2. Animal handling - possible systems

E. Animal housing options
   1. Animal grouping strategies
   2. Special needs facilities
   3. Milking cow barn sizing
   4. Example of new facility with double-12 milking parlor
   5. Freestall barn design

F. Animal housing features
   1. Building Access
   2. Ventilation
   3. Concrete surfaces
   4. Lighting
   5. Flexibility
   6. Expandability
   7. Gates
   8. Feed mangers
   9. Waterers
   10. Fans and Sprinklers
   11. High-volume low-speed fans
   12. Tunnel ventilation

G. Freestall design and bedding material
   1. Freestall design
   2. Bedding material choices
   3. Sand versus mattresses-performance and producer satisfaction

H. Site selection

1. Long term goals
2. Herd-size implications of expansion alternatives
3. Site selection factors
4. Expansion on an existing site
5. Building a new dairy

I. Milking center options

1. Milking center types
2. Sizing a milking system
3. Milking center components
4. Use of existing buildings to house milking centers
5. Milking procedure implications
6. Efficiency implications
7. Milking system performance
8. Parlor performance

J. Feeding the dairy herd

1. Defining your feeding program
2. Determining feed storage needs
3. Feed mixing and delivery options
4. Balancing feed storage capacities with expected needs
5. The decision process-an example
6. Cropland required
7. Determining forage storage type

K. Manure handling options

1. Freestall barn manure collection and removal systems
2. Manure transport methods
3. Manure storage options
4. Sizing manure storage
5. Other considerations
6. Methane digestion
7. Vacuum loading

L. Animal acquisition

1. Factors to consider
2. Animal sources
3. Animal types
4. Transition problems

M. Heifer raising options
   1. Heifer raising objectives
   2. Heifer raising costs
   3. Custom heifer raisers
   4. Heifer facilities

N. Labor requirements and scheduling
   1. Number of employees
   2. Compensation
   3. Scheduling labor
   4. Types of employees

O. Labor management
   1. Leadership styles
   2. Employee growth
   3. Organizing the workforce
   4. Job descriptions
   5. Employee handbook development
   6. Hiring the right employees
   7. Interviewing
   8. Training
   9. Performance evaluation

P. Record keeping systems
   1. Uses of data for decision making
   2. Types of record-keeping systems maintained by dairy producers
   3. Limitations of tying costs to events
   4. Information types
   5. Examples

6. Using the data collected

Q. Acquisition of products and services

1. Partnership arrangements
2. Enterprise choices
3. Types of custom operators
4. Estimating agricultural field machinery costs
5. Establishing building rental costs
6. Calculating feed requirements
7. Buy-sell agreements for crops or TMR
8. Heifer-raising contracts

2. Required Lab Content:

A. How to approach a dairy evaluation

B. How to make personality count when hiring an employee

C. Site evaluation

D. Soil constitution and measurements

E. Irrigation system requirements and delivery evaluation

F. Determination of crops to plant and timing

G. Calculating the herd feed needs on an annual basis

H. Alternatives to dry lot dairies, their worth and place

I. Observation and evaluation of dairy equipment and supplies

J. Housing and cow comfort determinations

K. Expansion design analysis

L. Cropping feasibility study

M. Labor requirements and laws awareness

N. Purchase and finance seminar discussion

O. Developing budgets, cash flows, and balance sheets

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete ANSC 220 and satisfactorily complete ANSC 224 and satisfactorily complete AGEC 200.

2. Requisite Skills
Before entering the course, the student will be able to:

A. Explain the dairy industry and dairy animal behavior.

B. Describe common record keeping procedures.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)
Instructors of the course might conduct the course using the following method:

1. Lecture and discussion.
2. Demonstration.
3. Use of audio-visual materials.
4. Field trips to various dairies.
5. Presentations by industry professionals.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study and preparation for weekly quizzes, midterm and final exam.

B. Written evaluations of dairies observed while on field trips.

C. Analysis and preparation of the dairy management plan.

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. After evaluating the project dairy, recommend upgrades to improve productive abilities and justify the expense in the budget, cash flow, and balance sheet.

B. Develop and justify a comprehensive dairy management plan that incorporates ideas from various other dairy visits, trade shows and seminars that will increase profit.

C. Explain the correlations between animal behavior, animal stress, and environment to the productive levels of the project herd.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Roger W. Palmer (2010). *Dairy Modernization* Delmar Cengage Learning.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Explain and compare the changes that have been taking place in twentieth-century dairy farming.

b. Identify the factors in planning or modernizing and operating a dairy.

c. Identify methods of animal handling and housing features.

d. Analyze various methods of financing a dairy.

e. Explain and analyze milk marketing and government controls.

f. Analyze the factors involved in selecting a dairy site.

g. Evaluate the layout for manure management systems.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Evaluate the cow comfort level of the herd.

2. Develop a strategy for improvement of milk production, milk quality, and herd health.

3. Determine the capacity of the dairy based on the design of the milking center.

4. Identify proper facility requirements like lighting, ventilation, drainage, walking surfaces that promote health and production.

5. Understand the importance and function of the milking center to deliver a quality dairy product to the consumer.

6. Identify the requirements for manure management in regards to local, state, and federal requirements.

7. Demonstrate familiarity of labor laws, FTE limits and production ratios per worker.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Examinations on lecture material.
2. Written analysis of dairies observed on field trips.
3. Participation in class discussion.

B. SUMMATIVE EVALUATION

1. Preparation of a dairy management plan.
2. Final exam.

ANSC - 228: Dairy Management

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Explain the major principles of dairy management, including management styles and facility requirement, cultural inputs, physical improvements and function, business planning, labor relations, and record keeping.
2. Create a modernization plan for a dairy including a comprehensive evaluation, recommendations, and cost projections.

Modesto Junior College
Course Outline of Record

ANSC 230

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 230—POULTRY SCIENCE **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

A study of the principles and practices of commercial poultry production. Emphasis to be placed on poultry nutrition, reproduction, environmental management, health, marketing and recordkeeping to ensure scientifically-based management decisions and consumer product acceptance. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Distribution and Importance of Poultry

1. World
2. United States
3. California
4. Contributions of Various Cultures to the Poultry Industry

B. Biosecurity

1. Importance
2. Procedures
3. Common disease problems

C. Common Breeds and Strains Used in California

1. chickens
2. turkeys
3. Ducks/geese

D. Poultry Anatomy and Physiology

1. External anatomy
2. Major body systems

E. Brooding and Rearing

1. Egg-type chicks
2. Meat-type
3. Small scale brooding
4. Commercial brooding

F. Nutrition and Feeding

1. Feed types
2. Nutritional requirements
    a. Egg production
    b. Meat production

G. Egg Incubation

1. requirements
2. types fo incubators
3. hatching
4. Care of newly hatched chicks

H. Poultry Processing

1. Snitation procedures
2. Government regulations
3. USDA egg grades & standards
4. USDA poltry meat grades and standards

I. Animal Welfare

1. Animal care
2. Animal welfare

2. <u>Required Lab Content:</u>

A. Tour of MJC Poultry Unit

1. Floor house
2. Processing plant
3. Laying hen facility
4. Incubation area
5. Gamebird area
6. Biosecurity precautions

B. Biosecurity

1. MJC Farm
2. Field trip precautions
3. Situational analysis

C. Poultry Breeds

1. Breed, class, variety
2. Common breeds
3. Field trip

D. Poultry Anatomy

1. Necropsy tools
2. Field necropsy procedures
3. Practice

E. Brooding

1. Clean up and sanitation
2. Set up
3. Chick arrival
4. Chick grading
5. Variations in brooding

F. Raising Fryers

1. Feeds and nutrients

2. Diseases and sanitation
3. Biosecurity
4. Field trip

G. Laying Hens

1. Egg production
2. Keeping records
3. Procedures
4. Cage vs. cage-free
5. Biosecurity and sanitation
6. Field trip

H. Egg Incubation

1. Incubators and hatchers
2. Setting eggs
3. Emergencies
4. Sanitation and biosecurity

I. Poultry Processing

1. Meat bird processing
2. Egg processing
3. Field trip

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Industry field trips
3. Industry guest speakers

4. Instructor demonstrations
5. Discussion
6. Instructor-supervised lab activities

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written laboratory reports

B. Weekly reading assignments

C. Study and preparation for laboratory exams and quizzes

D. Study for final exam

E. Preparation and participation in several poultry-related activities that take place outside normally scheduled class time

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical assignment: Demonstrate how to set up a brooding area for baby chicks, light the brood stove and select appropriate feeds and litter materials.

B. Typical exam question: Describe characteristics that make the Leghorn the most important egg laying chicken breed.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Norh, Mack O., Bell, Donald D. (1990). *Commercial Chicken Production Manual* (4th/e). Springer.

2. Other: Current and appropriate reading materials selected and assigned by the instructor.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Compare and contrast poultry production in the world, United States, and California.

b. Identify and describe the productive traits of commercial layers.

c. Define biosecurity, describe its importance to the poultry industry and demonstrate biosecurity precautions throughout the class.

d. Identify and discuss traits of various breeds and species of poultry.

e. Describe career opportunities and requirements for successful employment.

f. Describe factors involved in poultry production, health, and sanitation.

g. Identify and discuss animal welfare issues in the poultry industry.

h. Describe strategies used in poultry waste management, spent hen use, and other by-products of the poultry industry.

i. Examine the contributions of various cultures to the commercial poultry industry.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Identify poultry equipment and tools, explain how they are used and demonstrate their use.

2. Brood a flock of chickens and raise them to acceptable market weight.

3. Gather eggs, identify proper feeds for laying hens and demonstrate practical sanitation procedures.

4. Explain and demonstrate procedures used in processing poultry and eggs and demonstrate an understanding of both sanitation and biosecurity procedures.

5. Set and transfer eggs in an incubator.

6. Recognize common breeds of poultry, describe their origin and practical uses.

7. Demonstrate practices used in processing and grading poultry meat and eggs.

8. Describe conditions and equipment necessary to incubate eggs.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written laboratory reports that include problem-solving, situational analysis and discussion of field trip experiences.
2. Quizzes on required reading and lecture material.
3. Practical exams that demonstrate skills.
4. Written critical thinking scenarios.

B. SUMMATIVE EVALUATION

1. Final laboratory practical skill demonstration.
2. Written final exam.

ANSC - 230: Poultry Science

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify common poultry breeds and production methods utilized in the poultry industry.
2. Discuss production parameters associated with the poultry industry.

Modesto Junior College
Course Outline of Record

ANSC 232

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

ANSC 232—AVIAN PRACTICES **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Practices in avian management including breeders, fryers and layers; incubating, brooding, and rearing of chicks; feed preparation; recordkeeping; processing, and marketing of avian products. Specific work with game birds and non-commercial species of fowl. Field trips are required. Not repeatable. (A-F Only)
Transfer: (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Poultry Breeds and Uses

1. Chicken
2. Turkey
3. Duck
4. Other

B. Alternative Methods of Poultry Production

1. Free-Range\Pasture
2. Cage-Free
3. Organic
4. Heritage breeds
5. Slow-food movement
6. Advantages
7. Challenges

C. Brooding Chicks/Turkeys

1. Preparing for the chicks
2. Operation and repair of brood stove
3. Feeding and watering

4. Preventing disease

D. Raising Fryers and Game Meat Birds

1. Feeding
2. Care for litter/cages
3. Preventing disease
4. Providing ventilation and space
5. Harvesting
6. Marketing
7. Keeping and analyzing records

E. Caring for the Layers and Breeder Game Birds

1. Feeding and watering
2. Laying physiology
3. Preventing disease and parasites
4. Identifying danger and stress signals
5. Gathering, processing, and marketing of eggs
6. Culling
7. Keeping records
8. Marketing strategies
9. Incubating and hatching eggs

F. Conducting Research Projects

1. Using the scientific method
2. Research ethics
3. Project requirements
4. Keeping and analyzing records

G. Alternative Species

1. Squab
2. Ducks
3. Gamebirds
4. Other
5. Processing and marketing

6. Keeping and analyzing records

2. Required Lab Content:

A. Recognizing Poultry Breeds

B. Using Poultry Equipment

C. Brooding Set-up

D. Egg Gathering and Storage

E. Egg Incubation and Hatching

F. Experimental Design and Data Gathering

G. Field Trip to Squab Producer

H. Poultry Harvest and Marketing

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture on class material
2. Discussion of current topics
3. Facilitate skill development in lab sessions
4. Field trips to industry
5. Demonstration of processing procedures

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly laboratory reports

B. Study for final exam and laboratory skill exam

C. Complete a research project and present it in a report format

D. Study and preparation for quizzes

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Students will develop, design and carry out a research project on some aspect of alternative poultry production. Students will collect and analyze data and present the report to their classmates.

B. Students will compile a "Breed Study Guide" that includes all poultry breeds studied in class. The study guide will consist of a color picture of the breed, the origin, the history/uses of the breed, and existing varieties.

C. Typical quiz question: You are a 4H leader/FFA Advisor and your poultry group wants to start a poultry project. What breed would you recommend and why?

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Instructor-generated handouts that relate to the poultry industry, current issues and other relevant topics regarding alternative methods of poultry production.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Demonstrate the skills necessary to perform the jobs on various types of poultry operations.

b. Discuss alternative methods of poultry production including free-range, cage-free, pasture-raised, organic and specialty niche markets.

c. Identify and use various types of poultry-related equipment.

d. Using the scientific method, design, develop and carry out a research project related to some alternative method or specialty type of poultry production.

e. Analyze advantages and disadvantages of various strategies of alternative poultry production including marketing of products, potential for growth and demand.

f. Identify various breeds and types of fowl used in alternative production systems.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Use various types of poultry equipment.

2. Recognize common breeds of poultry used in alternative systems of production.

3. Design, develop and carry out a laboratory research project.

4. Successfully incubate eggs, hatch them and rear various poultry species.

5. Demonstrate skills in the harvesting, packaging and marketing of poultry.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written laboratory assignments
2. Periodic quizzes
3. Participation in hands-on aspects of course

B. SUMMATIVE EVALUATION

1. Final examination
2. Laboratory final examination
3. Research project report and presentation

ANSC - 232: Avian Practices

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Prepare brooding equipment and facilities for a flock of meat birds or egg layers.
2. Recognize and explain alternative methods of poultry production.

Modesto Junior College
Course Outline of Record

ANSC 235

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 235—POULTRY DISEASES AND HOUSING **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Anatomy and physiology of poultry; diagnosis, treatment, and control of disease; biosecurity; sanitation; types of housing and equipment; planning housing, and equipment needs; vaccination schedules. Students will conduct a research project. Field trips are required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Anatomy and physiology

1. Respiratory system
2. Excretory system
3. Digestive system
4. Reproductive
5. Unique adaptations of birds

B. Sanitation and biosecurity

1. Equipment and houses
2. Litter and ranges
3. Water and feed
4. Biosecurity protocols
5. Designing biosecurity plans
6. California Egg Quality Assurance Program

C. Post-mortem examination of fowl

1. Role of the Turlock Diagnostic lab
2. Using proper technique

D. Diseases, symptoms, cause, prevention, and control
    1. Coccidiosis
    2. Fowl pox
    3. Newcastle disease
    4. Bronchitis
    5. Laryngotracheitis
    6. Chronic respiratory disease
    7. Pullorum
    8. Coryza
    9. Cholera
    10. Paratyphoid
    11. Leukosis complex
    12. Mareks disease
    13. Blackhead
    14. Aspergillosis

E. Mechanical difficulties
    1. Internal layer
    2. Crop bound
    3. Impaction of oviduct
    4. Prolapse of oviduct
    5. Cannibalism

F. Parasites and insects—control and treatment
    1. Lice and mites
    2. Worms

G. General use of poultry drugs
    1. Administration methods
    2. Withdrawal periods
    3. Environmental/social concerns

H. Poultry facility design
    1. Buildings
    2. Pens

3. Waterers
4. Feeders
5. Miscellaneous

I. Evaluation of various production methods
   1. Meat bird producers
   2. Laying hen producers
   3. Turkey producers
   4. Other

J. Poultry research project design
   1. Scientific method
   2. Possible projects
   3. Design and completion
   4. Presentation

2. Required Lab Content:

A. Conducting a field necropsy
B. Identification of internal organs
C. Recognizing signs of disease
D. Observing a professional veterinarian conduct a necropsy and take tissue samples
E. Designing a biosecurity plan
F. Practical poultry facility design
G. Trends in poultry housing
H. Designing a poultry research project
I. Data collection and analysis of results
J. Class presentation of research results

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0

Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Class lecture and hands-on skill demonstration
2. Field trips
3. Demonstration of techniques used in various laboratory activities
4. Discussion of observations and class activities

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written laboratory reports

B. Study for periodic quizzes - 5 per term

C. Study for final exam and lab practical exam

D. Preparation and presentation of a research project

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Students will design, develop and carry out a research project on some aspect of poultry housing. They will prepare and present a research report to their classmates.

B. During lab, students will learn the procedures for conducting a necropsy and will demonstrate their knowledge by conducting a necropsy on a laying hen.

C. Typical quiz question: (Teacher provides actual necropsied hen with internal organs displayed.) Identify the following parts and describe the function of each.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** B. R Charlton (2000). *Avian Disease Manual* (5th/e). American Association of Avian Pathologists; 5th edition (2000).
2. Other: Readings from poultry industry magazines and journals: Poultry Science, Poultry USA, and Poultry Times.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify and explain the structure and function of various physiological systems.

b. Explain unique anatomical and physiological adaptations of the avian species.

c. Identify and describe symptoms and controls for common external poultry parasites.

d. Describe common disease signs and identify possible control/preventative measures.

e. Conduct a post-mortem exam and identify possible lesions.

f. Explain the significance of biosecurity and design a disease prevention program.

g. Demonstrate practical skills in treating diseases.

h. Identify housing and equipment needs of various types of poultry.

i. Compare and contrast environmental controlled poultry housing with open-typing housing.

j. Evaluate new trends in poultry housing, equipment and health management.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Explain the concepts of biosecurity and design a simple biosecurity plan for a small poultry farm.

2. Demonstrate steps in conducting a field necropsy and recognize any abnormalities.

3. Describe common poultry diseases, signs, symptoms and possible treatments.

4. Recognize types of poultry housing utilized by various species of poultry and give advantages and disadvantages of each.

5. Design and conduct a research project focusing on some aspect of poultry disease or housing.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. In-class objective examinations that test for definitions and understanding of major concepts relating to poultry disease and housing
2. Participation and attendance on field trips
3. Class participation, including involvement in discussion during lecture and laboratory
4. Weekly laboratory reports
5. Periodical written and practical quizzes

B. SUMMATIVE EVALUATION

1. Completion of a class research project and presentation of a group report
2. Final examination
3. Lab practical exam

ANSC - 235: Poultry Diseases and Housing

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe common commercial production strategies and the types of housing involved with each.
2. Explain basic biosecurity principles and develop a practical biosecurity plan for a farm.

Modesto Junior College
Course Outline of Record

ANSC 236

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 236—POULTRY BREEDING & SELECTION **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Principles of breeding, reproduction and selection of poultry. Examination of poultry breeds and their uses. Embryology, egg incubation, hatching and grading. Field trips are required. Not repeatable. (A-F Only)
Transfer: (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Poultry Introduction
   1. Unique characteristics
   2. Uses of poultry
   3. Production areas

B. Poultry Breeds
   1. Major chicken breeds
   2. Other fowl
   3. Uses and prevalence
   4. Unique qualities

C. Poultry Reproduction
   1. Characteristics
   2. Structure and function
   3. Egg production problems

D. Hen Selection
   1. Evaluation of laying hens
   2. Past production
   3. Present production

E. Hatching Eggs
   1. The commercial hatchery
   2. Qualities and characteristics
   3. Sources
   4. Storage

F. Egg Incubation
   1. Requirements
   2. Types of incubators
   3. Common problems

G. Hatching and Care of Chicks
   1. Hatching
   2. Care of day-old chicks
   3. Placement
   4. Trouble-shooting problems

H. Experimental Design
   1. The research project
   2. Hypothesis development
   3. Purpose and format
   4. Data collection
   5. Analysis and evaluation

I. Embryology
   1. Stages of development
   2. Characteristics
   3. Problems
   4. Analysis

2. <u>Required Lab Content:</u>

A. Review of poultry breeds
B. Hen reproductive system dissection

C. Egg incubation

D. Hatching and problem analysis

E. Experimental design and development

F. Brooding and rearing chicks

G. Hatchery management

H. Embryology project

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture on course material
2. Discussion of current topics
3. Field trips to local poultry industries
4. Hands-on application of practical skills
5. Demonstrations

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Preparation for periodical quizzes

B. Weekly laboratory reports

C. Preparation for active participation in laboratories

D. Development of hypothesis and research methods

E. Research project, one per term

F. Preparation for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Develop, design and carry out a small research project covering some aspect of poultry breeding and selection.

B. Complete a scientific report on the research project listed above.

C. Complete laboratory reports following field trips or other class lab activities.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Designated class reading assignments provided by the instructor.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify common breeds of fowl and assess their importance, common uses and unique characteristics.

b. Identify and describe the function of the reproductive organs of poultry.

c. Illustrate the basic principles of genetics and predict genotypic outcome.

d. Identify characteristics of desirable laying hens.

e. Explain principles of incubation and hatching, analyze and troubleshoot common incubation problems.

f. Describe hatchery operations and management.

g. Design and carry out a research project on some aspect of embryology, egg incubation and hatching.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Describe basic aspects of a modern chick hatchery.

2. Design, develop and carry out a research project on some aspect of egg incubation, hatching or embryology.

3. Recognize various breeds of fowl and describe their attributes.

4. Brood and grow-out a small flock of chickens.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly laboratory reports.
2. Exam on breed identification and use.
3. Participation in class discussions and laboratory activities.
4. Evaluation of student calculations of simple genetic outcomes given various scenarios.
5. Embryology research project.

B. SUMMATIVE EVALUATION

1. Evaluation and analysis of students' research projects.
2. Lab practical and final exam.
3. Class presentation of research results.

ANSC - 236: Poultry Breeding & Selection

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify, describe, and compare common poultry breeds.
2. Evaluate and select commercial laying hens, backyard fowl and other fowl.
3. Incubate and hatch eggs.
4. Troubleshoot common problems in poultry breeding.

Modesto Junior College
Course Outline of Record

ANSC 240

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 240—BEEF FITTING AND SHOWING **2 UNITS**

27 Lecture Hours, 27 Lab Hours , 54 Outside-of-Class Hours = 108 Total Student Learning Hours

Principles of selection, feeding, fitting, and presentation of beef animals for show. Four completions allowed. Field trips might be required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Selection

1. Where to look for desirable animals

B. Health program

1. Vaccination program
2. Feeds and feeding

C. Rations used in feeding livestock

1. Feeding programs
2. Fitting

D. Practices before the show

1. Practices while at the show
2. Procedures in the show ring

E. Show ring ethics

1. Show classifications and birth dates
2. Entry blanks for fairs

3. Rules and regulations

2. <u>Required Lab Content:</u>

A. Selection

1. Criteria used in selection
2. Where to look for desirable animals

B. Health program

1. Vaccination program

C. Feeds and feeding

1. Rations used in feeding livestock
2. Different feeding programs

D. Fitting and preparing for a show

1. Practices before the show
2. Practices at the show

E. Procedures in the show ring

1. Show ring ethics

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	27	1.50
Lab	27	0.50
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Discussion
2. Lecture
3. Demonstration
4. Use of PowerPoint presentations, videotapes, and problem-solving to supplement lectures

5. Possible field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments

B. Study and preparation for quizzes

C. Preparation for final exam

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Describe how to properly handle cattle when halter breaking.

B. List 5 grooming tools used to prepare for a livestock show and explain their uses.

C. Describe and then demonstrate how to exhibit a steer in the show ring.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Albers Research (2017). *Selecting, Fitting and Showing Beef* Albers Milling Company .

2. Other: Instructor handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify new trends in beef selection and feeding.

b. Demonstrate new equipment and grooming aids.

c. Describe new techniques in fitting and showing.

d. Demonstrate a higher level of skill in using fitting equipment, i.e., clippers, blowers, chutes and racks.

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate skill and proficiency in beef fitting and showing.

2. Demonstrate appropriate show ring ethics.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Class discussion and participation
2. Quizzes and tests
3. "Hands-on" practice in fitting and showing

B. SUMMATIVE EVALUATION

1. Final exam
2. Exam on practical laboratory skills

ANSC - 240: Beef Fitting and Showing

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Select a beef animal using standard criteria.
2. Identify proper feeds and feeding methods for a beef animal.
3. Train and fit steers or heifers for exhibition.

Modesto Junior College
Course Outline of Record

ANSC 241

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 241—SHEEP FITTING AND SHOWING **2 UNITS**

27 Lecture Hours, 27 Lab Hours , 54 Outside-of-Class Hours = 108 Total Student Learning Hours

Principles of selection, feeding, fitting, and presentation of sheep animals for show. Four completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Selection

1. Criteria used in selection
2. Selection of desirable animals

B. Health program

1. Vaccination program

C. Feeds and feeding

1. Rations used in feeding livestock
2. Feeding programs

D. Fitting

1. Practices before the show
2. Practices while at the show

E. Procedures in the show ring

1. Show ring ethics

F. Show classifications and birth dates

1. Entry blanks for fairs
2. Rules and regulations

2. Required Lab Content:

Content learned in lecture will be applied in lab portion.

A. Selection

1. Criteria used in selection
2. Where to look for desirable animals

B. Health program

1. Vaccination program

C. Feeds and feeding

1. Rations used in feeding livestock
2. Feeding programs

D. Fitting

1. Practices before the show
2. Practices while at the show

E. Procedures in the show ring

1. Show ring ethics

F. Show classifications and birth dates

1. Entry blanks for fairs
2. Rules and regulations

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	27	1.50
Lab	27	0.50

Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)
Instructors of the course might conduct the course using the following method:

1. Lecture
2. Discussion
3. Demonstrations
4. Use of PowerPoint presentations, video presentations, and problem-solving to supplement lectures
5. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments

B. Study and preparation for quizzes

C. Preparation for final exam

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Demonstrate how to present a market lamb in the show ring.

B. Describe methods of preventing "lamb fungus".

C. Describe a feeding program for a market lamb from 80 lbs. to market weight.

D. List 5 supplies that are used to prepare a lamb for show and explain their uses.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Laura Lawson (1994). *Showing Sheep: Selecting, Raising, Fitting, & Showing Guide* LDF Publications .

2. Other: Instructor handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify new trends in sheep selection and feeding.

b. Identify new trends in show classification.

c. Demonstrate new equipment and grooming aids.

d. Describe new techniques in fitting and showing.

e. List show classifications and base dates.

f. Work individually and without supervision in preparation of animals for exhibition (field trip).

g. Complete entry forms and other show paperwork without supervision.

h. Demonstrate a higher level of skill in using fitting equipment, i.e., clippers, blowers, chutes and racks.

i. Teach other students to prepare animals for exhibition (field trip).

j. Teach other students how to complete entry forms and other show paperwork.

k. Teach other students how to safely use livestock fitting and showing equipment.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate skill and proficiency in sheep fitting and showing.
2. Demonstrate appropriate show ring ethics.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Class discussion and participation
2. Quizzes and tests
3. "Hands-on" practice in fitting and showing

B. SUMMATIVE EVALUATION

1. Final exam
2. Exam on practical laboratory skills

ANSC - 241: Sheep Fitting and Showing

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Select a prospect lamb using standard criteria.
2. Feed a lamb so it properly attains market weight.
3. Train and fit sheep for exhibition.

Modesto Junior College
Course Outline of Record

ANSC 242

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

ANSC 242—SWINE FITTING AND SHOWING **2 UNITS**

27 Lecture Hours, 27 Lab Hours , 54 Outside-of-Class Hours = 108 Total Student Learning Hours

Principles of selection, feeding, fitting, and presentation of swine for show. Three completions allowed. Field trips are not required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Selection

1. Criteria
2. Where to look for desirable animals

B. Feeding Show Hogs

1. Common feed rations
2. Feeding practices
3. Supplements

C. Management Procedures

1. Housing
2. Sanitation

D. Fitting

1. Before show
2. While at the show

E. Equipment Use

1. Safety
2. Proper maintenance
3. Operation

F. Procedures in the Show Ring

1. Show ring ethics
2. Show classifications and birth dates
3. Entry form paperwork

G. Rules and Regulations

2. <u>Required Lab Content:</u>

A. Selection and Evaluation Practice

1. Gilts
2. Barrows
3. Breeding animals

B. Showmanship Practice

1. Novice
2. Intermediate
3. Advanced

C. Feeding Skills

1. Practice proper feeding techniques

D. Fitting Swine for Exhibition

1. Use of equipment
2. Safety
3. Application

E. Completing Show Forms & Entries

1. Classification examples
2. Breeds

3. Breeding dates and records

F. Show Ring Ethics in Practice

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	27	1.50
Lab	27	0.50
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Demonstration
3. Discussion
4. Use of Power point presentations, videos, and problem-solving to supplement lectures
5. Guided practice

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly practice and work with assigned animals

B. Study and preparation for quizzes

C. Preparation for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Given a pen of 4 feeder hogs, students will analyze, critique and discuss the merits of each using descriptive terminology appropriate for the species.

B. Read and analyze current literature in the field of livestock fitting and showing.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Instructor handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. 1st completion

b. Describe and practice new trends in swine selection, feeding, fitting, and presentation of swine animals for shows and sales.

c. Analyze classification and base dates for swine shows.

d. Describe common management practices used in small-scale swine production.

e. 2nd completion

f. Work individually and without supervision in preparation of animals for exhibition.

g. Complete entry forms and other show paperwork without supervision.

h. 3rd completion

i. Teach other students how to complete entry forms and other show paperwork.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Select and operate commonly used grooming equipment for swine show preparation.

2. Utilize ultra-sound technology in swine selection.

3. 2nd completion

4. Operate show equipment with a higher level of proficiency in preparing animals for show.

5. 3rd completion

6. Teach other students the basics of show preparation and exhibition.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Class discussion and participation
2. Quizzes and tests
3. "Hands-on" practice in fitting and showing

B. SUMMATIVE EVALUATION

1. Final exam
2. Laboratory Practical Exam

ANSC - 242: Swine Fitting and Showing

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Select a prospect barrow or gilt using standard evaluative criteria.

Modesto Junior College
Course Outline of Record

ANSC 243

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 243—EQUINE FITTING AND SHOWING **2 UNITS**

27 Lecture Hours, 27 Lab Hours , 54 Outside-of-Class Hours = 108 Total Student Learning Hours

Principles of selection, feeding, fitting, and presentation of horses for show. Four completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Selection of show horses

1. Evaluation of equine conformation
2. Evaluation of movement
3. Evaluation of biomechanics

B. Grooming and handling

1. Tool identification
2. Tack identification
3. Handling techniques

C. Where to look for desirable animals

1. Market research
2. Market trends

D. External and internal parasite control

1. Deworming protocols

E. Health and vaccination protocols

1. Vaccination protocols
2. Basic health exams / TPR

F. Feeds and feeding

1. Identification of various feed material
2. Feed brands / marketing

G. Rations used in feeding horses

1. Formulation of feed rations based on weight
2. Formulation of feed rations basic on age/work

H. Show preparation

1. Entry completion
2. Equipment preparation

I. Procedures in the show ring

1. Observation of show ring ethics
2. Demonstration of show ring performance

J. Rules and regulations at various exhibition levels

1. Research on the various levels of equine competition
2. Understanding of various regulations that are dependent upon the shows level or ranking

2. <u>Required Lab Content:</u>

A. Demonstration of grooming

1. Tool identification
2. Correct application of tool to various parts of the equine anatomy
3. Show preparation

B. Demonstration of show techniques

1. Showing in hand
2. Showing under saddle

3. Show ring protocols

C. Understanding the basics of equine nutrition

1. Feed utilization
2. Nutritional content of various feeds

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	27	1.50
Lab	27	0.50
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Discussion
3. Demonstration
4. PowerPoint presentations, videotapes, and problem-solving to supplement lectures
5. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments.

B. Study and preparation for quizzes.

C. Preparation for demonstrative exams.

D. Monthly demonstrations of techniques given in lab.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Students will complete written assignments emphasizing descriptive, analytical, and evaluative skills.

B. Read and analyze current literature in the field of equine fitting and showing.

C. Demonstrate the ability to organize an equine event.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Kent Thompson (2017). *Basic Equine Nutrition and Its Physiological Functions* (1/e). AAEP & Purina Mills.

2. Other: Instructor handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify techniques in grooming.

b. Identify trends in selection.

c. Discuss different uses and purposes of the horse.

d. Define rules governing performance and halter horses.

e. Demonstrate the use of new equipment and grooming aids.

f. Identify new trends in showing.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate basic grooming techniques.

2. Explain the process of preparing a horse for exhibition.

3. Demonstrate basic handling techniques.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Class discussion and participation.

2. Quizzes and tests.

3. "Hands-on" practice in fitting and showing.

B. SUMMATIVE EVALUATION

1. Final exam.

2. Exam on practical laboratory skills.

ANSC - 243: Equine Fitting and Showing

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Select a horse using standard selection criteria.
2. Understand how nutrition and competition pertain to fitness in the horse.
3. Feed an equine so it properly attains and maintains the proper weight.
4. Understand and complete basic feed calculations.
5. Identify feed components commonly used in equine feed.

Modesto Junior College
Course Outline of Record

ANSC 244

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 244—DAIRY FITTING AND SHOWING **2 UNITS**

27 Lecture Hours, 27 Lab Hours , 54 Outside-of-Class Hours = 108 Total Student Learning Hours

Principles of selection, feeding, fitting and presentation of dairy animals for sales and shows. Field trips might be required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Selection

1. Emphasis on type
2. Pedigree analysis
3. Cost of animals
4. How to purchase

B. Equipment

1. Basic equipment needs and maintenance
2. Supplies and equipment cost

C. Nutrition

1. Importance of animal condition
2. Type of feed and amounts
3. Feeding for show

D. Fitting and grooming

1. Importance
2. Clipping techniques
3. Correcting weak points
4. Housing

5. Training

E. Exhibiting

1. Showing techniques
2. Show ring dress and equipment

F. Diseases and parasites

1. Control of diseases and parasites

G. Miscellaneous skills

1. Trimming feet
2. Dehorning
3. Removing warts
4. Removing extra teats
5. Other skin disorders

2. Required Lab Content:

A. Identification of parts of a dairy heifer

1. Identification of differences of good parts and poor parts

B. Evaluation and judging of heifers on the PDCA scorecard

C. Demonstration of proper use, care, and maintenance of cattle clippers

1. Clipping the hair to sculpt an improved look

D. Identification of behavior patterns of dairy cattle

E. Animal handling

1. Teaching the heifer to respect a halter and to follow the lead
2. Teaching the heifer to pose to various positions that will make her more appealing

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	27	1.50
Lab	27	0.50
Discussion	0	0

Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Demonstrations
2. Use of PowerPoint presentations
3. Lecture and discussion
4. "Hands-on" activities working with dairy animals
5. Possible field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments.

B. Study and preparation for quizzes.

C. Preparation for final exam.

D. Weekly observation of others working animals and evaluating their positioning and showing of the heifers.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Writing assignments emphasizing descriptive, analytical, and evaluative skills in designing an advertisement, news release or marketing material.

B. Read and analyze current literature and photographs in the field of livestock fitting and showing.

C. Identify and discuss the area of the animal that most judges will evaluate to determine how much quality an animal has in a class.

D. Discuss the amount of loss in revenue if you do not set, show, or display your animal properly in the show ring or sales ring.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Instructor handouts

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify the proper equipment and supplies for grooming.

b. Describe the economic benefits of grooming and fitting for show and sale.

c. Demonstrate appropriate selection, grooming, fitting, feeding, and training for show.

d. Analyze dairy pedigrees and type as a tool for selection.

e. Work individually and without supervision in preparation of animals for exhibition (field trip).

f. Complete entry forms and other show paperwork without supervision.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Evaluate an animal for type and identify the strong traits and the weak traits.

2. Prepare by clipping hair to various lengths to hide poor faults and highlight strengths to a more distinguished appearance.

3. Train a heifer to lead and be comfortable around people, objects and loud noises without being frightened.

4. Feed the animal a ration that will make the animal look like a desirable replacement for a herd owner in need.

5. Explain the benefits of the animal's pedigree and the future production capabilities.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Class discussion and participation
2. Quizzes and tests
3. "Hands-on" practice in fitting and showing

B. SUMMATIVE EVALUATION

1. Final exam
2. Exam on practical laboratory skills

ANSC - 244: Dairy Fitting and Showing

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Select a dairy heifer using standard criteria.
2. Feed a dairy heifer so it attains and maintains proper weight.
3. Train and fit dairy cattle for exhibition.

Modesto Junior College
Course Outline of Record

ANSC 250

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

ANSC 250—VETERINARY PHYSIOLOGY, ANATOMY, & TERMINOLOGY **3 UNITS**

Formerly listed as: *ANSC - 250: Veterinary Physiology, Anatomy & Termin*
54 Lecture Hours , 108 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete ENGL 101 or qualification by the MJC assessment process.*

Commonly used terminology and biological concepts used in veterinary medicine. Includes study of basic normal anatomy and physiology in a body systems format, along with related vocabulary and spelling. Commonly used veterinary acronyms and abbreviations are woven throughout the course where relevant. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction to word structure, roots, prefixes, suffixes and combinations; introduction to body planes and application of directional terms

B. Introduction to biology of the cell and related terminology of cellular anatomy and physiology

C. Overview of body structure and organization defined in terms of anatomy and physiology of the tissues, organs, and organ systems

D. Disease progression in animals

E. Lab tests used in the small animal clinic

F. Animal health centers

G. Hematopietic system

1. Terminology
2. Anatomy
3. Physiology

H. Lymphatic system

1. Terminology
2. Anatomy
3. Physiology

I. Musculoskelatal system
   1. Terminology
   2. Anatomy
   3. Physiology

J. Cardiovascular system
   1. Terminology
   2. Anatomy
   3. Physiology

K. Respiratory system
   1. Terminology
   2. Anatomy
   3. Physiology

L. Nervous system
   1. Terminology
   2. Anatomy
   3. Physiology

M. Eye and visual pathway
   1. Terminology
   2. Anatomy
   3. Physiology

N. Ear
   1. Terminology
   2. Anatomy
   3. Physiology

O. Alimentary system
   1. Terminology
   2. Oral and GI anatomy
   3. Physiology

P. Urinary system

1. Terminology
2. Anatomy
3. Physiology

Q. Reproductive system

1. Terminology
2. Anatomy
3. Physiology

R. Endocrine system

1. Terminology
2. Anatomy
3. Physiology

S. Integumentary system

1. Terminology
2. Anatomy
3. Physiology

T. Pharmacology

1. Terminology of drugs
2. Routes of medication administration
3. Prescription format

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete ENGL 101 or qualification by the MJC assessment process.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate college-level writing skills.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00

Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture supported by PowerPoint presentations
2. In-class discussion of reading in text and handouts
3. Instructor-facilitated discussion of self-evaluation exercises in text

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written homework

B. Study for weekly quizzes and exams

C. Prepare for class performance and performance exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical exam question: What changes occur in ostocytes when a bone fractures and how does this change aid in the healing process?

B. Typical exam question: Match the following gastric cell type with the substance they produce.

1.	Parietal cell	a. mucous
2.	Chief cell	b. hydrochloric acid
3.	Goblet cell	c. gastrin
4.	G cell	d. pepsinogen

C. Typical exam question: Which organ produces bile and glucose?

D. Typical exam question: What animal does not have a gall bladder?

1. Dog
2. Cat
3. Cow
4. Horse

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Colville, Thomas & Bassert, Joanna (2014). *Clincal Anatomy and Physiology for Veterinary Technicians* (3/e). St. Louis, Missouri Mosby Elsevier.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Demonstrate an understanding of basic biology and microbiology.

b. Demonstrate an understanding of basic chemistry.

c. Identify normal anatomy and physiology of animals.

d. Define terminology used in small animal veterinary practice.

e. Identify disease progression in animals.

f. Analyze the complete animal system: terminology, anatomy and physiology.

g. Discuss the effect of various medications on the nervous and endocrine systems.

h. Analyze the disease process as it relates to the cardiovascular and respiratory systems.

i. Discuss medical terminology.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written homework
2. Quizzes and exams
3. Practical exams

B. SUMMATIVE EVALUATION

1. Mid-term written examination
2. Mid-term practical examination
3. Final written examination
4. Final practical examination

ANSC - 250: Veterinary Physiology, Anatomy, & Terminology

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Define medical, and anatomical, pharmaceutical and surgical terminology that is commonly used in the veterinary field.
2. Identify and describe the location and function of the major organ systems in the body.

Modesto Junior College
Course Outline of Record

ANSC 251

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 251—VETERINARY PHARMACY PROCEDURES **2 UNITS**

36 Lecture Hours , 72 Outside-of-Class Hours = 108 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete MATH 30 or qualification by the MJC assessment process.*

Includes discussion of veterinary pharmacology, proper labeling and dispensing instructions with emphasis on pharmaceutical calculations and metric conversions within the veterinary discipline. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Pharmacy Orientation

1. OTC and prescription items
2. Understanding proper packaging and labeling
3. Inventory evaluation techniques

B. Pharmacy Techniques

1. Math:

   a. Dosage calculations
   b. Conversion calculations: metric to standard

2. Language and labeling
3. Controlled substances

   a. Stocking
   b. Inventory
   c. Dispensing

4. Adverse drug reactions

C. Pharmaceutical Agents

1. Anthelmintics
2. Antiseptics/disinfectants
3. Vaccines
4. Pharmaceutical effects on various systems
    a. Circulatory
    b. Gastrointestinal
    c. Respiratory
    d. Nervous
    e. Urinary
5. Antihistamines
6. Sedatives
7. Narcotics

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete MATH 30 or qualification by the MJC assessment process.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Complete basic pharmaceutical conversions from the metric to a standard system.

C. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Use of visual aids
2. Lecture
3. Instructor-led discussion and problem solving

4. Class demonstrations and applications
5. Observation of commonly used labeling and pharmaceutical agents

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments

B. Weekly math and medication calculation assignments

C. Preparation for midterm exam

D. Preparation for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Student Case Assignment - Given a fictional case study with diagnosis and treatment plan, answer the following questions.

1. How is the diagnosis made?
2. What symptoms does the animal have?
3. What is the treatment plan?
4. What drugs are used and what is the dose? Please explain how the dose is calculated.
5. Explain the pharmacokinetics and pharmacodynamics of the drugs.
6. Are there any possible adverse reactions?
7. How will the patient's progress be monitored?

B. The vet wants 400 mg amoxicillin P.O. B.I.D. for 7 days to a dog. Doctor wants tablets dispensed. Tablets come in 200mg strength. How many total tablets should you give the owner for the 7 days?

1. 14 tablets
2. 7 tablets
3. 28 tablets
4. 42 tablets
5. None of the Above

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Amundson & Romich (2013). *Fundamentals of Pharmacology for Veterinary Technicians* (2nd/e). Delmar.

2. Other: Surgical scrubs, protective eyewear

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Evaluate protocols on the stocking, issuing, recording and handling of controlled substances.

b. Calculate dosages of prescribed medications.

c. Understand and communicate the importance of proper packaging, labeling and dispensing of prescription drugs.

d. Identify specific pharmaceutical agents.

e. Describe adverse reactions to drugs.

f. Identify basic chemical reactions involved with pharmaceutical solutions and reconstitutions.

g. Perform medical mathematical calculations that convert metric units to standard.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written homework
2. Reading reports
3. Written exams

B. SUMMATIVE EVALUATION

1. Mid-term written examination
2. Final written examination

ANSC - 251: Veterinary Pharmacy Procedures

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe potential drug interactions.
2. Calculate doses of medication for any given animal based on a veterinarian's instructions.
3. Identify symptoms that may appear in a patient during negative drug interactions.
4. Calculate common medical dosing conversions from metric to standard labels.

Modesto Junior College
Course Outline of Record

ANSC 252

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 252—VETERINARY EQUIPMENT: OPERATION, INSTRUMENTATION, AND SAFETY **3 UNITS**

54 Lecture Hours , 108 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete an MJC English composition course or the equivalent, or to exhibit proficiency in college-level essay writing skills.*

Introduction to diagnostic imaging equipment used in veterinary practices. Safe operation of radiographic equipment. Use of ultra-sound equipment. Use of gas anesthesia equipment - safety and proper procedure. Field trips are required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Procedures basic to preparing a technique chart

1. Protect against hazards of exposure
2. kVp and mAs
3. Table-top and grid requirements
4. Film types and exposure factors
5. Machine factors affecting exposure and radiographic detail
6. Patient conditions affecting exposure factors

B. Radiation safety precautions

1. California Radiation Control Regulations & Radiation Safety in Veterinary Practice (relevant sections)
2. Radiation monitoring devices
3. Protective equipment
4. Mechanical and chemical restraints for patients
5. Collimators
6. Storage of protective equipment

C. Understanding diagnostic radiographs

1. Measurement of patient
2. Positioning patient
3. Heel effect
4. Time of exposure

D. Manual and automatic concepts in processing of radiographic films

E. Digital Radiography Equipment

1. Use
2. Equipment
3. Safety
4. Storage

F. Labeling and filing radiographs

G. Ultrasound procedures

1. Patient prep
2. Ultrasound principles
3. Restraint techniques
4. Hazards of ultrasound exposure
5. Labeling

H. Anesthesia

1. Anesthetic agents and their properties
2. Anesthetic machine preparation and safe operation
3. Administration systems
    a. Semi-closed
    b. Closed
    c. Semi-open
    d. open
4. Endotracheal intubation

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete an MJC

English composition course or the equivalent, or to exhibit proficiency in college-level essay writing skills.

2. Requisite Skills
Before entering the course, the student will be able to:

A. Demonstrate college-level writing skills.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)
Instructors of the course might conduct the course using the following method:

1. Use of visual aids
2. Lecture
3. Instructor-led discussion and problem solving
4. Field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study for weekly quizzes

B. Weekly reading assignments / periodical reviews

C. Study for midterm exam

D. Study for final exam

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. When taking direction on the position of a patient, be able to describe and explain the direction the patient will be positioned in as well as the direction the image will be taken.

B. Explain how to tell if a radiograph is over exposed and what you could increase or decrease by the way of technique to improve the image.

C. What is the importance of radiographic labeling? Explain how a technician can tell the position of the patient based on labeling.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Anthony & Marguis (2010). *Handbook of Radiographic Postioning for Vet Techs* (2nd/e). Delmar.

2. **Book:** Lavin (2014). *Radiography in Veterinary Technology* (4th/e). Saunders.
3. Other: Surgical scrubs, protective eyewear

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Prepare and describe the how to use diagnostic imaging equipment.

b. Explain the use of radiation monitoring devices and safety equipment.

c. Explain the diagnostic value of radiographic procedures requiring contrast media.

d. Explain the technicians role in assisting with diagnostic ultrasound procedures.

e. Devise a checklist for the safe operation of anesthetic machines.

f. Determine the proper administration system and calculate appropriate flow rates.

g. Explain anesthetic instrumentation, induction, and monitoring for various animal species.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written homework
2. Reading reports
3. Written exams
4. Periodical reviews

B. SUMMATIVE EVALUATION

1. Mid-term written examination
2. Final written examination

ANSC - 252: Veterinary Equipment: Operation, Instrumentation, and Safety

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and operate common diagnostic equipment found in a veterinary practice.
2. Utilize common safety measures and precautions required when operating radiography equipment.
3. Maintain and monitor common diagnostic equipment utilized in a veterinary practice.

Modesto Junior College
Course Outline of Record

ANSC 253

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 253—VETERINARY LABORATORY PROCEDURES **1 UNITS**

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete an MJC English composition course or the equivalent, or to exhibit proficiency in college-level essay writing skills.*

Introduction to manual and automated veterinary lab techniques and procedures, including work with blood, urine, fecal and skin samples. Field trips are not required. Not repeatable. (A-F or P/NP)
Transfer: (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Understanding of laboratory techniques used to collect biological and microbiological samples:

1. Complete blood count
    a. PCV
    b. Total protein
    c. White cell counts
    d. RBC morphology
    e. Platelet estimate
2. Urinalysis
    a. Specific gravity
    b. Chemistries
    c. Evaluation of sediment
3. Fecal evaluation for endo parasites
4. Skin and hair
5. Specimen preparation and shipping

B. Parasitology

1. Describing endo/ecto parasites

C. Lab equipment

1. Understanding the importance of routine maintenance on lab equipment
2. Biohazardous material records and proper disposal

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete an MJC English composition course or the equivalent, or to exhibit proficiency in college-level essay writing skills.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate college-level writing skills.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Use of visual aids
3. Instructor-led discussion and problem solving
4. Demonstration of veterinary techniques
5. Instructor-facilitated group learning projects

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading reports

B. Weekly journal entries

C. Weekly periodical reports

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Discuss various veterinary laboratory procedures.

B. Analyze laboratory techniques and discuss the importance of individual tests for diagnostic use in patients.

C. Write reviews of current periodicals.

D. Compare and contrast various techniques demonstrated.

E. Analyze a completed laboratory report for potential health problems of the patient.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Hendrix, Charles (2008). *Laboratory Procedures for Veterinary Technicians* (5/e). Mosby.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Determine red and white blood cell counts as it relates to animal health.

b. Identify a pathogen and explain how to test for antibiotic sensitivity.

c. Observe a skin sample and identify parasites and fungus.

d. Explain how to perform microurinalysis.

e. Explain how to collect a fecal sample and check for endoparasites.

f. Explain how the safe handling of biohazardous materials is critical to the safety of a veterinary clinic.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written homework
2. Reading reports
3. Written exams

B. SUMMATIVE EVALUATION

1. Mid-term written examination
2. Final written examination

ANSC - 253: Veterinary Laboratory Procedures

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and describe common veterinary laboratory diagnostic procedures.
2. Explain how diagnostic procedures may relate to animal well-being.
3. Describe how parasites can be identified using laboratory techniques.
4. Identify disorders that can be diagnosed using blood products.
5. Describe various ways that laboratory samples can be collected and stored.

Modesto Junior College
Course Outline of Record

ANSC 255

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 255—PREPARATION FOR VETERINARY SURGICAL AND DENTAL ASSISTANCE 3 UNITS

54 Lecture Hours , 108 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete ANSC 250.*

Veterinary Technician preparation for surgery, surgery assistance, surgical and dental instruments and packs, anesthesia induction, monitoring and anesthetic machine maintenance, anatomy of the mouth and dental arcade, dental prophylaxis and extractions. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Identification and care for surgical instruments
   1. Commonly used surgical instruments
   2. Package and label instruments for sterilization
   3. Understanding methods of sterilization
      a. Gas
      b. Steam
      c. Cold

B. Preparation for surgery
   1. Personal hygiene and surgical technique
   2. Identification of surgical procedures
   3. Understanding patient positioning
   4. Explaining surgical site preparation

C. Suturing
   1. Suture materials, selection and characteristics
   2. Suture pattern, selection and characteristics

3. Suture technique
    a. Tension
    b. Spacing
    c. Knots

D. Recording surgical and anesthetic procedures
    1. Identify and describe the procedure
    2. Record complications
    3. Record anesthesia information
    4. Narcotic log

E. Anesthesia
    1. Barbiturate agents
    2. Non-barbiturate general anesthetic
        a. Properties
        b. Preparation
        c. Monitoring
    3. Gas anesthetics
    4. Local anesthetics

F. Identifying dental anatomy
    1. Physical exam procedures
    2. Occlusion patterns
    3. Normal wear
    4. Dental formulas
    5. Comparative anatomy between species

G. Dental instrumentation
    1. Principles of hand and power instruments
    2. Care, sharpening, disinfection, sterilization and lubrication

H. Describing tooth extraction and prophylaxis

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete ANSC 250.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Define dental and surgical terminology used in veterinary practice.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture supported by Power Point and other visual aids.
2. In class discussion of reading in text and handouts.
3. Instructor-facilitated discussion of self-evaluation exercises in text.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study for weekly quizzes

B. Weekly reading assignments

C. Study for midterm exam

D. Study for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical exam question: Which of the following is the INCORRECT surgical fasting time?

1. Puppies/Kittens – 8 hours
2. Dogs/Cats – 12 hours
3. Birds – 4 hours
4. Rabbits – 2 hours

B. Typical exam question: What is a possible danger if an animal has not been properly fasted? (Circle all that apply. Possibly more than one correct answer.)

1. Vomiting

2. Pneumonia
3. Death

C. Typical exam question: Which tools would be present in a basic spay/neuter surgical tray?

D. During anesthesia, a patient may have a difficult time maintaining body temperature. Give two possible reasons.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: McCurnin (2014). *Clinical Textbook for Veterinary Technicians* Elsiver.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify and understand how to sterilize surgical instruments used in veterinary medical practice.

b. Explain how to prepare a patient for surgery.

c. Record surgical and anesthetic procedures.

d. Identify dental anatomy for various animal species.

e. Identify and justify the selection of dental instruments in various veterinary situations.

f. Explain how the maintenance, cleaning and disinfection dental instruments is essential to successful dental procedures.

g. Dental extraction and prophylaxis.

h. Perform suture techniques required for various incisions/wounds.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written homework
2. Quizzes and exams
3. Practical exams

B. SUMMATIVE EVALUATION

1. Mid-term written examination
2. Final written examination
3. Mid-term practical examination

4. Final practical examination

ANSC - 255: Preparation for Veterinary Surgical and Dental Assistance

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and describe common dentistry practices in veterinary technology.
2. Identify and describe common surgical practices in veterinary technology.
3. Describe the care and maintenance involved with an anesthetic machine.
4. Identify surgical tools used during routine and emergency surgical procedures in large and small animal practices.

Modesto Junior College
Course Outline of Record

ANSC 257

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

ANSC 257—VETERINARY ASSISTANCE AND NURSING: ANIMAL HANDLING 2 UNITS

36 Lecture Hours , 72 Outside-of-Class Hours = 108 Total Student Learning Hours

Basic veterinary restraint methods and nursing procedures in small animal medicine, administration of medication, catheterization, vaccination techniques, bandaging and performing minor medical procedures. Field trips might be required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Restraint
   1. Avians
   2. Cats
   3. Dogs
   4. Rabbits
   5. Reptiles
   6. Rodents

B. Administration of Various Forms of Medication
   1. IV, Sub Q, IM, ID, IP, PO
   2. Problems with improper administration of medication

C. Catheterization
   1. Necessary equipment
   2. Selection of catheter size
   3. Insertion of IV catheters
   4. Securing an IV catheter

D. Fluid Therapy
   1. IV with indwelling catheter

2. Dosage/flow calculation
3. Sub Q fluid therapy

E. Vaccination

1. Types of vaccines
2. Methods of administration
3. Proper technique/dose
4. Vaccination schedule

F. Minor Medical Procedures

1. Trimming nails and hooves
2. Expressing/infusing anal sacs
3. Trimming wings/beaks
4. Trimming/float teeth
5. Removing sutures

G. Blood Collection and Transfusion

1. Taking a blood sample
2. Equipment required to collect, transfuse blood
3. Screening donors
4. Collecting and transfusing
5. Adverse effects

H. Bandages and Splints

1. Bandage and splint material selection
2. Bandaging techniques
3. Evaluating bandages
4. Types of splints
5. Application of casts and splints

I. Small Animal Disease Identification

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00

Lab	0	0
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Weekly classroom instruction
2. Industry relative classroom discussion
3. Possible field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written assignments including industry based periodicals and documents.

B. Weekly problem solving assignments designed to help students recognize critical situations.

C. Weekly journal documentation of animal behavior in a non-medical situation.

D. Case studies that expose students to commonly seen medical procedures in a small animal veterinary hospital.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical exam question: What are the four methods used to collect urine in small animals and identify which methods are acceptable for bacterial culture?

B. Typical exam question: What are the three principles of animal restraint?

C. Typical exam question: What are the five senses animal use for environmental perception? Give an example of each.

D. Typical exam question: Explain one type of animal aggression giving three examples and how you will handle an animal exhibiting this type of aggression.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** McCurnin, Dennis & Bassert, Joanna (2015). *Clinical Textbook for Veterinary Technicians* (9/e). St. Louis, Missouri Elsevier Saunders.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Describe appropriate restraint techniques for various small animals.

b. Describe methods of administration of medication.

c. Explain vaccination techniques.

d. Explain the selection, insertion and securing procedure used when placing an IV catheter.

e. Identify common domestic animal diseases.

f. Describe the application of casts and splints.

g. Describe the minor medical procedures that are most commonly involved with animal restraint in a clinic.

h. Describe animal behavior as it varies between species.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly medical journal assignments
2. Weekly written assignments
3. Weekly journal updates and log entries

B. SUMMATIVE EVALUATION

1. Mid-term written examination
2. Final written examination

ANSC - 257: Veterinary Assistance and Nursing: Animal Handling

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Explain the importance of restraint in terms of preventing zoonotic disease transmission.
2. Describe specific restraint methods in canine, feline, and exotic animals.
3. Identify animal behavior during stressful and medical procedures as it differs from typical behavior.

Modesto Junior College
Course Outline of Record

ANSC 258

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 258—HORSEMANSHIP **3 UNITS**

Formerly listed as: *ANSC - 258: Beginning Horsemanship*
36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Introduction to riding, saddling, grooming and bridling. Students will acquire basic knowledge of equipment and safety procedures. Course topics include use of riding aids and transitions. Students must provide their own horse and equipment for this course. Two completions allowed. Field trips are required. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Parts of the Horse

B. Conformation

C. Basic Safety and Groundwork

1. Safety
2. Groundwork

a. Approaching a horse

b. Haltering a horse

c. Leading a horse

d. Tying a horse

e. Saddling

f. Unsaddling

g. Bridling

h. Unbridling

i. Lunging

j. Restraints

D. Catch and Haltering

E. Basic Knots

1. Quick release
2. Fiador knot
3. Mecate

F. Horse Equipment

1. Parts of the western saddle and bridle
2. Equipment uses for different riding applications

G. Riding Horses

1. Walk
2. Trot

H. Basic Transitions between Gaits

2. <u>Required Lab Content:</u>

A. Trailering safety

B. Equine Handling

C. Equine Safety Techniques

D. Basic Riding Skills and Evaluation

E. Student Understanding of Equine Movement and Gaits

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Classroom instruction, including the presentation of facts and statistics from the equine industry
2. Supervision of students in contact with equines
3. Classroom instruction of students riding equines

4. Field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly journal writing

B. Weekly observation and demonstration of learned skills

C. Monthly summarization of activities involving equine safety and activity outside of the classroom

D. Semester project involving the local equine industry

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Analyze and compare differing safety techniques when handling horses.

B. Demonstrate proper leading, tying and handling of the animal.

C. Demonstrate the ability to ride a horse under direct instruction.

D. Classify training equipment and tack in a practical exam situation.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Cherry Hill and Carla Wennberg (2017). *101 Arena Exercises for Horse and Rider* (1/e). Storey Publishing, LLC.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify the parts of a horse.

b. Employ proper safety and groundwork practices.

c. Identify and label parts of a saddle.

d. Demonstrate basic riding skill at walk and trot.

e. Identify and ride basic transitions between gaits.

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate proper equine handling safety techniques.

2. Demonstrate the correct use of equipment and tack.

3. Demonstrate basic riding techniques at the walk and trot.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly evaluation of student performance in the classroom setting.
2. Weekly evaluation of progression to individual student goals.
3. Riding and handling evaluation.
4. Once each semester each student will be evaluated in a riding environment.

B. SUMMATIVE EVALUATION

1. Students will be evaluated in the area of riding.
2. Written midterm exam

ANSC - 258: Horsemanship

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate beginning equine handling, safety and riding techniques.

2. Describe basic equine behavior.

Modesto Junior College
Course Outline of Record

ANSC 260

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 260—ADVANCED HORSEMANSHIP **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Advanced instruction in the areas of riding, grooming, saddling and equine care. Students will acquire extensive knowledge of equipment and safety procedures. Course topics include use of advanced riding aids and training. Students must provide their own horse and equipment. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Parts of the Horse

B. Conformation

1. Form vs function

C. Basic Safety and Groundwork

1. Safety
2. Groundwork

a. Catching a difficult horse

b. Haltering a difficult horse

c. Leading a horse

d. Saddling and unsaddling

e. Bridling and unbridling

f. Lunging

g. Restraining a horse

D. Equine Behavior

1. Understanding and identifying dangerous situations

2. Reacting to dangerous situations

E. Basic Knots

1. Safety knots
2. Quick release knots

F. Equipment

1. Parts of the saddle
2. Parts of the bridle
3. Bit types

G. Biomechanics of Movement

1. Muscles involved in gaits and movement
2. Common gait abnormalities

H. Riding Horses

1. Walk
2. Trot
3. Lope/Canter
4. Gallop

I. Basic Transitions between Gaits

1. Halt-Walk
2. Walk-Trot
3. Trot-Lope/Canter

J. Competition Classes

1. Rules and regulations governing different events

2. <u>Required Lab Content:</u>

A. Completion of Transitions between Gaits

B. Haltering a Difficult Horse

C. Leading a Horse

D. Tying a Horse (with various knots)

E. Tacking Up a Horse

F. Lunging

G. Restraining a Horse

H. Completion of Various Tasks under Saddle

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Presentation of statistics and facts relating to the horse industry and current teaching methods.
2. Observation and critique of student interaction in the lab setting.
3. Supervision of student completion of required goals.

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly journal writing.

B. Weekly observation and demonstration of learned skills.

C. Monthly summarization of activities involving equine safety and activity outside of the classroom.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Demonstrate advanced safety techniques when handling horses.

B. Demonstrate advanced levels of riding skills on their own horse in a safe and effective manner.

C. Demonstrate knowledge and use of advanced equipment and tack in a practical exam situation.

D. Describe and demonstrate safety procedures involved with trailering horses.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Cherry Hill and Carla Wennberg (2005). *101 Arena Exercises for Horse and Rider* (1st /e).

Storey Publishing, LLC.

2. **Book:** Don Blazer & Cathy Hanson (2003). *Natural Western Riding* (2nd /e). Success is Easy.

3. **Book:** Lesley Ward (2010). *English Riding* CompanionHouse Books.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify the parts of a horse and their function in motion.

b. Employ proper safety and groundwork practices in any situation.

c. Assess the balance, movement and potential lameness of a horse by applying the principles of biomechanics.

d. Differentiate among and describe uses of horse equipment for different riding disciplines.

e. Demonstrate basic riding skill at walk, trot, canter and gallop.

f. Relate general conformation conditions with unexpected movement.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Successfully ride each individual gait and understand transitions in those gaits.

2. Properly handle and restrain a horse in any situation.

3. Demonstrate advanced level riding abilities such as identification of footfall patterns and biomechanics of movement.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly evaluation of student performance in classroom setting.

2. Weekly evaluation of progression to individual student goals.

B. SUMMATIVE EVALUATION

1. Students will be evaluated in the areas of riding and horsemanship.

2. Comprehensive riding evaluation at the conclusion of semester instruction.

ANSC - 260: Advanced Horsemanship

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate advanced level riding ability in a riding arena situation.

2. Demonstrate advanced level equine safety techniques.

Modesto Junior College
Course Outline of Record

ANSC 265

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

ANSC 265—INTRODUCTION TO COLT TRAINING **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Basic principles involved in handling and training the young horse. Course includes groundwork, trailering, starting a colt, advancing the green horse, and problem solving. Field trips might be required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Equine Behavior

1. Visual perception
2. Sense perception
3. Environmental impact on behavior

B. Equine Care and Housing

C. Training Equipment

1. Identification
2. Care and Handling

D. Groundwork Principles

1. Round pen techniques
2. Leading
3. Tying
4. Lunging
5. Sacking out

E. Basic Training and Riding Aids

F. Techniques for Training and Handling Inexperienced Horses

G. Trailering

H. Problem Solving

1. Potential problems during training
2. Generating solutions

I. Innovative Techniques in Progressive Training

2. Required Lab Content:

A. Leading

B. Tying

C. Lunging

D. Saddling

E. Bridling

F. Ground Handling Techniques

G. Safety around Horses

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity	0	0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Weekly classroom instruction including demonstrations and class activities involving equine safety
2. Live animal handling demonstration
3. Supervision of student involvement in classroom skill demonstration
4. Instructor led in-class situational and problem-solving tasks
5. Group and integrative learning through lab experience and individual progress
6. Possible field trips

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly skills demonstration

B. Weekly journal entry and industry research

C. Study and preparation for practical exams

D. Study and preparation for the skill demonstration midterm and final

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Distinguish between and compare various types of behaviors while working with young horses.

B. Formulate a safety techniques protocol for handling colts.

C. Demonstrate the ability to halter, lead, saddle and bridle a colt.

D. Examine current techniques and trends in the colt training industry.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Carruthers, Jodine (2013). *If Your Horse Could Talk: The Ultimate Guide to Partnership* (1st/e). Harmonious Horsemanship.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify equine behavior in various situations.

b. Demonstrate equine safety techniques.

c. Successfully halter and lead a young colt.

d. Successfully tie, brush and pick out the feet of a young colt.

e. Identify and demonstrate safe trailering techniques with a colt.

f. Identify and demonstrate use of proper equipment (halter, lead rope, grooming pieces).

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:
1. Safely catch, lead and tie and young horse.

2. Demonstrate safety techniques involved with saddling, bridling and exercising a young horse.

3. Identify common grooming tools and demonstrate how to properly use them on a horse.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly demonstration of skill development and animal advancement
2. Weekly journal entry
3. Weekly demonstration of safety techniques and problem solving given various situations

B. SUMMATIVE EVALUATION

1. Written and practical exams
2. Midterm - Demonstration
3. Semester project - halter break, train and gentle a green horse

ANSC - 265: Introduction to Colt Training

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate techniques in handling and training the green horse.
2. Identify common equine tack.
3. Describe the basic steps involved in basic horse training.

Modesto Junior College
Course Outline of Record

ANSC 270

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

ANSC 270—VETERINARY LARGE ANIMAL PHYSIOLOGY, ANATOMY & TERMINOLOGY 3 UNITS

54 Lecture Hours , 108 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete ENGL 101.*

The study of normal anatomy and physiology in large animals (equine, and production animals included)in a body systems format, along with related vocabulary and spelling. Biological, microbiological and chemical concepts as they relate to animal physiology and systemic function will be applied. Industry standard veterinary terminology, acronyms and abbreviations are used throughout the duration of the course. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction to word structure, roots, prefixes, suffixes and combinations; introduction to body planes and application of directional terms

B. Introduction to biology of the cell and related terminology of cellular anatomy and physiology

C. Overview of body structure and organization defined in terms of anatomy and physiology of the tissues, organs, and organ systems

D. Disease progression in large animals

E. Integument system

1. Terminology
2. Anatomy
3. Physiology

F. Skeletal system

1. Terminology
2. Anatomy
3. Physiology

G. Muscular System

1. Terminology
2. Anatomy
3. Physiology

H. Cardiovascular System

1. Terminology
2. Anatomy
3. Physiology

I. Hematopietic System

1. Terminology
2. Anatomy
3. Physiology

J. Respiratory System

1. Terminology
2. Anatomy
3. Physiology

K. Digestive System

1. Terminology
2. Anatomy
3. Physiology

L. Nervous System

1. Terminology
2. Anatomy
3. Physiology

M. Sense Organs

1. Terminology
2. Anatomy

3. Physiology

N. Endocrine System

1. Terminology
2. Anatomy
3. Physiology

O. Reproductive System

1. Terminology
2. Anatomy
3. Physiology

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete ENGL 101.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Write papers that demonstrate competent control over written language, including syntax, punctuation, grammar, and spelling.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Demonstrations of anatomical parts on large animal skeletons
2. In-class discussion
3. Lecture supported by PowerPoint presentations

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written homework

B. Study for weekly quizzes and exams

C. Prepare for class performance and performance exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical exam question: What changes occur in ostocytes when a bone fractures and how does this change aid in the healing process?

B. Typical exam question: Which organ produces bile and glucose?

C. Typical exam question: What animal does not have a gall bladder?

1. Goat
2. Sheep
3. Cow
4. Horse

D. Typical Assignment: Map the planes of directional terms on the following animals. How do the planes or terms change as the animals position changes?

1. Horse
2. Cow
3. Pig

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: McCurnin (2014). *Clinical Textbook for Veterinary Technicians* (8/e). Elsevier.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify normal anatomy and physiology of large animals (equine and production animals).

b. Define medical terminology used in a large animal veterinary practice.

c. Identify disease progression in animals.

d. Discuss systemic interaction within the body of a large animal.

e. Discuss an understanding of basic chemistry as it pertains to systemic function.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written homework
2. Weekly Quizzes
3. Quarterly Exams

B. SUMMATIVE EVALUATION

1. Mid-term Practical Exam
2. Mid-term Written Exam
3. Final Written Exam
4. Final Practical Exam

ANSC - 270: Veterinary Large Animal Physiology, Anatomy & Terminology

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify anatomy and physiology as it pertains specifically to large animals (equine and food production).
2. Understand chemical, biological and microbiological concepts as they pertain to systemic function in large animals.

Modesto Junior College
Course Outline of Record

ANSC 271

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

ANSC 271—LARGE ANIMAL VETERINARY SURGICAL AND DENTAL ASSISTANT 3 UNITS

54 Lecture Hours , 108 Outside-of-Class Hours = 162 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete ENGL 101.*

Veterinary Technician preparation for common large animal surgical procedures. Identification of surgical and dental instruments, surgical pack preparation, anesthesia induction, monitoring and anesthetic machine maintenance, anatomy of the mouth in multiple species, dental prophylaxis and extractions. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Identification and care for surgical instruments

B. Commonly used surgical instruments for large animal procedures

C. How to appropriately package and label instruments

D. Methods of sterilization

1. Gas
2. Steam
3. Cold

E. Preparation for surgery

1. Sterile fields
2. Sterile Technique
3. Surgical Site Preparation

F. Identification of surgical procedures in large animal

G. Patient positioning and restraint

H. Suturing

1. Suture materials, selection and characteristics

2. Suture pattern, selection and characteristics

I. Suture technique

1. Tension
2. Spacing
3. Knots

J. Anesthesia

1. Barbituate agents

a. Properties
b. Preparation
c. Monitoring

K. Non-barbituate general anesthetic

1. Properties
2. Preparation
3. Monitoring
4. Gas anesthetics
5. Local anesthetics

L. Dental anatomy

1. Physical exam procedures and equipment
2. Occlusion patterns
3. Normal wear vs disorders of wear
4. Comparative anatomy between species

M. Dental instrumentation

1. Principles of hand and power instruments
2. Care, sharpening, disinfection, sterilization and lubrication

N. Tooth extraction

2. <u>Recommended Content:</u>

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete ENGL 101.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Write papers that demonstrate competent control over written language, including syntax, punctuation, grammar, and spelling.

C. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture and use of visual aids
2. In-class discussion and problem solving
3. Instructor-facilitated discussion of assigned homework and reading

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Study for weekly quizzes

B. Weekly reading assignments

C. Study for midterm exam

D. Study for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Typical exam question: During an elective surgical procedure, which of the following is the INCORRECT surgical fasting time?

1. Foals– 8 hours
2. Cattle– 12 hours

3. Neonatal Ovine – 4 hours
4. Swine – 2 hours

B. Typical exam question: What is a possible danger if an animal has not been properly fasted? (Circle all that apply. Possibly more than one correct answer.)

1. Vomiting
2. Pneumonia
3. Death

C. Typical exam question: During anesthesia, a patient may have a difficult time maintaining body temperature. Give two possible reasons.

D. Typical exam question: Which of the following is the ideal stage and plane of general anesthesia?

1. Stage 1, plane 1
2. Stage 2, plane 2
3. Stage 3, plane 2
4. Stage 4, plane 1
5. None of the above

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Holtgrew-Bohling (2015). *Large Animal Clinical Procedures for Vet Tech's* (3rd/e). Elisver.

III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**
Upon satisfactory completion of this course, the student will be able to:

a. Identify, care for and sterilize surgical tools used in a large animal practice.
b. Demonstrate suturing techniques and equipment required for large animal wound closure.
c. Identify dental anatomy in large animal species.
d. Discuss dental prophylaxis and extraction.
e. Discuss surgical preparation and patient recovery.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly Quizzes
2. Weekly Tool Identification
3. Quarterly Anatomy Identification

B. SUMMATIVE EVALUATION

1. Mid-Term Written Examination
2. Mid-Term Practical Examination
3. Written Final Exam

ANSC - 271: Large Animal Veterinary Surgical and Dental Assistant

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Discuss dental anatomy, prophylaxis, and extraction techniques.
2. Identify surgical tools in terms of their specific use during various procedures.
3. Demonstrate knowledge of various suturing techniques.
4. Identify, equipment and industry standard techniques for sterilization of surgical instruments found in a large animal practice.

Modesto Junior College
Course Outline of Record

ANSC 273

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

ANSC 273—VETERINARY LARGE ANIMAL HANDLING **2 UNITS**

36 Lecture Hours , 72 Outside-of-Class Hours = 108 Total Student Learning Hours

Large animal nursing skills including restraint, fluid therapy, administration of medication, catheterization, procedure site preparation, bandaging, splints and casting. Field trips are not required. Not repeatable. (A-F Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Restraint

1. Identify and describe restraint for the following species:
2. Cattle
3. Goats
4. Horses
5. Llamas
6. Pigs
7. Sheep

B. Describe the administration various forms of medication

1. Oral
2. IV, Sub Q, IM, ID, IP
3. Problems with improper administration of medication

C. Catheterization

1. Necessary equipment
2. Proper site

D. Fluid therapy

1. IV with indwelling catheter
2. Dosage/flow calculation
3. IV catheterization sites

E. Vaccination

1. Types of vaccines in large animals
2. Methods of administration
3. Proper technique/dose and restraint methods
4. Vaccination schedules for various large animals

F. Bandages and splints

1. Necessary materials for bandages and splints
2. Bandaging techniques based on injury location
3. Evaluating and trouble-shooting bandages
4. Types of splints-large animal specific
5. Application of casts and splints

2. Recommended Content:

B. HOURS AND UNITS

2 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	0	0
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. In-class discussion
3. Demonstrations of large animal restraint techniques

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly written assignments including course outlines, take home quizzes and exams.

B. Weekly problem solving assignments designed to help students recognize critical situations.

C. Per term assignments to include: journal entries, and case studies

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Typical exam question: What are the four methods used to collect feces in large animals and identify which methods are acceptable for bacterial culture?

B. Typical exam question: What are the three principles of large animal restraint?

C. Typical exam question: What are the five senses animals use for environmental perception? Give an example of each.

D. Typical exam question: Explain one behavior that an aggressive bovine may exhibit when restrained. How you will handle an animal exhibiting this type of aggression?

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Holtgrew-Bohling (2013). *Large Animal Clincial Procedures for Veterinary Technicians* (2nd/e). Elsevier.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Describe appropriate restraint techniques for various large animals.

b. Select, insert and secure an IV catheter.

c. Clean a wound using accepted sterile procedure.

d. Describe methods of administration of medication.

e. Apply casts and splints.

f. Explain signs, symptoms, and treatments for common domestic large animal diseases.

g. Calculate fluid therapy rates and describe fluid therapy by various approved methods in large animal medicine.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Weekly journal entries based on animal observation

2. Weekly written assignments

3. Monthly reports on classroom topics

B. SUMMATIVE EVALUATION

1. Mid-Term written exam
2. Final written exam

ANSC - 273: Veterinary Large Animal Handling

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe restraint techniques and procedures commonly used in swine, ovine, bovine and equine veterinary procedures.
2. Explain the procedure involved in fitting a large animal patient for a cast or splint.

Modesto Junior College
Course Outline of Record

BOT 101

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

BOT 101—GENERAL BOTANY **4 UNITS**

36 Lecture Hours, 108 Lab Hours , 72 Outside-of-Class Hours = 216 Total Student Learning Hours
Prerequisite: *Satisfactory completion of BIO 101.*
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete an MJC English composition course or the equivalent, or to exhibit proficiency in college-level essay writing skills. or qualification by the MJC assessment process.*

Principles of plant life, plant morphology, anatomy, physiology, reproduction, genetics, evolution, and ecology of bacteria, fungi, algae, archaea, slime molds, bryophytes, and vascular plants. Field trips are required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: BIOL 6; BOT101 + BIO101+ ZOOL101= BIOL 2+ 4+ 6) **General Education:** (MJC-GE: A) (CSU-GE: B2, B3) (IGETC: 5B, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction
   1. Brief survey of the plant world
   2. The systematic study of plants
   3. Plants and human affairs

B. Plant organization - vegetative organs
   1. Types of plant tissues
   2. Vegetative organs of vascular plants
   3. Convergent evolution and ecological strategies reflected by vegetative plant organs

C. Reproductive organs and structures: convergent evolution and ecological strategies reflected by reproductive plant organs

D. Form and function
   1. The nature of plant metabolism
   2. Extensions of metabolic activities

E. Raw materials for metabolism

1. Sources for metabolites
2. Principles governing the absorption of metabolites
3. Xylem transport of water and dissolved substances
4. Phloem transport of nutrients
5. Soil-water relations: ecological adaptations to drought based on morphological/physiological features

F. Enzymes: catalysts of plant metabolism

G. Anabolism: the synthesis of plant material

1. Photosynthesis - from simple metabolites to sugars
2. Synthesis of other carbohydrates
3. Factors affecting photosynthesis
4. Fat synthesis
5. Protein synthesis
6. Assimilation - the climax of anabolism
7. C3 vs C4 vs CAM photosynthesis as evolutionary adaptations

H. Catabolism: the breakdown of plant materials

1. Digestion
2. Respiration - biological oxidation
3. Factors affecting respiration
4. The metabolic significance of the Krebs cycle

I. Growth and development

1. Nature of growth and development
2. Factors influencing plant growth
3. Mechanisms of growth control
4. Plant movements

J. Heredity

1. Plant genetics

K. Classification and diversity

1. Types of classification systems
2. Classification of the plant and plant-related kingdoms - traditional and modern

3. Cladistics: evolutionary relationships based on molecular evidence (Mitochondria and Chloroplast DNA)

L. The origin and evolution of plants

1. The origin of life
2. Plant evolution

M. Bacteria and Archaea

N. Kingdom Protista

1. Protistan form and function
2. The algal groups - photosynthetic
3. The myxomycetes - plasmodial slime molds

O. Kingdom Fungi

1. Zygomycota - zygospore formers
2. Ascomycota - ascospore formers
3. Basidiomycota - basidiospore formers
4. Fungi imperfecta
5. Mycorrhizal relationships

P. Non-vascular land plants

1. The Bryophyta (mosses, hornworts, liverworts)

Q. Lower vascular plants

1. Ferns
2. Whisk Ferns
3. Lycophytes
4. Sphenophytes
5. Evolutionary trends in lower vascular plants

R. Higher vascular plants

1. Gymnosperms
2. Angiosperms
3. Xylem evolution (tracheids to vessels)
4. Flower evolution

S. Plant Relationships

1. The Biosphere
2. Ecological principles/ecosystem dynamics
3. The plant community

2. Required Lab Content:

A. Scientific Method, Microscopy and Plant Cells/Tissues

1. Distinguishing the various structures and organelles of living cells with a light microscope
2. Distinguishing between cytoplasmic streaming and independent movement of organisms
3. Preparing laboratory drawings and being familiar with the use of both compound and dissecting microscopes

B. Plant Biological Molecules and Osmosis

1. Main groups of biological molecules found in plants

C. Photosynthesis

1. Demonstrating a simple paper chromatography technique and describing the sequence of plant pigments that separated on the chromatograph
2. Describing the main reactants and products of photosynthesis
3. Identifying the role of rubisco in the light independent reactions of photosynthesis

D. Respiration

1. Describing the main reactants and products of respiration
2. Identifying oxygen as the primary electron acceptor from the electron transport chain reactions
3. Role of ATP synthase

E. Mitosis/Meiosis and Introduction to Life Cycles

1. Describing and discussing what occurs in each of the stages of Mitosis and Meiosis
2. Identifying cellular structures involved with mitosis
3. Drawing a table and calculating the mitotic index observed in one field of view at high power

F. Plant Propagation

1. Propagating new plants from stems, roots and leaves
2. Performing a plant propagation on a culture medium of a plant from a seed embryo and understanding sterile techniques

G. Stem Morphology and Physiology

1. Differences between monocot and dicot stems
2. Identifying and knowing the parts and functions of the vascular bundle

H. Root Morphology

1. Differentiating between root hairs and lateral roots
2. Recognizing the loc ation and compostition of Casparian strips

I. Leaves

1. Locating and knowing the parts and functions of structures observed in the cross sections of various types of leaves
2. Recognizing guard cells from other epidermal cells

J. Plant Hormones and Tropisms

1. Effects of auxin and gibberellin on stem growth
2. Observing and knowing what tropisms are and why they occur

K. Tree Identification

1. Identifying from memory several tree specimens located within the Modesto Junior College Arboretum
2. Examining and observing plant diversity

L. Plant taxonomy/Identification, How to use the Jepson Manual

1. Using the Jepson Manual to determine the families of plant specimens
2. Recognizing qualities that are common to specific families of plants

M. Plant Collection

1. Demonstrating good plant collection procedures and the proper use of a plant press
2. Properly mounting and labeling plant specimens for their collection and the MJC herbarium

N. Genetics, Purple Hairy Fast Plants

1. Diagraming monohybrid and dyhybrid crosses
2. Demonstrating how to calculate probability

O. Prokaryotes and Protists

1. Parts and structure of a dinoflagellate and of a kelp or other large seaweed
2. How a diatom is constructed and moves

P. The Kingdom of Fungi

1. Sexual life cycle of Rhizopus and how it reproduces asexually
2. Preparing wet mounts and observe various mushroom specimens (identify the mycelium and basidium)

Q. Lichens

1. Nature and structure of a *lichen,* the basic forms of lichens, and how lichens reproduce

R. Seedless Plants

1. Describing the life cycle of a moss, liverwort, and fern
2. Recognizing the form and structure of bryophytes and how they di ffer from more complex plants

S. Gymnosperms

1. Distinguishing a pine, a cycad, Ginkgo, Gnetum, Ephedra, and Welwitshia from one another
2. Recognizing the differences between male and female cone

T. Angiosperms

1. Life cycle of a flowering plant and how a mature ovule becomes a seed
2. Describing the various ovary positions and general structure of flowers

U. Fruits

1. Describing and recognizing different types of fruits
2. Roles of each of the various parts of fruits

V. Berkeley Botanic Garden Tour (Field Trip)

1. Wide diversity of plants and their niche in their various natural environments
2. Importance of conservation of plant diversity

W. Caswell Park (Field Trip)

1. Observing a natural (declining) riparian oak woodland, which once existed throughout the Central Valley
2. Identifying several native species of plants

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of BIO 101.

2. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete an MJC English composition course or the equivalent, or to exhibit proficiency in college-level essay writing skills. or qualification by the MJC assessment process.

3. Requisite Skills

Before entering the course, the student will be able to:

A. Organize and interpret data from scientific experiments in biology and formulate conclusions.

B. Organize and interpret data from scientific experiments in biology and formulate conclusions.

C. Prepare labeled laboratory drawings to scale.

D. Demonstrate proficiency with laboratory equipment, procedures and dissection.

E. Analyze the role of biological science in society.

F. Distinguish between generalizations and principles, theories and laws, science and pseudoscience.

G. Apply the scientific methodology of investigation.

H. Describe the structure, function and relationships of DNA, RNA and proteins in living systems.

I. Describe the process of protein synthesis and its regulations as it occurs in eukaryotic and prokaryotic organisms.

J. Summarize the historical basis for biological principles and relate current research to these principles.

K. Explain the process of evolution in relation to the diversity of life.

L. Relate chemical and physical reactions to the processes of life.

M. Describe how the processes of adaptation and natural selection are illustrated at the molecular, cellular, organismal and population level.

N. Describe homeostatic mechanisms of living organisms and relate these strategies to the process of evolution.

O. Relate the concept of adaptation to the processes of reproduction and development in living organisms.

P. Explain the basic processes of genetic engineering and analyze the influence of biotechnology on society.

Q. Distinguish between transmission genetics and molecular genetics.

R. Define the characteristics that distinguish living from non-living things.

S. Interpret evidence regarding the origin of life.

T. Describe hierarchical levels of organization ranging from atoms to the biosphere.

U. Articulate the main idea and supporting elements from a reading selection. Propose and develop a thesis, and support that thesis with appropriate details and examples, including support from primary and secondary sources.

C. HOURS AND UNITS

4 Units

INST METHOD	TERM HOURS	UNITS
Lecture	36	2.00
Lab	108	2.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Instructor led discussions
3. Demonstrations
4. Field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Homework

B. Botany Article Summary, students will summarize a Botany article from a scientific journal publication

C. Plant Collection with written field notes

D. Laboratory Exercise Reviews

E. Laboratory Reports

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Exam questions:

1. Describe the concept of alternation of generations. How are the terms sporophyte and gametophyte related to this concept?
2. When and why do plants undergo photorespiration? Describe what happens during photorespiration. How does rubisco facilitate photorespiration?
3. What is so special about seeds? How do they convey an evolutionary advantage to plants?
4. In garden pea plants, a cross is made between true-breeding purple flowered plants (P) and true breeding white flowered plants (p). Purple flower color is dominant over white flower color. What are the genotypes of the F1 plants? If two of the F1 generation offspring were crossed what would be the phenotypes and genotypes of the F2 offspring?

B. Laboratory Exercise Questions:

1. Would your graph look different if you only plotted root or hypocotyl growth?
2. What supports the developing embryo until the time it can photosynthesize? What types of developmental events enable the emerging plant to shift its dependency from stored energy to energy from light?
3. How could you investigate and compare the rates of germination in various brassicas?

4. Is the sporophyte an "independent" or "dependent" Organism?

C. Homework Pack Questions:

1. What lives in the kelp forests? Why do kelp forests house so much biodiversity? What did Darwin think of this?

2. Differentiate between the life cycles of bryophytes, lycophytes, and pteridophytes.

3. Diagram and label the basic form of a flower. What is inflorescence and what are some of the main types?

4. Compare and contrast the processes of apoplastic and symplastic phloem loading.

5. Gregor Mendel's work with Pisum sativa (garden pea) led to his laws of heredity. Briefly describe why Mendel used Pisum in his research. What did he show to be true about dominant and recessive traits? What did he suggest in each of his laws of heredity? Refer to your book or check out Mendelweb at: http://www.mendelweb.org/mendel.html

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Bidlack and Janskey (2013). *Stern's Plant Biology* (13th/e). McGraw-Hill.

2. **Book:** Robert Ornduff, Phyllis M. Faber, and Todd Keeler-Wolf (2003). *Introduction to California Plant Life* (Revised/e). Turtleback/UC Press.

3. **Book:** James C. Hickman, Editor (1996). *The Jepson Manual: Higher Plants of California* Jepson Press.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Follow the scientific method to set up or identify a problem.

b. Utilize guidelines to increase depth and objectivity of observational skills.

c. Check for mistakes in observation or procedure.

d. Draw conclusions from the results.

e. Locate information from technical journals and publications, library resources, and current methods of knowledge storage and retrieval.

f. Differentiate between fundamental concepts and accidental or temporary phenomena in the world of botany.

g. Apply the fundamental body of knowledge in botany, which is the prerequisite to any further study in plant science and related fields.

h. Demonstrate a working vocabulary of structure, function, and concepts, included in the field of botany.

i. Interrelate the diversity and taxonomy of plants, fungi, algae, and slime molds and interpret the relationships of groups with each other.

j. Describe how plants are similar and how they differ from other living things.

k. Identify and describe the major physiological activities of plants.

l. Describe the significance of plants and photosynthetic organisms to all of life on earth.

m. Describe the interrelationships of plants and plant-like organisms to other living organisms in the environment.

n. Describe the interrelationships of plants and plant-like organisms to the abiotic factors of the environment.

o. Describe the Earth's major biomes and their relationship to plants and plant-like organisms.

p. Discuss the agricultural, economic and environmental importance of plants.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Prepare laboratory drawings and be familiar with the use of both compound and dissecting microscopes.

2. Apply the scientific method to identify questions, make hypotheses, test hypotheses, analyze results and make conclusions.

3. Accurately record data from the results.

4. Develop information through experimentation, observation, evaluation and familiarity with plants, fungi, algae, slime molds, and bacteria.

5. Follow laboratory directions and laboratory manual instructions.

6. Dissect plants and plant organs with neatness and precision to enable proper evaluation of the specimen.

7. Use the Jepson Manual to determine the families of plant specimens.

8. Demonstrate good plant collection procedures and the proper use of a plant press.

9. Identify from memory several tree specimens located within the Modesto Junior College Arboretum.

10. Identify and describe the anatomy and morphology of plants, fungi, and algae examined in this course.

11. Use laboratory equipment and the tools of botany.

12. Develop information through experimentation, observation, evaluation, and familiarity with plants, fungi, algae, and slime molds.

13. Dissect plants and plant organs with neatness and precision to enable proper evaluation of the specimen.

14. Identify and describe the anatomy and morphology of plants, fungi, algae, and slime molds treated in this course.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Written reports (research, review, critiques)
2. Plant collection with written field notes
3. Laboratory and field trip reports (written)
4. Laboratory and field identification of plant groups and species
5. Lecture quizzes
6. Unit exams

B. SUMMATIVE EVALUATION

1. Cumulative final examination
2. Two laboratory practicums

BOT - 101: General Botany

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and state the function of plant cell structures.
2. Determine whether an unknown plant is either a monocot or dicot based on the vascular arrangement patterns in both roots and stems.
3. Describe the role of the light dependent phase and light independent phase of photosynthesis.
4. Recognize characteristics of photosynthetic protistans, fungi, and plants.
5. Describe and contrast the main life cycles of plant, fungal, and protistan taxa.
6. Provide evidence for evolution in photosynthetic groups.

Modesto Junior College
Course Outline of Record

BOT 110

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

BOT 110—PLANT BIOLOGY **3 UNITS**

36 Lecture Hours, 54 Lab Hours , 72 Outside-of-Class Hours = 162 Total Student Learning Hours

Introduction to plants, including structure and function, heredity, development, reproduction, ecology, classification, evolution, economic and resource importance as they pertain to plants. Not open to students who have completed Biology 101. Not a substitute for Botany 101. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **General Education:** (MJC-GE: A) (CSU-GE: B2, B3) (IGETC: 5B, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Introduction

1. What is life?
2. Botany as a science

B. Principles of Cellular Biology

1. Typical plant cell functions: photosynthesis, respiration, and cell division (mitosis)
2. Carbohydrates, proteins, lipids, nucleic acids
3. Secondary phytochemicals
4. Micro and Macronutrients

C. Plant Anatomy and Physiology

1. Roots
2. Stems
3. Leaves
4. Flowers
5. Seeds

6. Hormones

D. Plant Life Cycles

1. Germination
2. Growth and development
3. Reproduction
4. Meiosis, non-vascular plants, gymnosperms, angiosperm
5. Alternation of generations
6. Senescence

E. Plant Evolution

1. lines of evidence
2. Mechanisms of microevolution
3. Mechanisms of macroevolution
4. Plant/Animal Coevolution

F. Classification

1. Algae
2. Mosses
3. Liverworts
4. Ferns
5. Gymnosperms
6. Angiosperms

G. Ecology

1. Plant ecosysytems, communities, populations
2. Ecosystem goods and services
3. Water and element cycling
4. Climate

H. Economic and resource importance of plants

2. <u>Required Lab Content:</u>

A. Introductory microscope training

B. Report writing

C. Proper preparation of plant specimens

D. Identification of plant parts

E. Taxonomic classification of collected plants

F. Use of dicotomous key to identify collected plants to family

G. Tour of MJC Arboretum

B. HOURS AND UNITS

3 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	36	2.00
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Instructor led field experiences
3. Use of audio-visual materials (films, photographic slides, videos, etc.)
4. Demonstration
5. Instructor led discussions

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly preparation for laboratory experiments

B. Weekly laboratory write ups

C. Preparation for mid-term and final lab practical

D. Preparation for mid-term exams on lecture material

E. Oral reports, one per term

F. Preparation for final exam

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Distinguish between plants of different phylogenic history.

B. Compose novel reports from student's experience in laboratory.

C. Judge the work of current botanical works.

D. Analyze data from laboratory work.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Bidlack and Janskey (2014). *Stern's Introductory Plant Biology* (13th/e). McGraw-Hill.
2. Manual: Greene, Catherine. Instructor generated lab manual for Plant Biology, BOT 110. Modesto Junior College duplicating
3. Manual: Baldwin, Bruce. Manual: The Jepson Manual: Higher Plants of California. University of California Press

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Differentiate between living and non-living

b. Explain the criteria by which plants are classified and identify what differentiates plants from members of all the other kingdoms.

c. Utilize properly biological and botanical terminology associated with cell biology, plant physiology, plant anatomy, plant genetics, classification, ecology, and evolution.

d. Demonstrate effective and proper use of laboratory equipment during laboratories involving cell biology, plant reproduction, genetics, anatomy, and physiology.

e. Identify plant structures and state their function.

f. Demonstrate the proper use of the scientific method.

g. Apply the rules of Mendelian genetics.

h. Explain modern concepts and principles of organic evolution with emphasis on plant evolution.

i. Explain basic ecological principles as they apply to plants and ecosystems.

j. Apply ecological principles to all terrestrial biomes.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Proficiently operate a compound microscope.
2. Generate a proper scientific report.
3. Conduct an authentic scientific exploration.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Laboratory activity write up
2. Quizzes and problem solving activities
3. Homework sheets
4. Midterm exams

B. SUMMATIVE EVALUATION

1. Comprehensive final exam

BOT - 110: Plant Biology

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Describe plant structure and function.
2. Classify plants according to their phylogeny.
3. Outline the reproductive processes in plants.

Modesto Junior College
Course Outline of Record

CHEM 101

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

CHEM 101—GENERAL CHEMISTRY 1 **5 UNITS**

54 Lecture Hours, 54 Lab Hours, 18 Discussion Hours , 144 Outside-of-Class Hours = 270 Total Student Learning Hours
Prerequisite: *Satisfactory completion of MATH 90 or qualification by the MJC assessment process.*
Recommended for Success: *Before enrolling in this course, students are strongly advised to complete CHEM 142 with a grade of C or better or complete High School Chemistry with a grade of B or better.*

Principles of chemistry emphasizing measurements and significant figures, chemical reactions, stoichiometry, gas laws and theory, chemical energy, atomic structure and quantum mechanics, periodic properties, chemical bonding, molecular structure, intermolecular attractions and properties of liquids and solids, and properties of solutions. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: CHEM 2A + 2AL) (C-ID: CHEM 110 CHEM 120S) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Nomenclature

1. Binary ionic compounds
2. Compounds containing polyatomic ions
3. Binary covalent compounds
4. Acids

B. Atomic Structure

1. The historical development of modern atomic theory
2. Fundamental particles comprising the atom
3. Isotopes and atomic weight
4. The periodic table; properties of metals and nonmetals
5. Chemical formulas and the representation of chemical structures

C. Quantum Theory

1. Waves and wave properties
2. Planck and quantum theory
3. Important historical experiments in the development of modern atomic theory
4. The Bohr Theory and atomic emission spectra
5. Limits of the Bohr theory; Heisenberg and de Broglie
6. Wave mechanics, the theories of Schroedinger, Hund and Pauli
7. Electron configurations of atoms and ions
8. Orbital diagrams
9. Electron configurations and the periodic table

D. Periodic Properties

1. Effective nuclear charge
2. The sizes of atoms and ions
3. Ionization energies
4. Electron affinities
5. Relating properties of elements to the periodic table

E. Chemical Reactions

1. Identifying types of chemical reactions by inspection of equations.
2. Balancing chemical equations
3. Solubility Rules
4. Molecular, total ionic and net ionic equations

F. Chemical Energy

1. Definitions of work, energy and heat including appropriate SI units
2. The First Law of Thermodynamics
3. State functions
4. Endothermic and exothermic processes
5. Enthalpy and Enthalpy of reaction; Hess's Law
6. Calorimetry

G. Stoichiometry

1. Percent composition
2. Empirical formula
3. Determining the molar masses of compounds
4. The mole, Avogadro's Number and associated calculations
5. Limiting reactant

H. Gas Laws

1. Characteristics of gases
2. Gas pressure, manometers and barometers
3. Gas laws, including Boyle's Law, Charles's Law, Gay-Lussac's Law and Avogadro's Hypothesis
4. The Ideal Gas Equation including quantitative relationships
5. Gas mixtures, Dalton's Law of Partial Pressures
6. Kinetic Molecular Theory
7. Gaseous diffusion and effusion; Graham's Law
8. The behavior of real gases, the van der Waals Equation

I. Molecular Structure and Bonding

1. Lewis structures and the octet rule
2. The energetics of ionic bond formation; the Born-Haber Cycle
3. Lewis structures and covalent compounds and ions, including multiple bonds
4. Bond polarity and electronegativity
5. Molecular polarity and dipole moments
6. Resonance structures and formal charge
7. Bond enthalpy and bond strength
8. Calculation of heats of reaction using bond enthalpies
9. VSEPR theory and molecular geometry
10. Molecular shape and molecular geometry
11. Valence bond theory
12. Orbital hybridization and covalent bond formation
13. Molecular orbital theory

J. States of Matter

1. Properties of the solid, liquid and gaseous phases
2. London Dispersion Forces, Dipole-Dipole Forces and Hydrogen Bonding
3. Vapor Pressure
4. Phase diagrams
5. Unit cells

K. Solutions

1. Properties of strong and weak electrolytes; properties of nonelectrolytes
2. Precipitation reactions in aqueous solutions, exchange reactions
3. Definitions and properties of acids and bases, neutralization reactions.
4. The production of gaseous products from exchange reactions
5. Oxidation-reduction reactions, oxidation numbers, displacement reactions a nd the activity series, balancing reduction-oxidation
6. reaction reactions by the method of half reactions
7. Quantitative treatment of solution concentration
8. Solution stoichiometry and chemical analysis including titrations

2. Required Lab Content:

A. Safety

B. Measurement tools, precision of measurement and errors

C. Create and use standard curve(s)

D. Titration methods

E. Qualitative techniques and observation that support the topics listed in the course content

F. Quantitative techniques that support the topics listed in the course content

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of MATH 90 or qualification by the MJC assessment process.

2. Advisories

Before enrolling in this course, students are strongly advised to complete CHEM 142 with a grade of C or better or complete High School Chemistry with a grade of B or better.

3. Requisite Skills

Before entering the course, the student will be able to:

A. Graph lines and find the equation of a line, given sufficient information.

B. Effectively use function notation to describe mathematical relationships.

C. Solve systems of linear equations in two or three variables by choosing the most effective method for the given problem.

D. Solve quadratic equations with real and complex solutions by completing the square and using the quadratic formula.

E. Add, subtract, multiply, divide, or compose two given functions.

F. Find the inverse of a given function.

G. Solve exponential and logarithmic equations.

H. Simplify expressions using the properties of logarithms.

I. Apply algebraic techniques to solve problems in various mathematical disciplines.

J. Solve chemical problems using unit analysis.

K. Write the formula equation, total ionic equation, and net ionic equation for a chemical reaction.

L. Name inorganic compounds and derive chemical formulas from names.

M. Understand uncertainty in measurements by using significant figures.

N. Use all three temperature scales and convert between them.

C. HOURS AND UNITS

5 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	54	1.00
Discussion	18	1.00
Activity	0	0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Relevant material is presented through class and/or online lectures and lecture/laboratory demonstrations

2. Students perform laboratory experiments that reinforce and expand upon concepts discussed in lecture

3. A portion of the lecture or lecture discussion may be presented online. Discussion boards, quiz tools and other online material may be used to enhance the face-to-face lecture. Laboratory and examinations must be given face-to-face.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments from lecture text

B. Chapter Review homework and/or recommended problems

C. Weekly preparation for laboratory including reading and pre-laboratory assignments

D. Complete record of all experimental work performed, and analysis of results obtained

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. A 519.9 gram piece of copper is heated to 621 ^{o}C and quickly added to a 101.0 gram piece of ice at -19.90 ^{o}C in a well-insulated flask that is immediately sealed. (a) If there is no loss of energy to the surroundings, what will the final temperature of this system be? (b) What phases of water will be present and in what quantities when this system reaches its final temperature?

B. Given that iron corrodes in the presence of oxygen to form rust, which you can assume for simplicity is iron(III) oxide, calculate the maximum mass of iron(III) oxide that can be produced when a cubic block of iron of side 2.717 cm reacts with 51.99 liters of oxygen at STP. Iron has a body-centered cubic structure and the atomic radius of iron is 124 pm. The reaction takes place at STP.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Zumdahl (2012). *Chemistry: An Atoms First Approach* (1st/e). Cengage.

2. Manual: Murov, Steve. Experiments in General Chemistry (Lab Manual). Brooks/Cole

3. Other: Student must purchase goggles from MJC Bookstore (Fog Gard Plus, ANSI Z87.1-1989, SEI Certified)

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Name and write the formula for binary ionic compounds, ionic compounds containing polyatomic ions, binary covalent compounds and acids.

b. Understand uncertainty in measurements by using significant figures.

c. Solve complex problems using the principles of dimensional analysis.

d. Describe the development of the atomic theory and determine the number of protons, neutrons and electrons. Calculate the atomic weight of an element using the natural abundance.

e. Determine the key components of the periodic table and understand the periodic trends of effective nuclear charge, atomic and ionic size, ionization energies, electron affinities and properties of the elements.

f. Demonstrate understanding of the nature of waves and the concept of quantized energy. Solve problems using the Bohr model of the atom. Understand and apply the theories of Schrodinger, Hund and Pauli. Write electron configuration and orbital diagrams for elements.

g. Balance and identify products in chemical reactions using the concepts of synthesis, decomposition, double-replacement, single-replacement and combustion.

h. Determine if a substance is a strong electrotype, weak electrolyte or nonelectrolyte. Predict the products, balance and write the molecular, total ionic and net ionic equations.

i. Understand chemical energy and solve problems using the first law of thermodynamics.

j. Define terms related to first law of thermodynamics. Employ the concept of state functions to solve thermochemical problems. Solve quantitative problems by the use of Hess's Law. Demonstrate understanding of the concept of calorimetry by solving appropriate thermochemical problems.

k. Find the percent composition of elements in a compound.

l. Determine the empirical formula using percent by mass and combustion analysis.

m. Use the concepts of stoichiometry and limiting reactant to solve complex chemical problems.

n. Describe the characteristic properties of the gaseous state. Demonstrate understanding of the concept of gas pressure by providing verbal descriptions and solving quantitative problems. Provide definitions of the following gas laws: Boyle's Law, Gay-Lussac's Law, Charles's Law and Avagadro's Hypothesis and also solve quantitative problems that relate to these laws. Solve quantitative problems related to the Ideal Gas Equation. Solve quantitative problems employing Dalton's Law of Partial Pressures. Define the terms effusion and diffusion; solve quantitative problems involving these concepts. Demonstrate understanding of the concept of Kinetic Molecular Theory by relating these concepts to observable gas properties. Use the van der Waals Equation to predict the properties of real gases. Demonstrate an understanding of the van der Waals constants.

o. Draw correct Lewis structures for elements and ions including those that violate the octet rule. Predict relative values of lattice energy for ionic compounds. Provide (draw) correct Lewis structures for molecules and ions. Predict the relative bond polarity for atoms connected by covalent bonds. Explain the concept of electronegativity and apply this principle to the determination of the polarity of chemical bonds and molecules. Provide resonance structures for ions and molecules. Use bond enthalpies to estimate enthalpy changes for chemical reactions.

p. Employ VSEPR theory to predict the geometry and shape of molecules and ions. Define the concept of valence bond theory and use valence bond theory and the concept of orbital hybridization to describe the bonding patterns in molecules and ions. Employ molecular orbital theory to predict the bond order in binary molecules.

q. Compare and contrast the differences between the solid, liquid and gaseous phases of matter. Identify the three types of intermolecular forces and, by inspection of chemical structures, predict which of these forces will be present in a particular molecule

r. Perform calculations based upon the unit cell of a crystalline solid metal or ionic solid that exhibit a simple cubic, face-centered cubic, or body-centered cubic unit cell.

s. Solve complex problems involving solutions, molarity and dilution.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate safe practice in the chemistry laboratory, including measures to prevent/control fire, explosion, contact with and/or intake of hazardous chemicals or fumes.

2. Compare and determine the accuracy and precision of different measuring devises and record data to correct significant figures.

3. Demonstrate the capacity to perform basic separation techniques such as: evaporation, gravity filtration, vacuum filtration chromatography, and/or distillation.

4. Determine the percent yield and/or recovery based on the theoretical yield, including examples of limiting reactant.

5. Classify and balance reactions based on observations. This will include predicting products and writing the net ionic equations.

6. Demonstrate the capacity to perform a titration, including standardization, using the

stoichiometry of the equation to calculate an unknown quantity.

7. Demonstrate understanding of gas law principles.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Assigned homework and/or quizzes given throughout the semester
2. Examinations given at regular intervals throughout the semester
3. Observation of laboratory technique and safety
4. Laboratory reports required after completion of each experiment
5. Identification of laboratory unknowns

B. SUMMATIVE EVALUATION

1. A comprehensive final examination

CHEM - 101: General Chemistry 1

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex multi-variable chemical problems using general chemistry concepts and theories.
2. Describe key events in the development of chemistry (atomic structure, quantum theory, molecular structure and bonding, and/or stoichiometry) and theories.
3. Identify and use chemical laboratory equipment and instrumentation to quantitatively and/or qualitatively determine an unknown.

Modesto Junior College
Course Outline of Record

CHEM 102

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

CHEM 102—GENERAL CHEMISTRY 2 **5 UNITS**

54 Lecture Hours, 54 Lab Hours, 18 Discussion Hours , 144 Outside-of-Class Hours = 270 Total Student Learning Hours
Prerequisite: *Satisfactory completion of CHEM 101.*

Continuation of CHEM 101 emphasizing kinetics, solutions, equilibrium, acids and bases, electrochemistry, thermodynamics, nuclear chemistry, coordination chemistry and descriptive chemistry. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: CHEM 2B + 2BL) (C-ID: CHEM 120S) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Properties of Solutions

1. Solution composition
2. Energy of solution formation
3. Factors affecting solubility
4. Colligative properites

B. Kinetics

1. Factors affecting the rate of reaction
2. Concentration effects and rate laws
3. Collision theory, temperature effects and the Arrhenius equation
4. Mechanisms
5. Homogeneous and heterogeneous catalysts

C. Equilibrium

1. Dynamic equilibria and the mass action expression
2. Equilibrium calculations

3. Le Chatelier's Principle

D. Acids & Bases

1. Bronstead-Lowery acid and bases and conjugates
2. Strong and weak acids and bases
3. pH and equilibrium calculations

E. Aqueous Equilibria

1. Titration curves
2. Buffers
3. Polyprotic acids
4. Solubility equilibria and factors affecting solubility
5. Equilibria of complex ions in aqueous solutions.
6. Selective precipitation of metal ions.

F. Electrochemistry

1. Half-Reactions and redox equations
2. Voltaic cells, the Nernst Equation, and Gibbs Free-Energy
3. Electrolysis

G. Thermodynamics

1. Second and third laws of thermodynamics
2. Spontaneity, entropy and Gibbs Free-Energy
3. Equilibrium and Gibbs Free-Energy

H. Coordination Chemistry

1. Complex ions and Coordination Compounds
2. Geometry

I. Descriptive Chemistry

1. General properties of nonmetals
2. Sources of oxygen, nitrogen, carbon, halogens, inert gases, silicon, phosphorus, and sulfur
3. Uses of oxygen, nitrogen, carbon, halogens, inert gases, silicon, phosphorus, and sulfur

J. Nuclear Chemistry

1. Nuclear reactions
2. Binding-energy changes for nuclear processes
3. Half-l ife of nuclides
4. Applications

K. Organic Chemistry

1. Basic nomenclature
2. Functional groups

2. Required Lab Content:

A. Safety

B. Measurement tools, precision of measurement and errors

C. Create and use standard curve(s)

D. Titration methods

E. Qualitative techniques and observation that support the topics listed in the course content

F. Quantitative techniques that support the topics listed in the course content

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of CHEM 101.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Differentiate between mixtures and pure substances. Solve complex problems using the principles of dimensional analysis

B. Describe the development of modern atomic theory. Derive the number of protons, neutrons and electrons in an atom from symbolic data. Calculate the atomic weight of an element using natural abundance data. Classify compounds as ionic or molecular by referring to the chemical formula. Name chemical compounds given the correct chemical formula; derive correct chemical formulas from compound names.

C. Identify the type of a chemical reaction from the chemical equation. Determine the molar mass of a compound from the chemical formula. Given the formula of a compound, calculate the percentage composition by mass. Determine a chemical formula from mass data. Perform calculations related to the mole concept. Determine the empirical formula of a compound given combustion analysis data. Perform stoichiometric calculations using chemical equations.

D. Differentiate between electrolytes and nonelectrolytes by referring to chemical formulas. Classify

reactions by type by referring to balanced chemical equations. Differentiate between acids and bases as well as the properties of acids and bases. Complete and balance the equations that describe decomposition, synthesis, displacement and exchange reactions. Convert molecular equations to the corresponding total ionic and net ionic equations.

E. Identify and balance reduction-oxidation equations. Employ balanced chemical equations to perform quantitative calculations for reactions between solutions.

F. Define terms related to first law of thermodynamics. Employ the concept of state functions to solve thermochemical problems. Solve quantitative problems by the use of Hess's Law. Demonstrate understanding of the concept of calorimetry by solving appropriate thermochemical problems.

G. Demonstrate understanding of the nature of waves by both verbal description and solving quantitative problems. Solve problems that involve the concept of quantization of energy. Solve problems that relate to the Bohr Theory of the atom. Provide verbal descriptions and discuss the important results of the theories of Schroedinger, Hund and Pauli. Be able to correctly predict the electron configuration of atoms and ions and draw the corresponding orbital diagrams by referring to the periodic table.

H. Describe the concept of effective nuclear charge and explain the effect of this phenomenon on the properties of atoms. Predict the relative sizes, ionization energies and electron affinities of atoms and ions based on the position of the element on the periodic table.

I. Draw correct Lewis structures for elements and ions. Predict relative values of Lattice energy for ionic compounds. Provide (draw) correct Lewis structures for molecules and ions. Predict the relative bond polarity for atoms connected by covalent bonds. Explain the concept of electronegativity and apply this principle to the determination of the polarity of chemical bonds and molecules. Provide resonance structures for ions and molecules. Use bond enthalpies to estimate enthalpy changes for chemical reactions.

J. Employ VSEPR theory to predict the geometry and shape of molecules and ions. Define the concept of valence bond theory and use valance bond theory and the concept of orbital hybridization to describe the bonding patterns in molecules and ions. Employ molecular orbital theory to predict the bond order in binary molecules.

K. Describe the characteristic properties of the gaseous state. Demonstrate understanding of the concept of gas pressure by providing verbal descriptions and solving quantitative problems. Provide definitions of the following gas laws: Boyle's Law, Gay-Lussac's Law, Charles's Law and Avagadro's Hypothesis and also solve quantitative problems that relate to these laws. Solve quantitative problems related to the Ideal Gas Equation. Solve quantitative problems employing Dalton's Law of Partial Pressures. Define the terms effusion and diffusion; solve quantitative problems involving these concepts. Demonstrate understanding of the concept of Kinetic Molecular Theory by relating these concepts to observable gas properties. Use the van der Waals Equation to predict the properties of real gases.

C. HOURS AND UNITS

5 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	54	1.00
Discussion	18	1.00
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Relevant material is presented through class lectures and lecture/laboratory demonstrations
2. Students perform laboratory experiments that reinforce and expand upon concepts discussed in

lecture

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments from lecture text

B. Chapter Review homework and/or recommended problems

C. Weekly preparation for laboratory including reading and pre-laboratory assignments

D. A complete record of all experimental work performed, and analysis of results

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. What is the pH at each stoichiometric point in the titration of 0.519 M acetic acid with 0.915 M NaOH? Draw a representation of the titration curve.

B. A galvanic cell has the following cell reactions:
M(s) + 2Zn2+(aq) --> 2Zn(s) + M4+(aq)
The standard emf of the cell is 0.16 V, what is the standard potential of the M/M4+ redox couple?

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Zumdahl (2012). *Chemistry: An Atoms First Approach* (1st/e). McGraw Hill Higher Education.

2. Manual: B. Stedgee, L. Maki. General Chemistry and Qualitative Analysis (Lab Manual). MJC Duplicating Dept

3. Other: Student must purchase Safety Goggles from the MJC Bookstore (Fog Gard Plus, ANSI Z87.1-1989, SEI Certified)

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Understand the factors that affect solubility. Calculate changes in vapor pressure, boiling point, freezing point and osmotic pressure with the addition of electrolytic and non-electrolytic solutes.

b. Identify factors that affect the rates of chemical reactions and explain how these factors work on a molecular level. Graphically determine the order of reaction and predict concentrations after a period of time for a first, second, or zero order reaction. Utilize collision theory, temperature effects, and the Arrhenius equation to explain and/or calculate rates of reaction. Understand the effects of homogeneous and heterogeneous catalysts.

c. Describe how entropy changes for different processes and how entropy and enthalpy affect the spontaneity of a chemical reaction. Determine the Gibbs free energy of a reaction and use it to determine if a reaction is spontaneous.

d. Describe the concept of chemical equilibrium, and describe how to shift a chemical reaction in the forward or backward direction.

e. Use the mass action expression to calculate if a reaction is at equilibrium, if the reaction is

favorable or unfavorable, and to determine equilibrium concentrations.

f. Identify, based on structure, if a substance is an acid or base, and use pH to calculate concentrations of hydronium and hydroxide ions in aqueous solutions. Use acid and base ionization constants to determine relative strengths of these solutions and to calculate pH, pOH, hydronium and hydroxide concentrations. Calculate a titration curve based on experimental data for a strong acid and/or base, a weak acid and/or base. Find the Ka from a titration curve. Utilize molecular structure to predict acid/base properties. Calculate pH and capacity of a buffer solution. Calculate solubility equilibria for a salt solution using Ksp, including factors affecting solubility.

g. Describe how electrolysis can be used to perform chemical reactions and be able to perform electrolysis calculations. Determine the potential, explain what the parts are in a galvanic cell using cell notation, and give the half reactions and the net reaction. Utilize reaction Gibbs free energy in cell potential calculations. Use the Nernst equation to perform electrochemical calculations. Predict spontaneity of reactions from the electrochemical series.

h. Calculate the half-life of a nuclear reaction. Balance nuclear reactions and describe applications and hazards of nuclear reactions. Describe the fundamental particles involved in a typical nuclear reaction (alpha, beta, gamma, neutron, proton, positron). Compare and contrast fission and fusion nuclear reactions.

i. Explain and calculate spontaneity of a chemical process based on the second and third laws of thermodynamics.

j. Name complex ions and coordination compounds. Describe the stereochemistry of complex ions and coordination compounds.

k. Name simple alkanes. Identify the functional groups in an organic molecule.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate safe practice in the chemistry laboratory, including measures to prevent/control fire, explosion, contact with and/or intake of hazardous chemicals or fumes.

2. Demonstrate the capacity to perform basic statistical analysis of data including standard deviation and confidence limits.

3. Demonstrate use of Excel (or similar spreadsheet) for graphing and analysis of data.

4. Create an experimental titration curve for a strong acid, weak acid and diprotic acid.

5. Determine experimentally how concentration, temperature and a catalyst affect the rate of a reaction and the activation energy.

6. Determine experimentally the rate law for a reaction and choose the most probable mechanism.

7. Use qualitative analysis to identify ions based on observations of known reactions.

8. Experimentally determine the equilibrium constant and use experimental data to explain Le Châtlier's principle.

9. Demonstrate the ability to evaluate data. Demonstrate the graphical techniques of analyzing experimental data, including determining the slope and graphing and interpreting logarithmic data.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Assigned homework and/or quizzes given throughout the semester
2. Examinations given at regular intervals throughout the semester
3. Observation of laboratory technique and safety
4. Laboratory reports required after completion of each experiment
5. Identification of laboratory unknowns

B. SUMMATIVE EVALUATION

1. A comprehensive final examination

CHEM - 102: General Chemistry 2

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex chemical problems using General Chemistry ideas (rate laws, equilibrium, thermodynamics and/or electrochemistry) and theories.
2. Describe key events in the development of chemistry (rate laws, equilibrium, thermodynamics and/or electrochemistry) and recognize that science is an evolving body of knowledge.
3. Identify and use chemical laboratory equipment and instrumentation to quantitatively and/or qualitatively determine an unknown.

Modesto Junior College
Course Outline of Record

CHEM 112

I. OVERVIEW

The following information will appear in the 2020 - 2021 catalog

CHEM 112—ORGANIC CHEMISTRY 1 **5 UNITS**

54 Lecture Hours, 54 Lab Hours, 18 Discussion Hours , 144 Outside-of-Class Hours = 270 Total Student Learning Hours
Prerequisite: *Satisfactory completion of CHEM 102.*

Organic Chemistry 1 is the first semester of a two semester sequence that covers bonding, acid-base relationships, nomenclature, stereochemistry, conjugation, resonance, mechanisms, reactions, synthesis and advanced spectroscopy of several functional groups. Laboratory includes basic techniques, (eg., separatory methods such as extraction and chromatography), as well as emphasis on MS, UV-vis, IR and NMR analysis. A one hour discussion each week will cover advanced problem solving of lecture topics. Students may not earn credit for both CHEM 112 and CHEM 122. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: CHEM 4A + 4AL; CHEM 4A, 4AL + 4B,4BL= CHEM 112+113) (C-ID: CHEM 150 CHEM 160S) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Electronic Structure and Bonding

1. ionic vs. covalent bonding
2. hybridization

B. Acids and Bases

1. pH and pKa
2. Henderson-Hasselbalch equation
3. organic acids
4. buffer solutions

C. Alkanes

1. molecular formulae, structure and hybridization
2. nomenclature
3. Newman projections

4. cyclic alkanes
5. molecular formulae
6. chair conformation of cyclohexane

D. Alkenes

1. molecular formulae, structure and hybridization
2. nomenclature
    a. cis-trans convention
    b. E, Z system
3. electrophilic addition reactions
    a. sample reactions
    b. mechanism

E. Stereochemistry

1. chirality
2. enantiomers
    a. drawing
    b. naming R, S system
3. diastereomers and meso compounds
    a. drawing
    b. naming R, S system
4. optical activity
    a. rotation
    b. calculation
5. Effect of stereochemistry on product structure and distribution

F. Alkynes

1. molecular formulae, structure and hybridization

2. nomenclature
3. reactions
4. alkynes as nucleophiles in synthesis

G. Electron Delocalization

1. resonance structures
2. conjugation
3. chemical consequences, eg., pKa modification
4. introduction to aromaticity

H. Alkyl halides

1. molecular formulae, structure and hybridization
2. nomenclature
3. substitution reactions
    a. SN2
    b. SN1
4. elimination reactions
    a. E2
    b. E1
5. stereochemical consequences of SN1, SN2, E1 and E2 reactions
6. competition between substitution and elimination reactions
7. alkyl halides in synthesis

I. Radical reactions

1. reactivity vs. selectivity
2. stereochemical consequences
3. allylic and benzylic radicals

J. Mass Spectrometry

1. fragmentation

2. isotopes
3. interpretation of spectra

K. Infrared Spectroscopy

1. position and intensity of absorption bands
2. effect of electron delocalization on absorption bands
3. interpretation of spectra

L. Ultraviolet absorption

1. Beer-Lambert Law
2. conjugated systems
3. effect of conjugation on wavelengths of absorption
4. color and applications
5. interpretation of spectra

M. Nuclear Magnetic Resonance

1. chemical shifts and shielding
2. splitting patterns
3. diamagnetic anisotropy
4. integration of signals
5. deuterium and solvent choice
6. interpretation of spectra
7. introduction to 13C NMR

N. Multi-step synthesis

1. electrophilic addition reactions
2. reactions of acetylide anions
3. substitution and elimination reactions of alkyl halides

O. Advanced problems in organic chemistry

1. conjugate acid/base ratios in buffer solution
2. stereochemistry of electrophilic addition reactions involving substituted cyclohexenes
3. resonance and stability

4. the effect of conjugation on electronic stability
5. Woodward-Fieser rules
6. 13C NMR
7. COSY, HETCOR, DEPT

2. Required Lab Content:

A. In the laboratory portion of the course, the students apply lecture concepts through hands-on learning while developing several laboratory skills such as extraction, crystallization, distillation, performing reactions and synthesis. MJC emphasizes a ***microscale*** curriculum: large scale experiments are for historical comparison only. Analytical techniques, i. e., melting points, GC-MS, UV-vis, IR, proton and 13C NMR spectroscopy are practiced increasingly throughout the semester.

B. Techniques and reactions are selected from the following:

1. Safety protocol, check-in, use of a pipette, transfering liquids and solids
2. Solubility and miscibility; intermolecular forces
3. Solubility; organic acids and bases
4. Crystallization and melting points
5. Mixed melting points; identification of an unknown compound
6. Extraction of a neutral compound from a mixture containing an acid or base impurity
7. Thin layer chromatography: identification of an unknown
8. Following a reaction by thin layer chromatography
9. Hydrogenation of a double bond eg., synthesis of methyl stearate from methyl oleate; product analysis by melting point
10. Steam distillation (microscale) of an oil: analysis by polarimetry or GC-MS
11. Simple and fractional distillation: semimicroscale and microscale procedure followed by GC-MS analysis
12. Column chromatography; analysis by UV-vis spectroscopy eg., spinach extract
13. IR and proton and 13C NMR spectroscopy of unknowns

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of CHEM 102.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate the proper use of laboratory instruments.

B. Demonstrate the graphics techniques of analyzing experimental data.

C. Design simple experiments to test chemical principles.

D. Use the concepts of pH, equilibrium, Ka and pKa to describe the strength, form (ionized or unionized) and solubility of an organic acid.

E. Apply concepts of thermodynamics, equilibrium and kinetics to chemical reactions/systems.

3. Health and Safety Skills/Restrictions

Before entering the course, the student must demonstrate the following skill or condition:

A. Demonstrate safe practice in the laboratory, including measures to prevent/control fire, explosion, contact with and/or intake of hazardous solid/liquid chemicals or chemical fumes and protect him or herself and others from injures such as cuts and burns.

B. Demonstrate proper procedures for disposal or organic and inorganic waste and broken glassware.

C. HOURS AND UNITS

5 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	54	1.00
Discussion	18	1.00
Activity	0	0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Instructor led discussion
3. Laboratory demonstrations
4. Instructor supervised experiments
5. online discussion boards

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Students will be required to read approximately 50 pages per week from the lecture text.

B. Approximately 70 homework problems will be assigned weekly either from the back of each chapter of the lecture text or an online homework system.

C. Students will complete 2-3 advanced problems on acid-base relationships, stereochemistry of reactions and COSY, HETCOR and DEPT NMR spectra.

D. A laboratory notebook must be prepared weekly. The prelaboratory portion will include a table of physical properties and toxicity data for all compounds to be used in the lab as well as an outline of the proposed procedure. A real time description of the procedure will be required followed by analysis of results obtained.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. The student must demonstrate an understanding of spectroscopy as evidenced by the ability to deduce the structure of a compound given its mass, ultraviolet-visible, infrared and/or 1H and 13C NMR spectra. This is demonstrated on exam material and in the laboratory setting.

B. The student must be able to apply a variety of chemical reactions as evidenced by an ability to synthesize small organic compounds in at least 3 steps given the structure of the product. The reagents must be specified and the reactions carried out in an appropriate order. This is demonstrated on exam material and in the laboratory setting.

C. Given a COSY spectrum, the student must be able to identify coupled protons.

D. Sample exam question: On the following pages you will find the MS, IR, 1H and 13C NMR spectra of compound A

1. Write the molecular formula for compound A.
2. Deduce the structure of compound A and draw it.
3. Synthesize compound A starting from benzene, any alkyl or aryl halide of 4 carbons or less and any necessary inorganic reagents.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Bruice (2016). *Organic Chemistry* (8th/e). Up Saddle River, NJ Prentice Hall.

2. **Book:** Pavia, Lampman, Kriz and Engel (2016). *A Microscale Approach to Organic Laboratory Techniques* (6th/e). Belmont, CA Brooks/Cole.

3. Manual: Bruice. Study Guide and Solutions Manual Organic Chemistry. Prentice Hall

4. Other: Student must purchase these items from MJC Bookstore:

1. Goggles (Fog Gard Plus, ANSI Z87.1-1989, SEI Certified)

2. Laboratory notebook with NCR pages

3. An Organic Chemistry Model Kit may be purchased at the bookstore or checked out from the instructor.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Write a procedure designed to separate an organic acid from a neutral molecule using the principles of solubility and pKa.

b. Identify the hybridization of neutral atoms, carbocations and carbanions and the corresponding bond order, bond angles and molecular shapes.

c. Name various organic molecules using both common and IUPAC nomenclature rules.

d. Determine the structure of an organic molecule when given its IUPAC name.

e. Use the principles of thermodynamics and kinetic analysis to evaluate a set of reaction

conditions and determine the resulting kinetic parameters at equilibrium.

f. Describe the physical characteristics of families of organic compounds including melting and boiling points, density, structure, polarity and solubility.

g. Determine the type of reaction mechanism operating in a given chemical reaction and describe the mechanism in detail using curved arrows to show movement of electrons. Special emphasis is placed on the mechanisms of electrophilic addition reactions, uni- and bi-molecular nucleophilic substitution and elimination reactions and radical reactions.

h. Predict the product of a given set of reactants under specified conditions as well as propose reactants and reaction conditions necessary for the production of a particular product. This includes reactions of alkanes, alkenes, alkynes and alkyl halides.

i. Devise multi-step synthetic schemes that will induce the production of a particular product molecule of some given complexity.

j. Apply the principles of stereochemistry to the structure, function and reactions of molecules containing chirality centers.

k. Interpret mass, ultraviolet-visible, infrared and nuclear magnetic resonance spectra as evidenced by the correct description of the structure of an unknown compound.

l. Determine the ratio of conjugate acid to base in a buffer solution of a given pH.

m. Properly predict product of an electrophilic addition reaction of a hydrogen halide to a substituted cycloalkene.

n. Properly describe and/or interpret a COSY, HETCOR or DEPT spectrum.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate safe practice in the laboratory, including measures to prevent/control fire, explosion, contact with and/or intake of hazardous solid/liquid chemicals or chemical fumes and protect him or herself and others from injuries such as cuts and burns.

2. Demonstrate proper procedures for disposal of hazardous waste and broken glassware.

3. Demonstrate the ability to perform the following basic laboratory techniques: measuring a melting point, transferring liquids via a pipette, determine the solubility of a substance in neutral, acidic and/or basic solution, use of a heating mantle and fume hood.

4. Demonstrate the ability to purify and/or separate two or more components in a mixture by the following techniques: crystallization, extraction, simple and fractional distillation, thin layer and column chromatography.

5. Demonstrate the ability to identify an unknown as well as follow a reaction by thin layer chromatography.

6. Demonstrate the ability to perform a synthetic organic reaction with a minimum of two steps, collect, purify and analyze the products.

7. Demonstrate the ability to determine the structure and/or purity of an organic compound given the MS, UV-vis, IR and/or NMR spectral data belonging to the compound in question.

8. Properly prepare a sample for analysis, load the sample on the instrument, use appropriate software to acquire a spectrum and remove the sample after data acquisition for each of the following instruments: ultraviolet-visible spectrophotometer, infrared spectrophotometer, gas chromatograph/mass spectrometer and nuclear magnetic resonator (both 1H and 13C).

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Examinations given at regular intervals throughout the semester
2. Assigned homework and/or quizzes given throughout the semester
3. Observation of laboratory techniques and safety
4. A laboratory notebook maintained by the student will be graded each experiment.
5. The purity and yield of organic products extracted and/or synthesized in the laboratory by the student will be evaluated by the instructor.
6. The student's ability to identify an unknown compound by various analytical methods will be graded by the instructor.

B. SUMMATIVE EVALUATION

1. A comprehensive final examination

CHEM - 112: Organic Chemistry 1

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex chemical problems using organic chemistry ideas (bonding, reactions and/or mechanisms) and theories.
2. Explain key events in the development of chemistry (bonding, reactions and/or mechanisms) and recognize that science is an evolving body of knowledge.
3. Identify and use chemical laboratory equipment and instrumentation to quantitatively and/or qualitatively determine an unknown.

Modesto Junior College
Course Outline of Record

CHEM 113

I. OVERVIEW

The following information will appear in the 2020 - 2021 catalog

CHEM 113—ORGANIC CHEMISTRY 2 **5 UNITS**

54 Lecture Hours, 108 Lab Hours , 108 Outside-of-Class Hours = 270 Total Student Learning Hours
Prerequisite: *Satisfactory completion of CHEM 112.*

Organic Chemistry 2 is the second semester of a two semester sequence that covers nomenclature, physical properties and reactions of alcohols and sulfur containing compounds, aromatic compounds, aldehydes, ketones, carboxylic acids, carboxylic acid derivatives, amines, heterocyclic and bio-organic compounds. Mechanisms to be addressed are electrophilic and nucleophilic aromatic substitution and nucleophilic acyl substitution and addition. Oxidation and reduction processes will be investigated more thoroughly. Course concludes with an introduction to biomolecules. Concepts from CHEM 112 will be reinforced. Laboratory includes reactions and multistep synthesis with continued development of analytical techniques, in particular, mass spectrometry, IR and 1H and 13C NMR spectroscopy. Students may not earn credit for both CHEM 113 and CHEM 123. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: CHEM 4B + 4BL) (C-ID: CHEM 160S) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Oxygen, nitrogen and sulfur containing compounds

1. nomenclature
2. reactions
3. use in synthesis

B. Benzene derivatives and other aromatic compounds

1. nomenclature of benzene derivatives
2. aromaticity, Huckel's rule, molecular orbital description
3. chemical consequences of aromaticity
4. heterocyclic aromatic compounds

C. Reactions of aromatic compounds

1. electrophilic aromatic substitution

a. mechanism
b. disubstitution, reactivity and orientation

2. Friedel-Crafts acylation and alkylation
3. nitration and sulfonation
4. halogenation
5. synthesis of benzene derivatives
6. arenediazonium salts
7. nucleophilic aromatic substitution reactions
8. benzyne
9. polycyclic aromatic hydrocarbons
10. syntheses of benzene derivatives

D. Physical and chemical properties of carboxylic acid derivatives

1. nomenclature of derivatives
   a. acyl halides
   b. acid anhydrides
   c. esters and carboxylic acids
   d. amides and imides
   e. nitriles
2. nucleophilic acyl substitution
   a. hybridization of carbon and tetrahedral intermediate
   b. leaving group, pKa of conjugate acid and reactivity
3. activation of carboxylic acids
4. syntheses and carboxylic acid derivatives

E. Physical and chemical properties of aldehydes and ketones

1. nomenclature of aldehydes and ketones
2. nucleophilic addition reactions
   a. Grignard reagents
   b. acetylide anions
   c. hydride anion
   d. cyanide anion

e. amines, imines and Wolff-Kishner reduction
f. water
g. alcohols

3. Esters and Grignard reagents
4. Wittig reaction
5. stereochemistry
6. syntheses using nucleophilic addition
7. nucleophilic addition to alpha, beta-unsaturated aldehydes and ketones
8. nucleophilic addition to alpha, beta-unsaturated carboxylic acid derivatives

F. Reactions at alpha and beta carbons of carboxylic acid derivatives and carbonyls

1. acidity
2. keto-enol tautomerism
3. reactions of enols and enolate anions
4. halogenation
5. Hell-Volhard-Zelinski reaction
6. lithium diisopropylamide to form enolate anions
7. alkylation
8. enamines
9. Michael addition (alkylation at the beta carbon)
10. aldol condensation followed by dehydration
11. Claisen condensation
12. Robinson annulation
13. decarboxylation of 3-oxocarboxylic acids
14. malonic ester and acetoacetic esters
15. syntheses at the alpha and beta carbons

G. Oxidation-reduction reactions

1. oxidation of alcohols, aldehydes, ketones, alkenes
2. oxidative cleavage of 1, 2 diols, alkenes and alkynes
3. stereochemical implications of oxidation and reduction

H. Physical and chemical properties of amines

1. inversion
2. basicity
3. phase-transfer catalysis
4. reactions and synthesis
5. nitrogen containing aromatic heterocycles

I. Basic structure and function of bioorganic compounds

1. carbohydrates
2. proteins, enzymes
3. lipids
4. nucleic acids

J. Multi-step synthesis; combinations of:

1. electrophilic addition reactions
2. reactions of acetylide anions
3. substitution and elimination reactions of alkyl halides
4. electrophilic aromatic substitution reactions
5. nucleophilic acyl substitution and addition reactions

2. <u>Required Lab Content:</u>

The laboratory portion of the Chem 113 continues in the same vein as Chem 112. The students apply lecture concepts through hands-on learning while continuing to develop several laboratory skills with an emphasis on ***microscale*** experimentation. Analytical techniques, i. e., melting points, GC-MS, UV-vis, IR, proton and 13C NMR spectroscopy are practiced increasingly throughout the semester.

Chem 113 places a heavier emphasis on reactions including, substitution, elimination, electrophilic aromatic substitution, nucleophilic acyl substitution and addition, Michael and aldol condensation reactions and the Wittig reaction. Synthesis are more challenging and multistep syntheses are included.

Techniques and reactions are selected from the following:

Basic organic laboratory skills and reactions

A. SN2, eg., synthesis of n-butylbromide

B. Dehydration of methylcyclohexanols

C. Nitration of methylbenzoate

D. Friedel-Crafts acylation

E. Esterification, eg, synthesis of benzocaine

F. Esterification, eg, synthesis of methylsalicylate

G. Grignard, eg., synthesis of triphenylmethanol

H. Extraction and analysis of essential oils

I. Fermentation

J. Saponification

K. NMR unknowns

L. Chemdraw and compound reports

M. Multi-step synthesis of reactions covered in course with product analysis

Advanced laboratory skills and reactions

A. Aldol condensation

B. Preparation of an α,β-unsaturated ketone via Michael and Aldol Condensation reactions.

C. Acetaminophen synthesis

D. Wittig reaction

E. Biodiesel from an oil, eg., coconut oil

F. Synthesis of a fluorescent dye

G. TPP Synthesis

H. Photo-oxidation

I. Chemiluminescence, energy transfer, luminol

J. Polymers

K. 13C and 2-D NMR< br />

3. Recommended Content:

A. Photochemistry

1. electronic transitions
2. photo-oxidation

B. Pericyclic reactions

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of CHEM 112.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Name various organic molecules using both common and IUPAC nomenclature rules.

B. Determine the structure of an organic molecule when given its IUPAC name.

C. Determine the type of reaction mechanism operating in a given chemical reaction.

D. Propose reactants and reaction conditions necessary for the production of a particular product compound.

E. Devise multi-step synthetic schemes that will allow the production of a particular product molecule of some given complexity.

F. Correctly predict the spectrum resulting from the spectroscopic analysis of a given organic molecule or to use a given spectrum to extract structural information concerning an organic molecule of unknown structure.

G. Apply the principles of stereochemistry to the structure and function of chiral molecules.

H. Apply purification methods including: recrystallization, simple, fractional, vacuum and steam distillation.

I. Synthesize or isolate organic compounds and determine their physical properties using instrumentation such as: gas chromatography, polarimetry, mass spectrometry, infrared and/or nuclear magnetic resonance spectroscopy.

J. Use the principles of stereochemistry in a addition and/or elimination reaction to correctly predict the product of such reaction with proper description of its stereocenters.

K. To incorporate COSY, HETCOR and/or DEPT to properly describe an unknown and/or a product of an organic reaction.

3. Health and Safety Skills/Restrictions

Before entering the course, the student must demonstrate the following skill or condition:

A. Demonstrate safe practice in the laboratory, including measures to prevent/control fire, explosion, contact with and/or intake of hazardous solid/liquid chemicals or chemical fumes and protect him or herself and others from injures such as cuts and burns.

B. Demonstrate proper procedures for disposal or organic and inorganic waste and broken glassware.

C. HOURS AND UNITS

5 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	108	2.00
Discussion	0	0
Activity	0	0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture

2. Instructor-led discussion.
3. Laboratory demonstrations
4. Instructor-supervised laboratory experiments.
5. Online discussion boards.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Students will be required to read approximately 50 pages per week from the lecture text.

B. Approximately 70 homework problems will be assigned weekly either from the back of each chapter of the lecture text or an online homework system.

C. A laboratory notebook must be prepared weekly. The prelaboratory portion will include a table of physical properties and toxicity data for all compounds to be used in the lab as well as an outline of the proposed procedure. A real time description of the procedure will be required followed by analysis of results obtained.

D. Additional notebook preparation will be required for the advanced laboratory procedures and reactions.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. The student must demonstrate the ability to use the reactions covered in CHEM 113 to synthesize a given organic compound, isolate and purify the compound and supply structural proof the the procedure was successful.

B. Sample exam question:

1. Prepare the following compound from benzene. You may use any alkyl or acyl halide of four carbons or less and any necessary inorganic reagents.
2. Assign peaks of pertinent functional groups on IR spectrum.
3. Assign carbons on ^{13}C NMR spectrum.
4. Assign protons on ^{1}H NMR spectrum and account for splitting patterns.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Pavia, Lampman, Kriz and Engel (2016). *A Microscale Approach to Organic Laboratory Techniques* (6th/e). Belmont, CA Brooks/Cole Thomson Learning.
2. **Book:** Bruice, P. (2016). *Organic Chemistry* (8th /e). Upper Saddle River, N.J. Pearson Education.
3. Manual: Bruice. Study Guide and Solutions Manual Organic Chemistry. Pearson/Prentice Hall
4. Other: Student must purchase these items from MJC Bookstore:
   1. Goggles (Fog Gard Plus, ANSI Z87.1-1989, SEI Certified)
   2. Laboratory notebook with NCR pages
   3. An Organic Chemistry Model Kit may be purchased at the bookstore or checked out from the instructor.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Name aromatic compounds, carboxylic acid derivatives and carbonyl compounds (aldehydes and ketones) using both common and IUPAC nomenclature rules and determine the structure of these compounds when given the name.

b. Devise three to five step synthetic schemes that will allow the production of a particular product molecule of some given complexity.

c. Integrate and apply analytical skills learned in CHEM 112, specifically, nuclear magnetic resonance, ultraviolet, visible and infrared spectroscopy and mass spectrometry, to compounds and reactions covered in CHEM 113.

d. Write the mechanism and determine the products of electrophilic substitution reactions of benzene and substituted aromatic compounds.

e. Write the mechanism and determine the products of nucleophilic acyl substitution reactions of carboxylic acid derivatives.

f. Write the mechanism and determine the products of nucleophilic addition reactions of carbonyl compounds, i. e., aldehydes and ketones.

g. Write the mechanism and determine the products of reactions involving the carbon alpha to a carbonyl group.

h. Determine the product of an oxidation or reduction reaction as well as identify appropriate oxidizing or reducing reagents to achieve the desired product.

i. Describe the basic structure and function of heterocycles and biomolecules, in particular, carbohydrates, proteins, lipids and nucleic acids.

j. Produce the IUPAC name for an alcohol, sulfur containing compound or amine given the structure. Give the products of an SN2, SN1, E2, or E1 reaction of these compounds. Propose reactants and reaction conditions necessary for the production of these compounds.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate safe practice in the laboratory, including measures to prevent/control fire, explosion, contact with and/or intake of hazardous solid/liquid chemicals or chemical fumes and protect him or herself and others from injuries such as cuts and burns.

2. Demonstrate proper procedures for disposal of hazardous waste and broken glassware.

3. Perform a representative number of chemical reactions, eg., substitution, elimination, electrophilic aromatic substitution (nitration, Friedel-Crafts acylation and alkylation), nucleophilic acyl substitution and addition, saponification, fermentation, Grignard, aldol, Michael and photo-oxidation reactions.

4. Analyze the success of a reaction based on comparison of reactant and product spectral data, i. e., GC-mass spectrometry, IR and/or NMR (1H and 13C) spectroscopy.

5. Perform a 1 step synthesis, isolate the product through separation and purification methods learned in Chem 112 and analyze the product through GC-mass spectrometry, IR and/or NMR (1H and 13C) spectroscopy.

6. Perform a multistep synthesis, isolate the product through separation and purification methods

learned in Chem 112 and analyze the product through GC-mass spectrometry, IR and/or NMR (1H and 13C) spectroscopy.

7. Isolate a natural compound from a biological substance and analyze it by GC-mass spectrometry, IR and/or NMR (1H and 13C) spectroscopy.

8. Prepare biodiesel from an oil and analyze it by GC-mass spectrometry, IR and/or NMR (1H and 13C) spectroscopy.

9. Prepare a dye and demonstrate its photo-physical properties by observing absorption, fluorescence and/or energy transfer.

10. Demonstrate the ability to determine the structure and/or purity of an organic compound given the GC-mass, IR and/or NMR (1H and 13C) spectral data belonging to the compound in question.

11. Interpret a COSY, HETCOR and DEPT spectrum.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Examinations given at regular intervals throughout the semester
2. Assigned homework and/or quizzes given throughout the semester
3. Observation of laboratory techniques and safety
4. A laboratory notebook maintained by the student will be graded each experiment.
5. The purity and yield of organic products extracted and/or synthesized in the laboratory by the student will be evaluated by the instructor.
6. The student's ability to identify an unknown compound by various analytical methods will be evaluated by the instructor.

B. SUMMATIVE EVALUATION

1. A comprehensive final examination

CHEM - 113: Organic Chemistry 2

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex problems using organic chemistry ideas (bonding, reactions, and mechanisms) and theories.
2. Explain key events in the development of chemistry (bonding, reactions, and/or mechanisms)and recognize that chemistry is an evolving body of knowledge.
3. Identify and use chemical laboratory equipment and instrumentation to quantitatively and/or qualitatively determine an unknown.
4. Extract pertinent information from an appropriate chemical database and report the information in a written narrative with chemical structures.

Modesto Junior College
Course Outline of Record

CHEM 133

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

CHEM 133—PROBLEM SOLVING SKILLS FOR CHEM 143 **1 UNITS**

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in CHEM 143.*

Designed to supplement CHEM 143 with additional assistance in developing problem-solving skills necessary for success. Emphasis is placed on dimensional-analysis, nomenclature, and other basic concepts. Must be taken concurrently with CHEM 143. Field trips are not required. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Measurement and Problem Solving

1. Scientific notation
2. Significant figures
3. Metric system
4. Units of measurement
5. Dimensional analysis
6. Density

B. Formulas and nomenclature

1. Binary compounds
2. Compounds with polyatomic ions
3. Acids

C. Balance and classify equations

D. Stoichiometry

1. Grams to moles
2. Mole-to-mole conversions and gram-to-gram conversions

3. Moles to number of atoms or molecules

E. Solutions

1. Concentration
2. Dilution

F. Various topics from Chem143

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in CHEM 143.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Be enrolled in Chem143

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures which develop theoretical material
2. Demonstrations of mathematical techniques, applications and problem solving strategies by both instructor and students
3. Applications of material to specific problems
4. Homework assignments and/or in-class exercises require students to analyze a given problem, select an appropriate procedure to solve the problem, apply the procedure, and evaluate the adequacy of both the result of the procedure and the procedure itself

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Problem solving homework assignments

B. Preparation for quizzes

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Given that 1 mi = 1760 yds., determine how many miles are in 1849 yds.

B. Magnesium metal burns in the presence of gaseous oxygen to produce solid magnesium oxide. If 1.25 moles of magnesium reacts with 5.25 moles of oxygen, how many moles of magnesium oxide can be produced?

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Hein, Morris; Pattison, Scott; Arena, Susan; and Best, Leo R. (2015). *Introduction to General, Organic, and Biochemistry* (11th/e). John Wiley & Sons, Inc..

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Apply the principles of dimensional analysis to unit conversions.

b. Understand uncertainty in measurements by using significant figures.

c. Use scientific notation to represent very large and very small numbers.

d. Name binary compounds consisting of metals and nonmetals and two nonmetals and compounds containing polyatomic ions.

e. Calculate and use density.

f. Balance and classify chemical reactions.

g. Convert between grams and moles and number of atoms or molecules.

h. Use stoichiometry to determine the amount of a substance needed or produced.

i. Calculate concentration of solutions and dilutions.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Tests and/or quizzes
2. Assigned homework

B. SUMMATIVE EVALUATION

1. Final examination

CHEM - 133: Problem Solving Skills For CHEM 143

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex chemical problems as related to concepts and problem solving in CHEM 143.

Modesto Junior College
Course Outline of Record

CHEM 143

I. OVERVIEW

The following information will appear in the 2020 - 2021 catalog

CHEM 143—INTRODUCTORY COLLEGE CHEMISTRY **4 UNITS**

54 Lecture Hours, 54 Lab Hours , 108 Outside-of-Class Hours = 216 Total Student Learning Hours
Prerequisite: *Satisfactory completion of MATH 30 or qualification by the MJC assessment process or MATH 29 or qualification by the MJC assessment process.*
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete MATH 89 or satisfactorily complete MATH 90 or qualification by the MJC assessment process.*

Designed to meet the requirements for allied-health majors and general education. Principles of general, inorganic chemistry with a strong emphasis on problem solving using dimensional analysis. Included are topics on measurement, classification of matter, nomenclature, gas laws, chemical reactions, atomic and molecular structure, stoichiometry, aqueous solutions and fundamentals of acids and bases. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: CHEM 14 + 14L) (C-ID: CHEM 101) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Scientific Method

B. Measurement and Problem Solving

1. Scientific notation
2. Significant figures
3. Metric system
4. Units of measurement
5. Dimensional analysis
6. Temperature conversions
7. Density

C. Matter and Energy

1. Classifying matter
2. Physical and chemical properties and changes

3. Energy and heat capacity

D. Atoms and Elements

1. Modern atomic theory
2. The atom: protons, neutrons, and electrons
3. Ions
4. Isotopes
5. Average atomic mass

E. Formulas and nomenclature

1. Binary compounds
2. Compounds with polyatomic ions
3. Acids

F. Mole conversions

1. Atomic mass, molar mass
2. Grams to moles
3. Moles to number of atoms or molecules
4. Mass percent composition of compounds
5. Empirical and molecular formulas

G. Chemical reactions

1. Evidence of a reaction
2. Balance and classify equations
3. Double displacement
4. Single displacement
5. Solubility rules

H. Stoichiometry

1. Mole-to-mole conversions and gram-to-gram conversions
2. Limiting reactant, theoretical yield, percent yield

I. Chemical bonding

1. Lewis structures
2. Ionic, covalent, and polar covalent bonding
3. Electron configuration and valence electrons
4. Molecular shape

J. Gases, Liquids, Solids

1. Combined gas law
2. Ideal gas law
3. Properties of liquids and solids
4. Phase changes
5. Heat of vaporization, heat of fusion
6. Properties of water and Hydrogen bonding

K. Solutions

1. Aqueous systems
2. Solubility
3. Concentration: mass percent, volume percent, molarity
4. Dilution
5. Solution stoichiometry
6. Osmolarity, osmosis

L. Acids, bases and salts

1. Properties and definitions of acids and bases
2. Reactions of acids and bases
3. Strong and weak acids and bases
4. Equilibrium, Ka
5. Acid/base titrations
6. pH
7. Buffers

2. <u>Required Lab Content:</u>

A. Safety

B. Measurement tools and precision of measurement

C. Use of standard curves

D. Qualitative techniques and observations that support the topics listed in course content

E. Quantitative techniques that support the topics listed in course content

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of MATH 30 or qualification by the MJC assessment process or MATH 29 or qualification by the MJC assessment process.

2. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete MATH 89 or satisfactorily complete MATH 90 or qualification by the MJC assessment process.

3. Requisite Skills

Before entering the course, the student will be able to:

A. Simplify arithmetic and algebraic expressions.

B. Solve linear equations and systems of linear equations.

C. Correctly use scientific notation.

D. Graph linear, quadratic, and exponential functions.

E. Demonstrate continuing mastery of all prerequisite skills.

F. Add, subtract, multiply, and divide rational expressions.

G. Solve rational equations.

H. Graph lines and find the equation of a line, given sufficient information.

I. Solve equations involving radical expressions.

J. Find the inverse of a given function.

K. Solve exponential and logarithmic equations.

L. Simplify expressions using the properties of logarithms.

C. HOURS AND UNITS

4 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	54	1.00
Discussion	0	0

Activity	0	0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Instructor-led discussion
3. Laboratory demonstrations
4. Instructor-supervised laboratory experiments
5. Online discussion boards

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly reading assignments from lecture text

B. Chapter Review homework and/or recommended problems

C. Weekly preparation for laboratory, including reading and pre-laboratory assignments

D. A complete record of all experimental work performed, and analysis of results

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Your patient weighs 168.7 lbs. and is taking a maintenance dose of a particular drug. The suggested dose is 3.27 ug per kg of body weight. What is an appropriate dose for your patient?

B. A box measures 13 in x 1.2 yd x 0.95 ft. What is the volume of the box in mL?

C. How many moles in 43.1 g of carbon?

D. How many molecules are in 218 g of methane, CH4?

E. Analysis of a chlorohydrocarbon found it to be 39.72% C, 1.666% H, and 58.62% Cl. What is the empirical formula of this compound?

F. Sodium metal reacts with liquid water to give hydrogen gas and sodium hydroxide which is soluble in water.

1. Write a chemical equation for this process with proper notation for phases. Balance the equation.
2. If 2 moles of sodium are allowed to react with plenty of water, how many moles of sodium hydroxide will be produced?
3. If 3.91 moles of sodium are allowed to react with plenty of water, how many moles of hydrogen gas will be produced?

G. Magnesium metal burns in the presence of gaseous oxygen to produce solid magnesium oxide. If 1.25 moles of magnesium reacts with 5.25 moles of oxygen, how many moles of magnesium oxide can be produced?

H. If 4.00 L of a gas at STP has a mass of 6.41 g, what is the molar mass of the gas?

I. How many grams of NaOH are in 253 mL of a 0.342 M aqueous solution?

J. You have 20.0 mL of stock solution which is 0.03500 M cupric sulfate. You place this into a 250.0 mL volumetric flask and fill the flask to the mark. What is the new molarity?

K. What is the osmolarity of a solution which is 0.0923 M aluminum chloride?

L. Determine the pH of a solution of .0035 M KOH.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Timberlake (2014). *Laboratory Manual for General, Organic and Biological Chemistry* (3rd/e). Pearson.

2. **Book:** Timberlake (2019). *General, Organic, and Biological Chemistry: Structures of Life* (6th/e). Pearson.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Apply the principles of the scientific method to solve basic chemical concepts.

b. Apply the principles of dimensional analysis to unit conversions.

c. Define and identify phases of matter.

d. Differentiate between pure elements, pure compounds, homogenous and heterogenous mixtures.

e. Differentiate between physical and chemical properties and changes.

f. Define subatomic particles, cations, anions and isotopes.

g. Identify atomic number and mass of an element on the periodic table.

h. Name binary compounds consisting of metals and nonmetals and two nonmetals and compounds containing polyatomic ions.

i. Apply Avogadro's number to mole and mass measurements.

j. Calculate molar mass.

k. Write balanced chemical equation and identify type of equation.

l. Use molar ratios to calculate moles (or mass) of chemicals consumed or produced as well as percent yield taking into account limiting reagents.

m. Differentiate between ionic, covalent and polar convalent bonds.

n. Write the Lewis dot structure and predict the shape (using VSEPR theory) of chemical compounds.

o. Identify periodic trends between metals, metalloids and nonmetals.

p. Predict the effect of changing pressure, volume, temperature or number of moles on a gaseous

system holding one or more of these variables constant.

q. Calculate an unknown variable in a gas law.

r. Define vapor pressure, surface tension and boiling point of substances.

s. Describe the features of a heating cooling curve.

t. Calculate mass percent, mass/volume percent and volume percent of a solution.

u. Calculate molarity and osmolarity of a solution.

v. Differentiate between strong and weak acids; strong and weak bases.

w. Calculate pH and [H+].

x. Define and understand buffers.

y. Define and calculate Ka for weak acids.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate safe practice in the chemistry laboratory, including measures to prevent/control fire, explosion, and contact with or intake of hazardous chemicals or fumes.

2. Demonstrate proper and safe use of laboratory equipment, including the thermometer, graduated cylinder, balance, Bunsen burner, pipet, buret, and filtration apparati.

3. Apply the scientific method.

4. Apply significant figures in measurements and calculations.

5. Use the fundamentals of graphing, and use graphs of known substances to determine the value of an unknown.

6. Write balanced equations for, observe, and classify various types of reactions including single replacement, double replacement, combination, decomposition, and combustion reactions.

7. Investigate the properties of gases and perform relevant calculations using gas laws.

8. Perform dilutions and calculate the concentrations of solutions.

9. Investigate the chemical principles of pH and acid-base reactions.

10. Perform titrations and obtain reproducible results.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Examinations will be given at regular intervals throughout the semester.
2. Assigned homework and/or quizzes may be given throughout the semester.
3. Observation of student laboratory technique and safety
4. Laboratory reports and/or quizzes will be required after completion of each experiment.
5. Identification of laboratory unknowns

B. SUMMATIVE EVALUATION

1. A comprehensive final examination

CHEM - 143: Introductory College Chemistry

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex chemical problems using general chemistry principles and theories.
2. Describe key events in the development of chemistry and recognize that science is an evolving body of knowledge.
3. Identify and use chemical laboratory equipment and instrumentation.

Modesto Junior College
Course Outline of Record

CHEM 144

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

CHEM 144—FUNDAMENTALS OF ORGANIC & BIOCHEMISTRY **4 UNITS**

54 Lecture Hours, 54 Lab Hours , 108 Outside-of-Class Hours = 216 Total Student Learning Hours
Prerequisite: *Satisfactory completion of CHEM 143.*

Basic principles of organic and biochemistry for allied health majors. Topics include general organic chemistry and biological chemistry as they apply to living systems. The laboratory component will support the course topics including both qualitative and quantitative experiments, and analysis of data. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (C-ID: CHEM 102) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

a. Alkanes
- i. saturated hydrocarbons
- ii. representation by Lewis and line structures, condensed formulas
- iii. hybridization and bonding
- iv. constitutional isomers
- iv. nomenclature
- v. sources, uses
- vi. reactions
- vii. cycloalkanes
- viii. alkyl halides

b. Alkenes and Alkynes
- i. unsaturated hydrocarbons
- ii. hybridization and bonding
- iii. geometric isomers
- iv. common and E, Z nomenclature
- v. sources, uses of alkenes and alkynes
- vi. reactions
- vii. Markovnikov's rule and regiochemistry

c. Aromatic hydrocarbons
- i. the benzene ring
- ii. hybridization, electronic pi cloud
- iii. nomenclature
- iv. sources, uses
- v. reactions
- vi. polycyclic aromatic hydrocarbons

d. Alcohols and ethers
- i. functional groups
- ii. nomenclature

iii. dipoles, intermolecular forces
iv. diols and triols
v. sources, uses
vi. reactions

e. Aldehydes and ketones
i. hybridization and bonding
ii. carbon-oxygen bond polarity
iii. nomenclature
iv. sources, uses
v. reactions

f. Carboxylic acids and esters
i. hybridization and bonding
ii. carbon-oxygen and oxygen-hydrogen bond polarities
iii. nomenclature
iv. dipoles, intermolecular forces
iv. acidity, pK_a and buffers
v. alpha-hydroxy acids
vii. sources, uses
viii. reactions

g. Amines and amides
i. hybridization and bonding
ii. resonances structures
iii. dipoles and intermolecular forces
iv. nitrogen protonation and ion formation
v. sources, uses
vii. reactions

h. Stereoisomerism
i. chirality centers
ii. plane polarized light, specific rotation and optical activity
iii. enantiomers
iv. R,S nomenclature
v. racemic mixtures
vi. diastereomers
vii. meso compounds

i. Carbohydrates
i. mono-, oligo and polysaccharides
ii. aldoses and ketoses
iii. Fischer projections
iv. D and L designations
v. anomers and mutarotation
vi. redox reactions of sugars
vii. starch, glycogen and cellulose
viii. complex polysaccharides

j. Lipids
i. simple lipids
ii. compound lipids

iii. steroids
iv. fat soluble vitamins
v. lipoproteins
vi. saturated and unsaturated lipids
vii. hydrophobic and hydrophilic lipids
viii. membranes

k. Amino acids and proteins

i. structure vs. function
ii. carboxyl, amino and variable groups
iii. essential amino acids
iv. D and L designations
v. amphoterism, isoelectric points
vi. peptide linkages and cross linkages
vii. primary, secondary, tertiary and quaternary structures
viii. fibrous, globular proteins
ix. chromatography and electrophoresis
x. enzymes

l. Nucleic acids
i. DNA and RNA bases
ii. the sugar phosphate backbone
iii. hydrogen bonding and the double helix
iv. high energy nucleotides
v. DNA replication
vi. protein synthesis and codons

2. <u>Required Lab Content:</u>

Techniques and reactions selected from the following:

A. molecular models
B. distillation
C. extraction
D. melting point
E. hydrocarbons
F. reflux
G. chromatography
H. synthesis
I. carboxylic acids
J. titration
K. polymers
L. esters: esterification or hydrolysis
M. carbohydrates
N. lipids: triglycerides
O. proteins
P. electrophoresis

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of CHEM 143.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Apply the principles of the scientific method to solve basic chemical concepts and use dimensional analysis for unit conversions.

B. Differentiate between pure elements, pure compounds, homogenous and heterogeneous mixtures, chemical and physical properties and changes.

C. Use the periodic table of elements to determine atomic number, mass number, protons, electrons, neutrons, molar mass, naming binary compounds. Classify elements as metals, nonmetals and metalloids.

D. Balance chemical equations and use mole ratios to determine percent yield.

E. Differentiate between ionic and covalent compounds and use Lewis structures and VSEPR to predict shape of molecules.

F. Define normal boiling point, normal melting point and determine relative boiling points based on intermolecular forces.

G. Calculate molarity of a solution or use molarity to determine moles of an element or compound.

H. Differentiate between strong and weak acids; strong and weak bases, calculate pH and (H+), calculate the proper ratio of weak acid or base to conjugate cation or anion to prepare buffer solution of defined pH.

I. Use and identify standard chemical equipment including graduated cylinder, pipet, buret and Bunsen burner.

C. HOURS AND UNITS

4 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Relevant material is presented through class lectures and lecture/laboratory demonstrations.
2. Students perform laboratory experiments that reinforce and expand upon concepts discussed in lecture, under instructor supervision.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Reading assignments from lecture text approximately

B. Chapter Review homework and/or recommended problems

C. Weekly preparation for laboratory including reading and pre-laboratory assignments

D. A complete record of all experimental work performed, and analysis of results

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Homework:

1. For each pair below, describe the intermolecular force and choose the compound with the higher melting point.

a. CH_3Cl and KCl

b. NaOH and CH_3CH_2OH

c. $CH_3CH_2CH_2$ and $CH_3(CH_2)_5CH_3$

2. Draw the structure for each of the following compounds

   a. 2-methylpentanal

   b. formaldehyde

   c. acetic acid

B. Exam question:

1. Give the name or the structure for each of the following. If naming stereoisomers, be specific wth D-, L-, alpha-, or beta-

   a. image of a structure with a chiral center, double bond and alkyl substiutent

   b. beta-D-Galactose

   c. a triglyceride made from two palmitic acids and one oleic acid

   d. the amino acid valine - as if is found at physiological pH

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Timberlake (2014). *Laboratory Manual for General, Organic, and Biological Chemistry - See more at: http://www.pearsonhighered.com/educator/product/Laboratory-Manual-for-General-Organic-and-Biological-Chemistry-3E/978032* (6th/e). Pearson.
2. **Book:** Timberlake (2013). *General, Oragnic and Biochemistry:Structures of Life* (4th/e). Pearson.
3. Other: Student must purchase goggles from MJC Bookstore (Fog Gard Plus, ANSI Z87.1-1989, SEI Certified)

III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**
   Upon satisfactory completion of this course, the student will be able to:

   a. Correctly draw number of covalent bonds and lone pairs required by hydrogen, carbon, oxygen, nitrogen, sulfur, or halogen atom.

   b. Predict bond angle and molecule geometry of molecules consisting of carbon, hydrogen, and oxygen atoms. Predict bond angles and geometries associated with single, double, or triple bonds.

   c. Name simple alkanes using IUPAC (systematic) nomenclature. Compare physical properties (such as boiling point) of two compounds from the same family. Distinguish between the terms "conformation", "constitutional isomer", and "different chemical formula". Understand and utilize the line angle method of drawing molecules.

   d. Name simple alkenes and alkynes using IUPAC nomenclature. Distinguish between cis and trans alkenes. Recognize alkenes that do not exist as cis-trans isomers. Predict correct product of addition to alkenes, utilizing Markovnikov's Rule if needed.

   e. Name simple benzene derivatives using IUPAC nomenclature. Recognize the difference between benzene rings and cyclohexane rings. Predict correct product of nucleophilic aromatic substitution onto benzene itself.

   f. Name simple alcohols using IUPAC (systematic) nomenclature. Compare physical properties (such as boiling point and water solubility) of two compounds from the same family or different families, including alcohols, ethers, or thiols. Predict correct product(s) of oxidation or dehydration of alcohols.

   g. Recognize tetrahedral stereocenters. Distinguish between chiral and achiral molecules. Tell the number of stereoisomers possible for a given chiral molecule. Distinguish between types of stereoisomers (cis-trans, enantiomer, diastereomer). Determine the R or S configuration of a stereocenter.

   h. Define acid and base. Provide the conjugate acid of a given base or the conjugate base of a given acid. Determine relative strength of two acids given their Ka's or pKa's. Determine relative strength of two bases given their Kb's or pKb's. Given an acid-base reaction and strength of acids (or bases), determine the acid, base, conjugate acid, conjugate base, and tell which side is favored.

   i. Name simple amines using IUPAC (systematic) nomenclature. Identify aromatic and aliphatic amine and determine which class is more basic.

   j. Name simple aldehydes and ketones using IUPAC (systematic) nomenclature. Predict correct products of some reactions of aldehydes and ketones.

   k. Name simple carboxylic acids, esters, and amides using IUPAC (systematic) nomenclature. Predict correct product(s) of some reactions of carboxylic acids, esters, and amides.

l. Compare physical properties (such as boiling point and water solubility) of two compounds from the same family or different families, including hydrocarbons, alcohols, ethers, thiols, amines, aldehydes, ketones, carboxylic acids, esters, and amides.

m. Recognize Fischer projections of simple carbohydrates, classify them as aldoses or ketoses, classify them as D or L sugars, determine the number of carbons, and determine the number of stereocenters. Provide the aldonic acid, alditol, or uronic acid of a simple carbohydrate in Fischer projection form. Recognize cyclic forms of sugars, classify them as aldoses or ketoses, classify them as pyranoses or furanoses, determine the number of carbons, identify the anomeric carbon, and classify them as alpha or beta. Understand the differences in structure between common disaccharides and polysaccharides.

n. Recognize the structures of common lipids such as triglycerides, glycerophospholipids, steroids, and eicosanoids. Identify the structural differences between saturated, unsaturated, and trans fatty acids and determine how the differences affect their physical properties and the properties of the triglycerides made with them. Predict the products of saponification or hydrogenation of a triglyceride.

o. Classify amino acids as non-polar, polar, acidic or basic. Predict the effect an acidic or basic amino acid will have on the pH of a peptide. Draw the correct protonation state of an amino acid or peptide at a given pH. Tell the charge an amino acid or peptide will have at a given pH. Given a chart of amino acids, draw a tri-peptide or tetra-peptide. Recognize the primary, secondary, tertiary, and quaternary structures of proteins. Identify the forces that hold together these structures. List agents that can disrupt these forces and denature the protein.

p. Classify enzymes based on the type of reactions they catalyze. Recognize the way an enzyme's rate of catalysis responds to changes in enzyme concentration, substrate concentration, pH, temperature, or inhibition. Define the following terms: active site, competitive inhibition, non-competitive inhibition, allosterism, feedback regulation, cofactor, coenzyme, apoenzyme, substrate.

q. Identify the structural parts of a nucleoside or nucleotide. Identify the differences bewteen an RNA nucleotide and a DNA nucleotide. Identify the 3' and 5' ends of a nucleotide. Given a sample strand of DNA, provide the complementary strand of DNA or the translated strand of mRNA. Given a strand of mRNA and the genetic code, determine the protein produced by translation. Define the terms replication, transcription, translation, and reverse transcription.

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate safe practice in the chemistry laboratory, including measures to prevent/control fire, explosion, contact with and or intake of hazardous chemicals or fumes.

2. Demonstrate the ability to purify a mixture of chemicals by distillation. (The student shall demonstrate the ability to set up a distillation apparatus,
use a pipet, and to use a density measurement to characterize a liquid).

3. Demonstrate the ability to purify a mixture of chemicals by extraction.

4. Demonstrate the ability to separate and identify components of a mixture by chromatography.

5. Investigate the solubilities and simple reactivities (eg. halogenation) of various hydrocarbons (alkanes, alkenes, arenes).

6. Investigate the solubilities and simple reactivities (eg. oxidation) of aldehydes

7. Investigate the solubilities of carboxylic acids.

8. Perform a Fischer esterification reaction.

9. Perform chemical tests (eg. Benedict’s test) to investigate the properties of carbohydrates.

10. Investigate the solubilities and simple reactivities (eg. halogenation as saturation test) of various lipids.

11. Investigate the simple reactivities (eg. denaturation) of proteins.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Examinations given at regular intervals throughout the semester
2. Assigned homework and/or quizzes given throughout the semester
3. Observation of laboratory technique and safety
4. Laboratory reports required after completion of each experiment
5. Identification of laboratory unknowns

B. SUMMATIVE EVALUATION

1. A comprehensive final examination

CHEM - 144: Fundamentals of Organic & Biochemistry

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve abstract and complex chemical problems using organic and biochemical ideas and theories.
2. Describe key events in the development of organic and biochemistry and recognize that science is an evolving body of knowledge.
3. Identify and use chemical laboratory equipment and instrumentation.

Modesto Junior College
Course Outline of Record

DANCE 121

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

DANCE 121—BALLET 1 **1 UNITS**

Formerly listed as: *PEC - 133: Ballet 1,PEI - 133: Weight Lifting*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours

Fundamental ballet technique and terminology. Students are required to have appropriate dance shoes and dance attire. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC)
Local Requirement: (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Barre Work
   1. Plie
   2. Tendu
   3. Degage
   4. Rond de Jambe
   5. Releve
   6. Frappe
   7. Developpe
   8. Grand Battment

B. Center Work
   1. Stretches
   2. Adage
   3. Locomotor Skills
      a. waltz
      b. simple grand allegro
   4. Preparation for Pirouettes

5. Petite Allegro
6. Simple Grand Allegro

C. Qualities and Dynamics of Movement

1. Sustained Quality
2. Percussive Quality
3. Fluid Quality
4. Sharp Quality

D. Timing and Rhythm

1. 4/4
2. 3/4

E. Desired Dance Goals

1. Flexibility
2. Placement
3. Kinesthetic Awareness
4. Coordination
5. Balance
6. Muscular Strength

F. Aesthetic Valuing, Critical Thinking

1. Written Critique of Live Dance Concert

G. Acquisition and Understanding of Classical Ballet Terminology

1. Constant exposure to French ballet terms
2. Written Assessment of Ballet Terminology

H. Self and Peer Evaluation

B. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0

Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)
Instructors of the course might conduct the course using the following method:

1. Demonstration/description of skills
2. Lecture
3. Instructor evaluation and correction of demonstrated skills
4. Instructor-led practice of skill or combination of skills

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Write one critique of live dance performance. Pay special note to rhythm, space, performance quality of dancers, and choreographical form.

B. Typical Exam Question: Define the ballet term, Plie'.

C. Typical Movement Assignment: Tombe, pas de bourree, glissade, assemble.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: No textbook required.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Understand and identify basic classical ballet vocabulary.
2. Demonstrate basic movements of classical ballet technique during barre and center work.
3. Appraise dance as a critical thinker.
4. Demonstrate rhythmic qualities in adagio and petite allegro movement phrases.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. In-class participation
2. Written critique of dance performance
3. Midterm exam
4. Terminology quiz
5. Classroom participation in Ballet Barre and Center Movement Technique

B. SUMMATIVE EVALUATION

1. Completion of movement final
2. Final exam

DANCE - 121: Ballet 1

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate proper usage of the basic classical ballet vocabulary.
2. Demonstrate basic movements of classical ballet technique using appropriate flow of time, force and dynamics.
3. Appraise dance as a critical thinker by using appropriate dance vocabulary in the written form.

Modesto Junior College
Course Outline of Record

DANCE 122

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

DANCE 122—BALLET 2 **1 UNITS**

Formerly listed as: *PEC - 127: Ballet 2*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 121.*

Intermediate level ballet technique and terminology. Students are required to have appropriate dance shoes and dance attire. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Barre Work

1. Plie
2. Tendu
3. Degage
4. Releve
5. Rond de Jambe
6. Frappe
7. Rond de jambe en'lair with pirouettes
8. Developpe
9. Grand Battement

B. Center Work

1. Stretches
2. Adagio
3. Pirouette Preparation
4. Pirouettes: en dehors/en dedans
5. Petite allegro: simple/complex

6. Locomotor Skills
    a. Grand Allegro (simple and complex)
7. Classical Ballet Variations
    a. Blue Bird
    b. Don Quixote
8. Reverance

C. Qualities and Dynamics of Movement
1. Sustained Quality
2. Percussive Quality
3. Fluid Quality
4. Sharp Quality

D. Timing and Rhythm
1. 4/4
2. 3/4

E. Desired Dance Goals
1. Flexibility
2. Placement
3. Kinesthetic Awareness
4. Coordination
5. Balance
6. Muscular Strength

F. Aesthetic Valuing, Critical Thinking
1. Written Critique of Live Dance Concert

G. Acquisition and Understading of Classical Ballet Terminology
1. Constant Exposure to French ballet terms
2. Written Assessment of Ballet Terminology

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 121.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Basic locomotor skills: waltz, simple balance, tombe pas de bourree, soute arabesque

B. Tendu en croix from third position - with and without por de bras.

C. Degage en croix from third - with and without por de bras.

D. Rond de jambe en dehors and en dedans, both a terre and grand, with STRAIGHT legs.

E. Single frappe en croix

F. Grand Battement en croix with por de bras

G. Simple adadio sequence with appropriate fluid and sustained movement quality

H. Single pirouettes en dehors

I. Simple jumps: changement, echappe, glissade, assemble, sissone with appropriate dynamics

J. Demi and Grand Plie in first, second, third, and fourth positions.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Demonstration/description of skills
2. Lecture
3. Instructor evaluation and correction of demonstrated skills
4. Instructor led practice of skill or combination of skills

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Write one critique of live dance performance. Pay special note to rhythm, space, quality and type of movement, performance quality of dancers, technical strength of dancers, and choreographic form.

B. Typical Exam Questions:

1. Define the ballet term: Balance Entournant.

2. Identify via live demonstration: Tombe pas de bourree, pirouette, waltz turn, chasse releve arabesque, sousous.

C. Typical Movement Assignments:

1. Rond de jambe en'lair

2. Pirouette en dedans

3. Soute Arabesque, balance entournant, glissade, soute chat.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: No textbook required

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Understand and identify intermediate level classical ballet vocabulary.

2. Demonstrate intermediate level movements of classical ballet technique during barre and center work.

3. Appraise dance as a critical thinker.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. In-class participation
2. Written critique of dance performance
3. Midterm exam
4. Ballet terminology quiz
5. Classroom participation in Ballet Barre and Center Movement Technique

B. SUMMATIVE EVALUATION

1. Completion of movement final
2. Final exam

DANCE - 122: Ballet 2

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Understand and identify intermediate level classical ballet vocabulary.
2. Demonstrate intermediate level movements of classical ballet technique during barre and center work.
3. Appraise dance as a critical thinker.

Modesto Junior College
Course Outline of Record

DANCE 131

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

DANCE 131—JAZZ 1 **1 UNITS**

Formerly listed as: *THETR - 188: Jazz 1,THETR - 188A: Jazz Dance*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours

Beginning Technique of Jazz Dance with explorations into contemporary derivations of jazz. Emphasis on technical style of this form, and to the interrelationships of music and movement. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Beginning Warm up sequence to strengthen core and increase flexibilty

B. Body isolations with use of different body parts moving, independently of the rest of the body

C. Body rolls

D. Vertical stretch of the arms, shoulder girdle, both sides of the torso and legs

E. Flex and extend the feet employing the lower and upper leg

F. Plie' in first, second and fourth position of the feet through stretch and contration of the quadricep muscle group applying alignment

G. Locomotor movements across the floor involving isolation, skips, jumps and rhythmic timing and execution

H. Battements (kicks) with large torso movements and complementary balance and placement of the arms

I. Turns unique to the Jazz style including pivot turns and chaine turns

J. Group work on refinement of dances and student contribution

B. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00

Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Demonstration/discussion by the instructor of the correct application of subject matter
2. Practical application of styles and interpretation of Jazz dance
3. Master classes by guest artists
4. Exposure to professional companies via field trips or video
5. Small group work on refinement of dance sequences taught by instructor with instructor supervision and feedback

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

lab only - no outside-of class hours required.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Write a review of a dance concert using technical dance terminology to critically discuss choreography, production elements and performance.

B. Group assignment: Choreography problem solving related to jazz dance sequence taught by instructor, involving time and space.

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Kraines, Minda Goodman and Esther Pryor (2004). *Jump into Jazz: The Basics and Beyond for Jazz Dance Students* (5th/e). The Mcgraw-Hill Companies.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate the interrelationships between music and movement.
2. Identify Jazz movement vocabulary through written source and movement source.
3. Perform a Jazz movement phrase with proper spine and foot alignment.
4. Demonstrate body isolation with rhythmic clarity.
5. Demonstrate beginning level jazz dance phrasing with an understanding of time, space, and choreographic elements.

6. Demonstrate beginning level jazz technique in center floor phrasing and locomotor patterns.
7. Identify varying Jazz styles of movement and choreography.
8. Write a critique of a live or on film jazz dance concert.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of beginning body alignment placement and muscle coordination
2. Demonstration of beginning jazz body isolations
3. Group studies in choreography involving space and time
4. Participation in Jazz sequences center floor or locomotor patterns to develop awareness of rhythmic music pulse
5. Demonstration of the recognition of the different styles of Jazz dance

B. SUMMATIVE EVALUATION

1. Class participation
2. Movement technique and performance test
3. Written critique of dance performance
4. Group work including solving choreographic problem

DANCE - 131: Jazz 1

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Differentiate between Jazz dance and other related styles such as modern and ballet technique.
2. Demonstrate skill in body isolation, working with and against music pulse.
3. Perform the physical characteristics of jazz dance including the use of plie', rhythm, and syncopation.

Modesto Junior College
Course Outline of Record

DANCE 132

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

DANCE 132—JAZZ 2 **1 UNITS**

Formerly listed as: *THETR - 129: Jazz 2*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 131.*

Intermediate technique of Jazz Dance with explorations into contemporary derivations of jazz. Emphasis on technical style of the form and the interrelationship of music and movement. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Complete warm-up of the body with concentration on body placement (alignment) focus and performance

B. Flex and extension of feet employing the lower and upper leg muscles

C. Plie, Battement in first, second, fourth and fifth position foot alignment

D. Turns unique to the jazz style including intermediate skill progress from single to double turn in parallel and turned out positions

E. Basic and intermediate recognition demonstrated by instructor of different styles of Jazz dance

F. Demonstration of increased awareness in basic and intermediate musical meters from simple to complex 3/4, 4/4 6/8 metered time signature

G. Group work in choreograhic problem solving studies involving space and use of levels, time signature

H. Self evaluation of skill levels in oral or written form

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 131.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate basic knowledge of Jazz dance terminology.

B. Demonstrate basic jazz dance skills: single pirouette turn, pas de bourre, grande jete, passe jump.

C. Recognize different jazz dance styles.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Instructor demonstration of jazz dance terminology.
2. Demonstration of basic and intermediate level of jazz dance through instructor taught jazz dance sequences.
3. Presentation of jazz dance audiovisual materials.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Write a review of a dance concert using technical dance terminology to critically discuss choreography and performance.

B. Evaluate group choreography studies recognizing differences in use of time and space.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Kraines, Minda Goodman and Ester Pryor (2004). *Jump into Jazz: The Basics and Beyond for Jazz Dance Students* (5th ed./e). McGrraw-Hill .

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Identify intermediate jazz movement vocabulary through written source and movement source.

2. Perform an intermediate level jazz phrase with proper spine, foot and arm alignment.

3. Demonstrate intermediate level jazz dance phrasing with an understanding of time, space, and choreographic elements.

4. Demonstrate intermediate level jazz technique in center floor phrasing and locomotor jazz skills.

5. Identify vernacular sub-genres of jazz dance through movement and choreography.

6. Critique jazz performance in the written form.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of stretching, dance conditioning, and warm up exercises supported by correct body alignment as it relates to Jazz dance.
2. Evaluation of locomotor skills of intermediate skill in jumps, double pirrouette turns and leaps.
3. Demonstration of jazz dance forms in rhythmic, progressive,lyrical, theatrical and contemporary styles.
4. Group studies in Jazz choreography with use of time in space built upon self evaluation.
5. Evaluation of demonstrated level in group dance taught by instructor based on performance.
6. Dance performance through video or live performance.

B. SUMMATIVE EVALUATION

1. Participation and demonstration of level based on attendance.
2. Skills level test on learned and instructed combinations by instructor.
3. Group test based on choregraphic problem solving involving use of time and space.
4. Written review of dance performance either done from video or live performance.

DANCE - 132: Jazz 2

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Develop Intermediate skills in body isolation, working with and against music pulse.
2. Differentiate between Jazz dance and other related styles such as Modern and Ballet technique.
3. Demonstrate improvement in stretch, flexibility, and core strength.
4. Perform the physical characteristics of Intermediate jazz dance; use of plie', battement, grand jete, pirouette, pas de bouree, rhythm, syncopation and body isolations.

Modesto Junior College
Course Outline of Record

DANCE 133

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

DANCE 133—JAZZ 3 INTERMEDIATE/ADVANCED **1 UNITS**

Formerly listed as: *THETR - 130: Jazz 3 Intermediate/Advanced*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 132.*

This course is a continuation of Jazz 2. This course is a combined intermediate and advanced Jazz Dance Technique class that will continue to build on dance terminology in theory and practical training. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Complete Warm-up of the body with concentration on body placement (alignment) focus and performance

B. Flex and extension of feet employing the lower and upper leg muscles

C. Plie, grande plie, tendu, deggage, battement in frist, second, foruth and fifth position foot alignment

D. Turns unique to the jazz style at the intermediate/advanced level: double, triple pirrouette turns, double pique turns, axle turns, and A La seconde turns

E. Intermediate recognition of dance terminology demostrated by instructor within the different styles of the jazz genre

F. Demonstrattion of increases recognition of intermediate musical meters from simple to complex 3/4, 4/4 and 6/8 metered time signature

G. Group work in choreographic problem solving studies involving space and use of levels and time signature progression

H. Self-evaluation of intermediate/advanced levels in oral and written form

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 132.

2. Requisite Skills
Before entering the course, the student will be able to:

A. Demonstrate intermediate jazz dance technique.

B. Demonstrate intermediate level jazz skills; reverse leap, double pirroute, pas de bourre turn.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)
Instructors of the course might conduct the course using the following method:

1. Lecture of intermediate/advanced jazz dance terminology
2. Demonstration of intermediate/advanced level of jazz dance through instructor taught jazz dance combinations addressing complex time signature patterns
3. Audio visual jazz dance showing followed by instructor interpretation and analysis

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required.

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Write a review of a dance concert using technical dance terminology to critically discuss choreography and performance.

B. Evaluate group choreography studies recognizing differences in use of time and space.

C. Perform a self and peer evaluation recognizing intermediate/advanced level skills through written and oral discussion.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Kraines, Minda Goodwin and Ester Pryor (2004). *Jump into Jazz: The Basics and Beyond for Jazz Dance Studies* (5th/e). McGraw-Hill.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate intermediate and advanced body isolations specific to the rib cage, hips, shoulders, and head.

2. Demonstrate intermediate/advanced locomotor skills including jumps, turns and leaps.

3. Demonstrate intermediate/advanced jazz dance forms in rhythmic, progressive, lyrical, theatrical, and contemporary styles.

4. Demonstrate choreographic studies within a group setting that incorporate the use of time and space.

5. Recognize jazz dance styles through written and/or oral presentation.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of student's flexibility, core body strength, supported by correct body alignment as it relates to Jazz dance at the intermediate/advanced level.
2. Evaluation of intermediate/advanced Jazz dance forms in rhythmic progression in lyrical, theatrical and contemporary jazz dance styles
3. Evaluation of locomotor skills of intermediate/advanced skills in jumps, double and triple pirouette turns, pique turns and leaps.
4. Evaluation of group and duet studies incorporating intermediate/advanced jazz choreography with use of time and space.
5. Evaluation of demonstrated intermediate/advanced skills taught by instructor specific to jazz choreographed combinations based on performance qualities.
6. Evaluation of jazz dance performance through video or live dance performances.

B. SUMMATIVE EVALUATION

1. Skills level test on learned and instructed intermediate/advanced level technical combinations by instructor.
2. Group test based on choreographic problem solving on complex time signatures and use of space.
3. Written review of dance performance either from video or live performance.

DANCE - 133: Jazz 3 Intermediate/Advanced

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Flex and extend feet employing the lower and upper leg muscles at the intermediate/advanced level progression of skill.
2. Demi plie, grande plie, deggage and battement in first, second, fourth and fifth foot positions.
3. Execute turns unique to jazz at the intermediate/advanced level include: pirouette, pique, axle, and a la seconde turns.
4. Recognize different styles of jazz relative to all other forms of dance.
5. Complete warm-up of the body with concentration on body placement(alignment)focus on performance.

Modesto Junior College
Course Outline of Record

DANCE 134

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

DANCE 134—JAZZ 4 ADVANCED **1 UNITS**

54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 133.*

Advanced technique of jazz Dance with explorations into contemporary derivations of jazz. Emphasis on advanced technical style of the form and the interrelationships of music and movement. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Complete warm-up of the body with specific concentration on individual muscle groups that assist in proper body alignment for advanced technique in Jazz

B. Plie, grande plie, tendu to degage to battement through first and second incorporating focus to arabesque to ponche

C. Turns unique to the jazz genre at the advanced level; triple inside and outside turns in parallel and turned out positions, double pique turns with changing spot front, side, and back, double a la seconde turns

D. Advanced recogonition of dance terminology specific to the sub-genres in jazz such as musical theater and contemporary styles

E. Self-evaluation of advanced level skills in oral and written form

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 133.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate intermediate/advanced level jazz skills; switch leap, reverse leap, grand jete, triple pirroute turns, and double pique turns.

B. Demonstrate intermediate/advanced skill in rhythmic time signatures in jazz dance

combinations.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture of advanced jazz dance terminology.
2. Demonstration of advanced level of jazz dance through instructor taught combinations involving complex time signature patterns and movement design.
3. Audio visual jazz dance showing followed by instructor interpretation and analysis.

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Lab only - no outside-of-class hours required

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Write a review of a dance concert using beginning to advanced technical dance terminology to critically discuss choreography and performance.

B. Evaluate solo, duet, and group choreography studies recognizing differences in use of time and spatial design.

C. Perform a self and peer evaluation recognizing advanced level technical skills through written and oral discussion.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Lindsay Guarino and Wendy Oliver (2015). *jazz Dance: A history of the Roots and Branches* (2nd/e). Gainsville FL University Press of Florida, reprint edition (April 14, 2015).

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Identify advanced jazz movement vocabulary through written source and movement source.

2. Perform an advanced level jazz phrase with proper spine, foot and arm alignment.

3. Demonstrate advanced level jazz technique in center floor phrasing and locomotor phrasing.

4. Identify vernacular sub-genres of jazz dance through movement combinations and choreographic design.

5. Critique jazz performance in the written form.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of student's flexibility, core body strength, supported by correct body alignment as it relates to jazz dance at the advanced level
2. Evaluation of advanced jazz dance forms in rhythmic progression in lyrical musical theater and contemporary jazz dance styles
3. Evaluation of demonstrated advanced skills taught by instructor specific to jazz choreographed combinations based on performance qualities
4. Evaluation of jazz dance performed through video or live dance performances
5. Evaluation of group and duet studies incorporating advanced skills through choreographic design

B. SUMMATIVE EVALUATION

1. Skills level test on instructed advanced level technical combinations
2. Group test based on choreographic problem solving on complex time signatures involving spatial relationship and design
3. Typed critique of a dance performance either from video or live performance

DANCE - 134: Jazz 4 Advanced

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate advanced body isolations specific to the rib cage, hips, shoulders, and head.
2. Demonstrate advanced locomotor skills that include; grand jete, switch leap, reverse leap, side leap, axle turn, and a la seconde turns.
3. Demonstrate advanced jazz dance forms in rhythmic, progressive, musical theater, and contemporary styles.
4. Recognize jazz dance styles through written critique.

Modesto Junior College
Course Outline of Record

DANCE 141

I. OVERVIEW

The following information will appear in the 2019 - 2020 catalog

DANCE 141—HIP HOP 1 **1 UNITS**

Formerly listed as: *DANCE - 141: Hip Hop,THETR - 170: Hip Hop,THETR - 170XA: Hip Hop*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours

Beginning fundamental skills of hip hop dance derived from the current dance vernacular and culture. Dance movement education, exploration, and recreation. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Warm up exercises to introduce beginning coordination, flexibility, and alignment

B. Movement phrasing dedicated to rhythmic studies

C. Movement vocabulary with focus on weight change

D. Hip Hop movement vocabulary such as Rocking

E. Movement phrasing that includes floorwork

B. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Physical demonstration of required movement material.
2. Verbal instruction to facilitate key words relative to kinesthetic movement.
3. In-class video presentation of movement studies relative to learning objectives.
4. In-class guest performers/teachers whose professional expertise can engage the learning process.

5. In-class exercises of movement to music to develop an understanding of rhythm.
6. In-class group studies to allow exploration of time, space and energy.

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required.

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Complete a weekly self-assessment of Hip Hop vocabulary and movement skills.

B. Write a critique of a live or film Hip Hop presentation.

C. Typical exam questions:

1. Describe the qualities of Rocking.
2. What are the four beginning elements of Hip Hop?

E. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** S. Craig (2006). *Hip Hop Matters: Politics, Pop Culture and the struggle for the soul of the movement* (Reprint /e). -.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Differentiate between Hip Hop and other forms of Dance such as Jazz and Ballet.
2. Demonstrate skill in body isolation and syncopation.
3. Increase strength in core muscle groups and flexibility.
4. Perform the physical characteristics of Hip Hop.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Physical demonstration of beginning movement vocabulary on a daily class basis

2. Daily movement vocabulary assessment by solo or group
3. Student demonstration in class once a week either by solo or group comprehension of coordination
4. Regular in class participation of choreographic studies relative to time

B. SUMMATIVE EVALUATION

1. Midterm movement evaluation demonstrating 2-4 movement combinations, each relative to mastering the different learning objectives
2. Written in class midterm assignment identifying beginning fundamentals of hip hop
3. Final movement evaluation demonstrating comprehension of all learning objectives for the totality of the semester
4. Written self-assessment of student's ability to accomplish the required learning objectives

DANCE - 141: Hip Hop 1

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate beginning level movements identifying rhythmic isolations in the body.
2. Appraise dance as a critical and creative thinker in movement and discussion; applying dance knowledge and dance vocabulary.
3. Execute stationary and locomotor movements appropriate to beginning skill level.

Modesto Junior College
Course Outline of Record

DANCE 142

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

DANCE 142—HIP HOP 2 **1 UNITS**

54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 141.*

Intermediate skills of hip hop dance derived from the current dance vernacular and culture. Dance movement and education, exploration, and recreation. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Movement phrasing dedicated to rhythmic studies

1. Syncopation
2. Isolation
3. Musicality

B. Movement vocabulary with a focus on weight change with variations in speed and length

C. Hip Hop movement vocabulary

1. Breaking

D. Movement phrasing that includes floorwork

1. Top Rock
2. 6 step

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 141.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate correct body alignment when performing warm up exercises.

B. Identify and comprehend the four elements of Hip Hop.

C. Identify and perform movement that includes rhythm variations and weight changes.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Physical demonstration of required movement material
2. Verbal instruction to facilitate key words relative to kinesthetic movement
3. In-class video presentation of movement studies relative to learning objectives
4. In class guest performers/teachers
5. Instructor-led in-class exercises of movement to music to improve beginning level understanding of rhythm and musicality to an intermediate level
6. In class group studies to allow exploration of time, space, energy, and performance

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Lab only - no outside of class hours required.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Complete weekly self-assessment of Hip Hop vocabulary and movement skills at the intermediate level.

B. Written critique of live or filmed Hip Hop presentation discussing aesthetic values and historical knowledge of Hip Hop.

C. Typical exam questions:

1. Compare and contrast the movement qualities of Rocking and Breaking.
2. What is the relationship between Top Rock and Breaking?

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** S. Craig Watkins (2006). *Hip Hop Matters: Politics, Pop Cultures and the Struggle of the Soul of Movement* Boston, MA Beacon Press Books.

III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**
   Upon satisfactory completion of this course, the student will be able to:

2. **Lab Objectives**
   Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Differentiate between forms of Hip Hop such as Rocking and Breaking.
2. Demonstrate skill in body isolation, syncopation, and musicality.
3. Increase strength in core muscle groups, flexibility, and balance.
4. Perform physical characteristics of Hip Hop at an intermediate level.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Physical demonstration of movement vocabulary on a daily basis.
2. Daily movement vocabulary assessment by solo or group.
3. Student will demonstrate in class once a week either by solo or group comprehension of coordination and syncopation.
4. Regular in class participation of choreographic studies relative to time and energy.

B. SUMMATIVE EVALUATION

1. Midterm movement evaluation demonstrating 3-5 movement combination, relative to mastering the different learning objectives.
2. Written in class midterm assignment identifying intermediate movement terminology/vocabulary.
3. Final movement evaluation demonstrating comprehension of all learning objectives for the totality of the semester.
4. Written self-evaluation of student's ability to accomplish the required learning objectives.

DANCE - 142: Hip Hop 2

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Appraise dance as a critical and creative thinker in movement and discussion; applying dance knowledge, vocabulary, and historical context.
2. Demonstrate intermediate level movements identifying musicality in the body.
3. Execute stationary and locomotor movements appropriate to intermediate skill level.

Modesto Junior College
Course Outline of Record

DANCE 143

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

DANCE 143—HIP HOP 3 **1 UNITS**

54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 142.*

Intermediate/advance skills of hip hop dance derived from the current dance vernacular and culture. Dance movement and education, exploration, and recreation. Field trips are not required. Field trips are not required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Warm up exercises to improve and progress upon coordination, flexibility, alignment, balance and inversion at the intermediate/advance level

B. Movement phrasing dedicated to rhythmic studies

1. Syncopation
2. Isolation
3. Musicality
4. Performative self-expression

C. Complex movement vocabulary with a focus on improvisational choices guided by musical selection

D. Hip Hop movement vocabulary

1. Cypher

E. Movement phrasing that includes inversions

1. Shoulder stands
2. Hand stands

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 142.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate correct body alignment and muscle engagement when performing warm up exercises.

B. Compare and contrast Rocking, Breaking, and Top Rock.

C. Identify and demonstrate movement that includes complex rhythm variations, weight changes, and floor work.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Physical demonstration of required movement material
2. Verbal instruction to facilitate key words relative to kinesthetic movement
3. In-class video presentations of movement studies relative to learning objectives
4. Instructor-led in-class exercises of movement to music to improve intermediate level understanding of rhythm, musicality, and performance intention to an intermediate/advance level.
5. In class group studies to allow exploration of time, space, energy, and performance

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Lab only-no outside of class hours required.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Complete weekly self-assessment of Hip Hop vocabulary and movement skills at the intermediate/advance level.

B. Write a critique of a live or filmed Hip Hop presentation, discussing aesthetic values, and historical and cultural context of Hip Hop.

C. Typical exam questions:

1. What is the significance of the cypher in Hip Hop?
2. Define and give an example of appropriation.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Jeff Chang (2007). *Can't Stop Won't Stop: A Story of the Hip Hop Generation* New York, NY St. Martin's Press.

III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**
Upon satisfactory completion of this course, the student will be able to:

2. **Lab Objectives**
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate skill in body isolation, syncopation, musicality, and performative self-expression.
2. Increase strength in core muscle groups, flexibility, balance, and alignment.
3. Demonstrate comprehension of inverted body alignment.
4. Perform physical characteristics of Hip Hop at an intermediate/advance level.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Physical demonstration of movement vocabulary on a daily basis.
2. Daily movement vocabulary assessment by solo and/or group.
3. Student will demonstrate in class once a week by solo and/or group comprehension of coordination, syncopation, musicality and improvisation.
4. Regular in class participation of choreographic studies relative to time, energy, and performative dynamics.

B. SUMMATIVE EVALUATION

1. Midterm movement evaluation demonstrating 4-6 movement combinations, relative to mastering the different learning objectives.
2. Written in class midterm assignment identifying intermediate and advanced movement terminology/vocabulary.
3. Final movement evaluation demonstrating comprehension of all learning objectives for the totality of the semester.
4. Written self-evaluation of student's ability to accomplish the required learning objectives.

DANCE - 143: Hip Hop 3

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate intermediate and advancing level movements identifying various rhythmic isolations in the body.
2. Appraise dance as a critical and creative thinker in movement and discussion; applying dance aesthetic knowledge and vocabulary as well as historical and cultural context.
3. Execute stationary and locomotor movements appropriate to and intermediate and advance level.

Modesto Junior College
Course Outline of Record

DANCE 144

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

DANCE 144—HIP HOP 4 **1 UNITS**

54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Prerequisite: *Satisfactory completion of DANCE 143.*

Advance skills of hip hop dance derived from the current dance vernacular and culture. Dance movement and education, exploration, and recreation. Field trips are not required. Not repeatable. (A-F or P/NP)
Transfer: (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Warm up exercises to improve and progress upon coordination, flexibility, alignment, balance, and inversion at the advanced level

B. Movement phrasing dedicated to rhythmic studies

1. Syncopation
2. Isolation
3. Musicality
4. Performative self-expression
5. Improvisation

C. Movement vocabulary with a focus on performative improvisational choices informed by muscial selection and other bodies in space

D. Comprehension of Hip Hop movement vocabulary

1. Freestyle
2. Show and prove

E. Movement phrasing that includes inversions

1. Shoulder stands

2. Hand stands
3. Plyometric movement

B. ENROLLMENT RESTRICTIONS

1. Prerequisites

Satisfactory completion of DANCE 143.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate correct body alignment and muscle engagement when performing warm up exercises.

B. Demonstrate skill in body isolation, syncopation, musicality, and performative self-expression at the intermediate/advance level.

C. Identify and demonstrate movement that includes complex rhythm variations, floor work, and inversions.

D. Articulate the importance of the cypher in Hip Hop dance.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Physical demonstration of required movement material
2. Verbal instruction to facilitate key words relative to kinesthetic movement
3. In-class video presentations of movement studies relative to learning objectives
4. Instructor-led in-class exercises of movement to music to improve intermediate level understanding of rhythm, musicality, and performance intention to an advance level
5. In-class group studies to allow choreographic exploration of time, space, energy, design, and performance

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Lab only--no outside of class hours required.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Complete weekly self-assessment of Hip Hop vocabulary and movement skills at the advanced level.

B. Write a critique of a live or filmed Hip Hop presentation, discussing aesthetic values, and historical, cultural, and current social context of Hip Hop.

C. Typical exam questions:

1. Discuss the influence of Hip Hop on popular culture.
2. Describe and analyze the "show and prove" mentality in Hip Hop dance.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Jeff Chang (2007). *Can't Stop Won't Stop: A Story of the Hip-Hop Generation* New York City, NY St. Martin's Press.

III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**
Upon satisfactory completion of this course, the student will be able to:

2. **Lab Objectives**
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Demonstrate skill in body isolation, syncopation, musicality, performative self-expression, and improvisation at the advanced level.

2. Increase strength in core muscle groups, flexibility, balance, alignment, and plyometric movements.

3. Demonstrate advanced comprehension of suspended inverted body alignment.

4. Perform physical characteristics of Hip Hop at an advanced level.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Physical demonstration of movement vocabulary on a daily basis.
2. Daily movement vocabulary assessment by solo and/or group.
3. Student will demonstrate in class once a week by solo and/or group comprehension of coordination, syncopation, musicality, and self-expression.
4. Regular in class participation of choreographic and improvisational studies relative to time, energy, and performative dynamics

B. SUMMATIVE EVALUATION

1. Midterm movement evaluation demonstrating 4-6 movement combinations, each relative to mastering the different learning objectives.
2. Final movement evaluation demonstrating comprehension of all learning objectives for the totality of the semester.
3. Written self-assessment of student's ability to accomplish the required learning objectives.
4. Written in class midterm assignment identifying advanced movement terminology/vocabulary.

DANCE - 144: Hip Hop 4

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Demonstrate advanced level movements identifying rhythmic isolations in the body.
2. Appraise dance as a critical and creative thinker in movement and discussion; applying dance knowledge and dance vocabulary while considering aesthetic values related to Hip Hop as well as historical, cultural, and social contexts.
3. Execute stationary and locomotor movements appropriate to advanced skill level.

Modesto Junior College
Course Outline of Record

EASCI 161

I. OVERVIEW

The following information will appear in the 2015 - 2016 catalog

EASCI 161—EARTH SCIENCE **4 UNITS**

54 Lecture Hours, 54 Lab Hours , 108 Outside-of-Class Hours = 216 Total Student Learning Hours

An introductory study of the several branches of earth science: geology, oceanography, meteorology, and astronomy. Topics include the scientific method, natural resources, minerals, rocks, volcanism, plate tectonics, earthquakes, weathering, erosion, geological time, fresh water, ocean water, ocean currents, the ocean floor, atmosphere, clouds, storms, climate, the sun, the moon, the solar system, stars, interstellar matter, and the formation of the universe. Field trips are required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: ESC 33) (C-ID: GEOL 121) **General Education:** (MJC-GE: A) (CSU-GE: B1, B3) (IGETC: 5A, 5C)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Earth Science and the Earth System

1. The field of Earth Sciences
    a. natural resources and sustainability
    b. scientific method
2. Nebular Hypothesis
3. Earth as a System
    a. bio-geochemical cycles

B. The Solid and Not-So Solid Earth

1. Minerals
2. Rocks
    a. Igneous
    b. Sedimentary (age relationships)
    c. Metamorphic

3. Geological Time

    a. dating methods

    b. fossils

C. Shaping the Earth's surface

1. External Processes

    a. mechanical and chemical weathering

    b. mass wasting

        i. types of events

        ii. trigger mechanisms

    c. rivers and streams

        i. stream processes

        ii. three types of stream channels

        iii. stream valley evolution

    d. groundwater

        i. Modesto aquifer

2. Internal Processes

    a. plate tectonics and volcanism

        i. divergent plate boundaries

        ii. transform fault plate boundaries

        iii. convergent plate boundaries

    b. earthquakes

        i. elastic rebound

        ii. seismic waves

        iii. scales of measurement

        iv. effects and hazards

D. Earth's Global Ocean

1. Ocean Floor

    a. bathymetry: imaging the seafloor

b. oceanic provinces
    i. margins: features and processes
        i. active vs. passive
    ii. deep ocean basin features and processes
    iii. oceanic ridges features and processes
    iv. seafloor sediment
        i. types
        ii. locations
        iii. resources

2. Ocean Dynamics
    a. salinity, temperature, density, and layering
    b. surface ocean currents
    c. upwelling/downwelling
    d. deep ocean currents
    e. waves and breaking waves
    f. coastal processes
        i. summer vs. winter beaches
        ii. long-shore drift and long-shore transport
    g. tides and lunar tidal cycles

E. Earth's Atmosphere
1. The Atmosphere
    a. structure
    b. composition
    c. thermodynamics
        i. radiation budget
        ii. greenhouse effect/conduction/convection
        iii. seasons

2. Water in the Atmosphere

a. humidity, dew-point, saturation, condensation
b. cloud formation
c. precipitation processes and types

3. Air Pressure and Wind
   a. air pressure measurement and changes
   b. wind
      i. controlling forces
   c. surface pressure and wind patterns
      i. cyclones and anti-cyclones
      ii. local winds
   d. upper air pressure and wind patterns
      i. ridges and troughs
   e. global atmospheric circulation (3-cell model)
4. Storms
   a. mid-latitude cyclones
   b. thunderstorms
   c. tropical cyclones/hurricanes

F. Earth's Context in Space
1. General Structure of the Solar System
   a. terrestrial (inner) vs. jovian (outer) planets
   b. the moon
   c. comets
   d. asteroids
   e. meteors, -oids, - showers, and -ites
2. The Big Picture
   a. stars and stellar evolution
   b. interstellar matter

c. formation of the universe

2. <u>Required Lab Content:</u>

A. Using Earth System Models

1. Topographic maps
2. Bathymetric maps
3. Satellite imagery
4. Block models
5. Fluid dynamics tubs
6. Stream/landscape models
7. Weather maps

B. Minerals

1. Properties
2. Identification/classification
3. Uses

C. Rocks: properties, classification, and interpretation

1. Igneous
2. Sedimentary
3. Metamorphic
4. Dating methods

D. Streams, Stream Processes, and Groundwater

1. Stream channel types
2. Stream valley development
3. groundwater processes

E. Plate Tectonics

1. Asthenospheric convection
2. Patterns of seismicity and volcanism
3. Seafloor ages, isochrons, and spreading rates

F. Earthquakes

1. Ground shaking and ground types

2. Fault types
3. Active faults
    a. features
    b. rates of motion
    c. recurrence intervals
4. Locating earthquakes

G. The Ocean Floor
1. Bathymetric profiles
2. Oceanic provinces
3. Tectonic and sedimentary processes

H. Ocean Dynamics
1. Surface currents and gyres
2. Salinity, temperature, and density of seawater
3. Water masses and ocean layering
4. Wind-driven waves
5. Coastal process

I. The Atmosphere
1. Vertical structure
    a. air pressure and density
    b. air temperature, layers, and boundaries
2. Earth-sun relationship and seasons
3. Temperature controls and climate

J. Water in the Atmosphere
1. Psychrometers
2. Relative humidity and dew-point temperature
3. Saturation and condensation
4. Fog and cloud formation

K. Wind in the Atmosphere
1. Barometers

2. Surface charts and surface winds

< li>Upper-level charts and upper-level winds

3. **Fronts, Air Masses, and Mid-Latitude Cyclones**
   - **A. Fronts and air masses on surface charts**
   - **B. Weather radar**
   - **C. Meteograms and frontal passage weather**

4. **Structure of the Solar System and Cosmos**
   - **A. Constructing a scale model of the solar system**
   - **B. Interstellar matter and stellar evolution**

- HOURS AND UNITS

4 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	54	3.00
Lab	54	1.00
Discussion	0	0
Activity		0

- METHODS OF INSTRUCTION (TYPICAL)
  Instructors of the course might conduct the course using the following method:

1. Lecture
2. Demonstrations
3. Instructor supervised group problem solving
4. Instructor led field trip with facilitation of problem solving that involve observation, synthesis, and application of geologic principles

- ASSIGNMENTS (TYPICAL)

1. **EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS**
   Time spent on coursework in addition to hours of instruction (lecture hours)

   A. current event article summary/analysis (weekly)

   B. textbook readings (weekly)

   C. questions sets (weekly)

   D. pre-lab activity (weekly)

   E. group research project (two/semester)

F. study and prepare for lecture exams (three/semester)

G. study and prepare for lab exams (three/semester)

H. field trip (once/semester)

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Typical assignment:

1. Access and read an earth-science related article, summarize its main points, explain how it is related to one of the principle fields of earth science, and examine ways in which the topic of the article could affect your life.

B. Lecture exam question:

1. In what ways are rivers and streams important as a natural resource?

C. Lab exam problem:

1. Given a model and associated scale of an offset features along an active fault, calculate the rate of motion along the fault and create a summary of the hazard posed by the fault to nearby communities

D. Field trip problem:

1. After observing the general rock types and stratigraphic relations of an area, provide a brief sketch of the geological history of an area in terms of earth system processes

• TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Tarbuck, Edward and Fredrick Lutgens (2009). *Earth Science* (12th /e). Upper Saddle River, NJ Pearson/Prentice Hall.

2. Other: Instructor-generated lab manual

• DESIRED LEARNING

A. OBJECTIVES

A. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Describe the nature, methods, and importance of the Earth Sciences, including geologic time, dating methods, and fossils.

b. Describe the nature, classification, and importance of minerals.

c. Relate the three main types of rocks to the various Earth system processes that formed them.

d. Describe in words and drawings how the earth's external processes shape the earth's surface, pose natural hazards, and provide natural resources.

e. Relate the theory of plate tectonics to the physiographic features of the earth's surface and ocean basins and to the patterns of earthquakes, volcanoes, and mountain ranges.

f. Relate the elastic rebound theory to earthquake occurrence and earthquake hazards.

g. Describe in words and drawings the significant bathymetric features of the various ocean provinces and relate them to various processes that formed them.

h. Describe in words and drawings the characteristics, origins, and consequences of ocean currents, waves, and tides.

i. Describe in words and drawings the composition, structure, and thermodynamics of the Earth's atmosphere.

j. Relate the unique properties of water to its role in atmospheric thermodynamics, weather, and climate.

k. Relate patterns of air pressure variations within Earth's atmosphere to specific weather phenomena such as wind, air temperature changes, cloud formation, and precipitation.

l. Compare and contrast the various time and spatial scales, atmospheric processes, and weather associated with mid-latitude cyclones, thunderstorms and hurricanes.

m. Relate the physical and compositional patterns of the solar system to the processes that formed it and processes which still operate within it.

n. Describe how interstellar matter can evolve into stars and stellar evolution.

B. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Use various models (topographic/bathymetric maps, satellite imagery, weather maps, block models, fluid dynamics tubs, and stream/landscape models) to identify features and properties of the earth system.

2. Observe the properties of minerals and use those properties to identify the mineral and its economic significance.

3. Observe the properties of the three main rock types and use those properties to identify the rocks and describe the processes and places where they were formed, as well as the methods used to date them (including fossils).

4. Use models to identify various types of stream channels and groundwater features and relate them to the processes that formed them.

5. Use models and data to identify features and processes of the earth and relate them to the tectonic processes that create or cause them.

6. Use models to identify various features of the earth's surface, relate them to various types of faults, and assess hazards posed by that fault based on calculations of average rates of motion and average recurrence intervals.

7. Use models to identify features of the ocean floor and relate them to the processes that formed them in the past and that are likely to be occurring there today.

8. Use models to characterize dynamic features of the earths ocean (such as surface and deep currents, vertical mixing, and waves)in terms of temperature, salinity, density, and wave size and then relate these dynamic features to the processes that form them and their effects within the earth system (such as climate or coastal processes).

9. Use maps, models, and raw data to describe the air pressure, air temperature, and air density distributions at various locations within the earths atmosphere and near the earths surface across a range of scales of space and time and relate these patterns (such as seasonal shifts in

temperature or spatial distributions of temperature) to their causes.

10. Use models, various lab apparati, and raw data to predict the likelihood of cloud or fog formation within the earths atmosphere.

11. Use maps and weather data to describe the patterns of wind within the earth's atmosphere and relate those wind patterns to various types of weather.

12. Use weather maps and other weather data, as well as various models and lab apparati, to identify storm-related features in the earths atmosphere(such as cyclones, clouds, fronts, and precipitation) and relate them to the weather they create (such as temperature and wind patterns).

13. Given a small-scale model of the sun, build a model of rest of the solar system at the same scale, identify compositional trends within it, and relate those trends to the processes that formed the solar system.

14. Use appropriate astronomical equipment to observe feature of the sun and visible planets and relate those features to processes operating within the sun and the solar system.

- METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

A. Article Summary/Analysis

B. Lab Activities

C. On-line Homework

B. SUMMATIVE EVALUATION

A. Exams

EASCI - 161: Earth Science

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify and explain the formation and uses of the materials that make up the solid earth.
2. Describe and explain the causes and consequences of the internal and external processes that control the shape of the earth's landforms and seafloor.
3. Describe and explain the causes and consequences of the processes that control ocean circulation, waves, tides, and coastal processes.
4. Describe and explain the causes and consequences of the processes that control atmospheric circulation, weather, and climate.
5. Describe and explain the processes that formed the solar system and then place the solar system within the broader context of the cosmos.

Modesto Junior College
Course Outline of Record

MUSA 161

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

MUSA 161—ELEMENTARY STRINGS **1 UNITS**

Formerly listed as: *MUSIC - 127: Elementary Strings*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to have access to a string instrument. There are some instruments available to borrow.*

Introduction to playing orchestral stringed instruments (violin, viola, cello, or bass). Designed for students with no previous instrumental music experience, students who wish to review fundamentals of string playing, or experienced instrumentalists who wish to learn a new instrument. Students must own or have access to a bowed string instrument. Public performance required. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Appropriate Bow Hold
   1. Right hand bow exercises

B. Left Hand Position
   1. Dexterity exercises

C. Reading basic rhythms and pitches
   1. Note values
   2. Rest values
   3. Note names

D. Scales and simple melodies
   1. Classical melodies
   2. Fiddle tunes
   3. Folk tunes
   4. Alternative styles

E. Rehearsal Techniques

1. Tuning
2. Relaxation exercises
3. Balance
4. Dynamics
5. Articulation
6. Following the conductor

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to have access to a string instrument. There are some instruments available to borrow.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Call and response: Instructor demonstration of pitches and rhythms/student return demonstration
2. Use of audio aids such as CD's
3. Group repetition of assigned scales and melodies
4. Oral critiques by instructor after student performance
5. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside of class hours required.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. 2 - 3 major scales including G Major and D Major

B. Music studied includes folk tunes, fiddle tunes, and famous Classical and Romantic melodies.

C. Identify and perform Italian tempo and dynamic markings.

D. Identify and demonstrate pitch and rhythmic notation.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Dillon, J. (1995). *Strictly strings Book 1: a comprehensive string method* Alfred Publishing.

III. DESIRED LEARNING

A. OBJECTIVES

1. **Required Objectives**
Upon satisfactory completion of this course, the student will be able to:

2. **Lab Objectives**
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Perform simple melodies and scales.
2. Perform basic instrumental technique with ensemble, including appropriate bow hold.
3. Read basic music notation and demonstrate accurate pitches and rhythms.
4. Employ proper care and maintenance of the instrument.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of student performance of assigned music
2. Verbal quizzes
3. Participation in biweekly classes

B. SUMMATIVE EVALUATION

1. Individual playing tests
2. Written exam
3. Review of DVD or CD of public performance

MUSA - 161: Elementary Strings

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify pitches and read simple melodies on a bowed string instrument with proper technique.
2. Perform in concert with an ensemble with basic rhythmic accuracy and dynamic variety.

Modesto Junior College
Course Outline of Record

MUSA 162

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

MUSA 162—INTERMEDIATE STRINGS **1 UNITS**

54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete MUSA 161.*

Designed for the continuing string student at the intermediate level on Violin, Viola, Cello, or Bass. Students must own or have access to a bowed string instrument. Public performance required. Field trips might be required. Not repeatable. (A-F or P/NP) **Transfer:** (CSU, UC) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Appropriate Bow Hold

1. Right hand bow exercises

B. Left Hand Position

1. Dexterity exercises

C. Reading Basic Rhythms and Pitches

1. Note Values
2. Rest Values
3. Note Names

D. Scales and Intermediate Melodies

1. Classical melodies
2. Fiddle tunes
3. Folk tunes
4. Alternative styles

E. Rehearsal Techniques

1. Tuning
2. Relaxation exercises
3. Balance
4. Dynamics
5. Articulation
6. Following the conductor

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete MUSA 161.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate balanced instrument position and bow hold.

B. Identify and perform simple rhythmic and pitch notations.

C. Play a G major scale on violin, viola, cello, or bass

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Call and response: Instructor demonstration of pitches and intermediate level rhythms/Students return the demonstration
2. Use of audio/visual materials such as CDs to demonstrate musical concepts
3. Group and solo repetition of assigned melodies and scales
4. Oral critiques by Instructor after student performances
5. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required.

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. 3 to 4 major scales including D major, G major, and F major with bowing variations.

B. Students will be assigned a fiddle tune such as "John Ryan" and perform it alone and in groups for the class.

C. Identify and perform in class Italian tempo and dynamic markings.

D. Identify and perform in class pitch and rhythmic notation.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: O'Reilly, John (1995). *Strictly Classics* (N/A/e). USA Highland Etling of Alfred Music.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:
1. Perform intermediate-level melodies and scales.
2. Perform advancing instrumental technique with an ensemble including appropriate bow hold.
3. Read intermediate music notation and demonstrate accurate pitches and rhythms.
4. Employ proper care and maintenance of the instrument.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of student performance of assigned music
2. Verbal quizzes

B. SUMMATIVE EVALUATION

1. Individual playing tests
2. Written final exam
3. Review of Audio/Visual recording of public performance

MUSA - 162: Intermediate Strings

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Identify pitches and read intermediate level melodies on a bowed string instrument with proper technique.
2. Perform in concert with an ensemble with increasing rhythmic accuracy and dynamic variety.

Modesto Junior College
Course Outline of Record

MUSA 163

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

MUSA 163—APPLIED MUSIC (VIOLIN AND VIOLA) **1 UNITS**

Formerly listed as: *MUSIC - 128: Applied Music (Violin and Viola)*
18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Limitations on Enrollment: *Enrollment limited to students who pass an audition.*

Study and performance of violin or viola technique and literature. Public performance participation required. Four completions allowed. Field trips might be required. (A-F or P/NP) **Transfer:** (CSU, UC) (C-ID: MUS 160) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Definition and discussion of Music Notation
   1. Traditional usage
   2. Functional vocabulary

B. Comparison and contrasting of Meters and Rhythms
   1. Simple and compound time signatures
   2. Note and rest values

C. Discussion and analysis of Literature
   1. Repertoire from different eras

D. Identification and discussion of Instrumental Techniques
   1. Scales and arpeggios
   2. Shifting
   3. Bowing techniques including detache, staccato and spiccato
   4. Phrasing
   5. Intonation
   6. Tone quality

E. Identification of Practice Methods

F. Second completion

1. Increased ranges of scales and incorporation of different scale types such as melodic, harmonic and natural minor
2. Difficult key signatures and meters discussed in greater detail
3. Expansion of practice methods to assist memorization
4. Introduction to more difficult repertoire

G. Third completion

1. Increased detail-oriented problem solving regarding intonation, rhythm, tone, and bow articulation
2. Notation conventions and practices explored in greater detail
3. Expansion of technical warmups and etudes to suit expanding repertoire

H. Fourth completion

1. Expansion of studied repertoire to include transfer level literature
2. Preparation for university audition, including recital performances

B. ENROLLMENT RESTRICTIONS

1. Limitations on Enrollment

Enrollment limited to students who pass an audition.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Read music.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture, instructor demonstration and discussion
2. Analysis and discussion of student demonstrations
3. Use of recorded materials to demonstrate advanced technique

4. Discovery through experimentation
5. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Daily practice of scales, technical studies, and repertoire

B. Students will keep a practice log describing the focus of practicing and time spent on each practice assignment

C. Participation in public performance

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Students are given musical assignments that require analysis. These works will be studied for a semester and performed on a final concert. Students compare and contrast different musical styles and analyze tone quality, intonation, phrasing, fingerings, and bowings. They also determine rhythmic and technical difficulties and explore solutions.

B. Weekly scales and arpeggios are assigned with bowing variations. Students investigate solutions to technical difficulties and create exercises to improve performance.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Dependent on individual assignment for each student. For example, one student will study Mozart and another will study Bach.

Scales and arpeggios are also assigned according to the level of each student. Some students will use scales from The Essentials for Strings Book and others will use the Flesch Scale System.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify a variety of musical terms.

b. Identify and perform different tempi, rhythms, dynamics, and bow techniques.

c. Compare and contrast literature from different style periods specific to your solo instrument (violin or viola).

d. Formulate and execute a regimen of private practice.

e. Develop left hand strength, dexterity, and accuracy in intonation.

f. Perform a solo or ensemble work in concert.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of student performance of assigned music and technical studies
2. Verbal Quizzes
3. Written Practice Logs

B. SUMMATIVE EVALUATION

1. Participation in public performance
2. Jury by music faculty and/or professional musicians

MUSA - 163: Applied Music (Violin and Viola)

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Perform appropriate repertoire using proper technique on violin or viola.
2. Perform scales, etudes, and literature appropriate for violin or viola.

Modesto Junior College
Course Outline of Record

MUSA 164

I. OVERVIEW

The following information will appear in the 2018 - 2019 catalog

MUSA 164—APPLIED MUSIC (CELLO AND BASS) 1 UNITS

Formerly listed as: *MUSIC - 129: Applied Music (Cello and Bass)*
18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Limitations on Enrollment: *Enrollment limited to students who pass an audition.*

Study and performance of cello or bass technique and literature. Recital and public performance participation required. Four completions allowed. Field trips might be required. (A-F or P/NP) **Transfer:** (CSU, UC) (C-ID: MUS 160) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Music notation
   1. Traditional usage
   2. Functional vocabulary

B. Meters and rhythms
   1. Simple and compound time signatures
   2. Note and rest values

C. Analysis of literature
   1. Repertoire from different eras

D. Instrumental techniques
   1. Scales and arpeggios
   2. Shifting
   3. Bowing techniques including detache, spiccato, and spiccato
   4. Phrasing
   5. Intonation
   6. Tone quality

E. Practice Methods

F. Second completion

1. Increased ranges of scales and incorporation of different scale types such as melodic, harmonic and natural minor
2. Difficult key signatures and meters discussed in greater detail
3. Expansion of practice methods to assist memorization
4. Introduction to more difficult repertoire

G. Third completion

1. Increased detail-oriented problem solving regarding intonation, rhythm, tone, and bow articulation
2. Notation conventions and practices explored in greater detail
3. Expansion of technical warmups and etudes to suit expanding repertoire

H. Fourth completion

1. Expansion of studied repertoire to include transfer level literature
2. Preparation for university audition, including recital performances

B. ENROLLMENT RESTRICTIONS

1. Limitations on Enrollment

Enrollment limited to students who pass an audition.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Read music.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture, instructor demonstration and discussion
2. Analysis and discussion of student demonstrations
3. Use of recorded materials to demonstrate advanced technique

4. Discovery through experimentation
5. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
Time spent on coursework in addition to hours of instruction (lecture hours)

A. Daily practice of scales, technical studies, and repertoire

B. Students will keep a practice log describing the focus of practicing and time spent on each practice assigment

C. Study of repetoire appropriate for the instrument from the canon of literature

D. Participation in public performance

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Students are given musical assignments that require analysis. These works will be studied for a semester and then performed on a final concert. Students compare and contrast different musical styles and analyze tone quality, intonation, phrasing, fingerings, and bowings. They also determine rhythmic and technical difficulties and explore solutions.

B. Weekly scales and arpeggios are assigned with bowing variations. Students investigate solutions to technical problems and create exercises to improve performance.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Dependent on individual assignment for each student. For example, one student will study Bach and another will study Shostakovich.

Scales and arpeggios are also assigned according to the level of each student. Some students will use The Essentials for Strings Book and others will use Klengel or Simandl.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Identify a variety of musical terms.

b. Identify and perform different tempi, rhythms, dynamics, and bow techniques.

c. Compare and contrast literature from different style periods specific to solo instrument (cello or bass).

d. Formulate and execute a regimen of private practice.

e. Develop left hand strength, dexterity, and accuracy in intonation.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Evaluation of student performance
2. Verbal Quizzes
3. Written Practice Logs

B. SUMMATIVE EVALUATION

1. Participation in public performance
2. Jury by Music department faculty members and/or professional musicians

MUSA - 164: Applied Music (Cello and Bass)

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Perform appropriate repertoire using proper technique on cello or bass.
2. Perform etudes, scales, and literature appropriate for cello or bass.

Modesto Junior College
Course Outline of Record

MUSA 173

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

MUSA 173—APPLIED BRASS AND PERCUSSION **1 UNITS**

Formerly listed as: *MUSA - 173: Applied Music (Brass & Percussion),MUSA - 173: Applied Music (Brass and Percussion),MUSIC - 142: Applied Music (Brass & Percussion)*
18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Limitations on Enrollment: *Enrollment limited to students who pass an audition.*

Study and performance of brass and percussion solo literature, etudes, scales, and technical studies. Intended for music majors and/or advanced players. Recital and public performance participation required. Student must own or have access to an instrument appropriate for this course. Four completions allowed. Field trips might be required. (A-F or P/NP) **Transfer:** (CSU, UC) (C-ID: MUS 160) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Evaluation of the Instrumentalist
   1. Music reading ability
   2. Tone production
   3. Repertoire previously performed
   4. Previous level of achievement

B. Rhythmic facility

C. Metric divisions and contemporary notation

D. Musical Notation
   1. Clefs (trombone and euphonium only)
   2. Note and rest values
   3. Pitch notation
   4. Key signatures

E. Playing Techniques
   1. Breath control (brass only)
   2. Embouchure (brass only)

3. Posture
4. Finger placement
5. Intonation
6. Sticking (percussion only)
7. The ideal sound
8. Warm-ups
9. Tuning

F. Scales in Appropriate Ranges
1. Major
2. Chromatic
3. Minor
4. Whole tone
5. Pentatonic

G. Sight-reading techniques

H. Practice methods

I. Memorization techniques

J. Performance and recital preparation with and without an accompanist

K. Repertoire exploration

L. Interpretation and performance practices

M. Phrase structure

N. Maintenance of the musical instrument

O. Second repeat
1. Increased ranges of scales and incorporation of different scale types such as melodic, harmonic, and natural minor
2. Practice methods expanded to assist memorization
3. Uncommon key signatures and meters discussed in greater detail
4. Introduction to more difficult repertoire

P. Third repeat
1. Increased problem-solving regarding tone and embouchure
2. Notation conventions and practices explored in greater detail
3. Warm ups and breathing techniques expanded to suit advancing repertoire

Q. Fourth repeat

1. Expansion of studied repertoire into four-year college or university transfer-level literature
2. Preparation for university entry-level audition and/or jury exam explored

B. ENROLLMENT RESTRICTIONS

1. Limitations on Enrollment

Enrollment limited to students who pass an audition.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture/discussion
2. Demonstration
3. Individual practice
4. Drill
5. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Scales in major and minor modes

B. Study and performance in class of etudes and excerpts demonstrating characteristic quality of sound and technique appropriate to the instrument

C. Solo and/or small ensemble literature

D. Public performance

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Students will demonstrate critical listening and analysis of performance by selecting difficult passages and excerpts from their literature and improving upon these sections through drill and practice.

B. Students will analyze and perform articulations and ornaments in a historically accurate manner

for the piece or excerpt being studied.

C. Students will demonstrate musical proficiency by performing appropriate level solo pieces, excerpts and scales in class and/or in public performance.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Solos will be selected from compilations of representative literature such as those contained in the Journal of the National Association of College Wind and Percussion Instructors and Instrumentalist Magazine's Brass and Percussion Anthologies.

2. Other: Student must own or have access to an appropriate instrument

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Play with precise rhythm.

b. Play the correct pitches with accurate intonation.

c. Play with the articulation, dynamics, phrasing, and expression appropriate to the literature being studied.

d. Play in a stylistically appropriate manner suitable to the genre, period, and style of the literature.

e. Perform improvised solos as applicable.

f. Demonstrate appropriate use of blend and balance when performing with an accompanist.

g. Memorize performance literature when appropriate to the performance medium and artistic tradition.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Preview performances for professor and/or students

B. SUMMATIVE EVALUATION

1. Assessment of musical skills based on performance
2. Assessment of tone production
3. Assessment of student realization of assigned solos
4. Participation in course activities
5. Jury of Music Department faculty members

MUSA - 173: Applied Brass and Percussion

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Perform solo and/or small ensemble repertoire using proper technique on one's instrument.
2. Perform etudes, scales, and literature appropriate for the student's level.

Modesto Junior College
Course Outline of Record

MUSA 183

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

MUSA 183—APPLIED WOODWINDS **1 UNITS**

Formerly listed as: *MUSA - 183: Applied Music (Woodwind),MUSA - 183: Applied Music (Woodwinds),MUSIC - 144: Applied Music (Woodwind)*
18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Limitations on Enrollment: *Enrollment limited to students who pass an audition.*

Study and performance of woodwind solo literature, etudes, scales, and technical studies. Intended for music majors and/or advanced players. Recital and public performance participation required. Student must own or have access to an instrument appropriate for this course. Four completions allowed. Field trips might be required. (A-F or P/NP) **Transfer:** (CSU, UC) (CC: MUSIC 52) (C-ID: MUS 160) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Evaluation of the Instrumentalist
   1. Music reading ability
   2. Tone production
   3. Repertoire previously performed
   4. Previous level of achievement

B. Rhythmic Facility

C. Metric Divisions and Contemporary Notation

D. Musical Notation
   1. Clefs (bassoon only)
   2. Note and rest values
   3. Pitch notation
   4. Key signatures

E. Playing Techniques
   1. Breath control
   2. Embouchure

3. Posture
4. Finger placement
5. Intonation
6. Aperture (flute, piccolo)
7. The ideal sound
8. Warm-ups
9. Tuning

F. Scales in Appropriate Ranges
   1. Major
   2. Chromatic
   3. Minor

G. Sight-reading techniques

H. Practice methods

I. Memorization techniques

J. Performance preparation with and without an accompanist

K. Repertoire exploration

L. Interpretation and performance practices

M. Phrase structure

N. Maintenance of the musical instrument

O. Second repeat
   1. Increased ranges of scales and incorporation of different scale types such as melodic, harmonic, and natural minor
   2. Practice methods expanded to assist memorization
   3. Uncommon key signatures and meters discussed in greater detail
   4. Introduction to more difficult repertoire

P. Third repeat
   1. Increased problem-solving regarding tone and embouchure.
   2. Notation conventions and practices explored in greater detail
   3. Warm ups and breathing techniques expanded to suit advancing repertoire

Q. Fourth repeat
   1. Expansion of studied repertoire into four-year college or university transfer-level literature

2. Preparation for university entry-level audition and/or jury exam explored

B. ENROLLMENT RESTRICTIONS

1. Limitations on Enrollment

Enrollment limited to students who pass an audition.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture-discussion
2. Demonstration
3. Individualized practice
4. Drill
5. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Scales in major and minor modes

B. Study and performance in class of etudes and excerpts demonstrating characteristic quality of sound and technique appropriate to the instrument.

C. Solo and/or small ensemble literature

D. Public performance

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. The student will demonstrate critical listening and analysis of performance by selecting difficult passages and excerpts from their literature and improving upon these sections through drill and practice.

B. The student will analyze and perform articulations and ornaments in a historically accurate manner for the piece or excerpt being studied.

C. Students will demonstrate musical proficiency by performing appropriate level solo pieces, excerpts and scales in class and/or in public performance.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Solos will be selected from compilations of representative literature such as those contained in the Journal of the National Association of College Wind and Percussion Instructors and Instrumentalist Magazine's Woodwind Anthologies. Solo and chamber to be decided by instructor and individual student.

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Play with precise rhythm.

b. Play the correct pitches with accurate intonation.

c. Play with the articulation, dynamics, phrasing, and expression appropriate to the literature being studied.

d. Play in a stylistically appropriate manner suitable to the genre, period, and style of the literature.

e. Perform improvised solos as applicable.

f. Demonstrate appropriate use of blend and balance when performing with an accompanist.

g. Memorize performance literature when appropriate to the performance medium and artistic tradition.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Preview performances for professor and/or students.

B. SUMMATIVE EVALUATION

1. Assessment of musical skills based on performance
2. Assessment of tone production
3. Assessment of student realization of assigned solos
4. Active participation in class activities
5. Jury of Music Department faculty members

MUSA - 183: Applied Woodwinds

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Perform solo and/or small ensemble repertoire using proper technique on one's instrument.
2. Perform etudes, scales, and literature appropriate for the student's level.

Modesto Junior College
Course Outline of Record

MUSE 165

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

MUSE 165—STRING ORCHESTRA **1 UNITS**

Formerly listed as: *MUSIC - 150: String Orchestra*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Recommended for Success: *Before enrolling in this course, students are strongly advised to satisfactorily complete MUSA 163 or satisfactorily complete MUSA 164.*
Limitations on Enrollment: *Enrollment limited to students who perform satisfactorily in an audition, demonstrating ability to sight read music, play scales, and adjust intonation on a bowed string instrument.*

Rehearsal and public performance of orchestral music for strings. Repertoire will include works from many eras and a variety of cultures. Focus on developing bowing and left hand technique. Four completions allowed. Field trips might be required. (A-F or P/NP) **Transfer:** (CSU, UC) (C-ID: MUS 180) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Music Notation

B. Meter and Rhythm

1. Time signatures
2. Note and rest values
3. Fermatas

C. String Orchestra Literature

1. Baroque
2. Classical
3. Romantic
4. Contemporary
5. Alternative styles

D. Rehearsal Techniques

1. Tuning
2. Balance and blend
3. Tone color and dynamics
4. Phrasing
5. Articulation
6. Following conductor
7. Sight reading
8. Relaxation exercises

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to satisfactorily complete MUSA 163 or satisfactorily complete MUSA 164.

2. Limitations on Enrollment

Enrollment limited to students who perform satisfactorily in an audition, demonstrating ability to sight read music, play scales, and adjust intonation on a bowed string instrument.

3. Requisite Skills

Before entering the course, the student will be able to:

A. Demonstrate different rhythms and dynamics.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Demonstration
3. Use of audio/visual recordings
4. Possible field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Lab only- no outside-of-class hours required.

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. 5 - 7 chamber orchestra pieces from a variety of eras and styles are practiced and performed each semester.

1. The repertoire changes every semester.

2. Eras studied include the baroque, classical, romantic, and 20th century. Alternative styles may include fiddle tunes, mariachi tunes, and/or Balkan music.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Typical Assignments are selected from Baroque, Classical, Romantic, and 20th Century works from the standard repertoire. Assignments may also include alternative styles such as fiddle tunes and/or mariachi music.

An example of a Baroque work: Bach Brandenburg Concerto
An example of a fiddle tune: Swallowtail Jig (Irish)
An example of a mariachi tune: Guadalajara

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives
Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Use a variety of musical techniques including legato, staccato, martele, spiccato, and pizzicato.

2. Perform in a chamber orchestra concert demonstrating rhythmic accuracy, good intonation, and dynamic variety.

3. Practice scales in several different keys.

4. Demonstrate tone production.

5. Demonstrate appropriate stage etiquette.

6. Identify and perform tempo markings and dynamics.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Playing tests to evaluate performance of assigned chamber orchestra literature

2. Verbal quizzes
3. Active participation in rehearsals
4. Oral evaluation of student demonstration of bowing techniques including legato, martele, staccato, and spiccato

B. SUMMATIVE EVALUATION

1. Reviews of DVD's of class performances
2. Participation in public performance

MUSE - 165: String Orchestra

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Play an instrument in chamber orchestra with proper technique and style.
2. Read and learn chamber orchestra literature.

Modesto Junior College
Course Outline of Record

MUSE 175

I. OVERVIEW

The following information will appear in the 2017 - 2018 catalog

MUSE 175—SYMPHONIC BAND **1 UNITS**

Formerly listed as: *MUSIC - 146: Symphonic Band*
54 Lab Hours , 0 Outside-of-Class Hours = 54 Total Student Learning Hours
Limitations on Enrollment: *Enrollment limited to students who pass an audition.*

Rehearsal and performance of original wind band literature and transcriptions for band. Public performances are required. Student must own or have access to an appropriate instrument. Four completions allowed. Field trips might be required. (A-F or P/NP) **Transfer:** (CSU, UC) (C-ID: MUS 180) **Local Requirement:** (Activities)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

2. Required Lab Content:

A. Music Notation

1. Traditional usage
2. Functional vocabulary
3. Contemporary formats

B. Meter and Rhythm

1. Simple, compound, and complex time signatures
2. Note and rest values
3. Tied combinations of note and rest values
4. Fermatas and anacruses

C. Band Literature

1. Traditional works with programmatic and non-programmatic formats
2. Original band literature
3. Transcriptions from other genres
4. Contemporary works including atonal and aleatoric formats

5. Functional literature
6. Solo works with large ensemble accompaniment

D. Rehearsal Techniques

1. Tuning and warm-up rituals
2. Balance and blend
3. Tone color
4. Phrasing
5. Articulation
6. Working out of individual sectional parts
7. Interpretation

E. Performance Preparation and Execution

1. Concert format
2. Length of program
3. Performer endurance
4. Aesthetic considerations
5. Professionalism

3. Recommended Content:

B. ENROLLMENT RESTRICTIONS

1. Limitations on Enrollment

Enrollment limited to students who pass an audition.

2. Requisite Skills
Before entering the course, the student will be able to:

A. Demonstrate music reading skills.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	0	0
Lab	54	1.00
Discussion	0	0

Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture/Discussion of aesthetic and historical aspects of literature
2. Demonstration
3. Particularization and drill of difficult sections of literature
4. Rehearsal of entire works to gain a better understanding of compositional elements and context of pieces
5. Field trips

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

Lab only - no outside-of-class hours required.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Students will participate in public performances and classroom performances displaying musical and technical skills acquired on selected literature.

B. Students will analyze and critique an in-class performance and offer constructive criticism for improvement.

C. Students will perform a piece or section of a piece of music. During the performance, students will display a knowledge of the aesthetics of a piece of music by correctly interpreting their dynamic markings and balancing their individual part within the ensemble as a whole.

D. Students will demonstrate proficiency at reading music notation by performing an excerpt individually or in sections.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Other: Student must own or have access to an appropriate instrument

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

2. Lab Objectives

Upon satisfactory completion of the lab portion of this course, the student will be able to:

REQUIRED OBJECTIVES:

1. Understand individual player's role in the larger ensemble.
2. Perform their individual part with characteristic tone and technique.
3. Participate in public performances at both the college and in the community.

4. Demonstrate requisite knowledge of tempo, dynamics, aesthetic understanding, and demonstration of sight reading skills.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Oral evaluations of rehearsals and performances.
2. Audio/visual reviews of class performances and performances.

B. SUMMATIVE EVALUATION

1. Participation in course activities, such as public performances.
2. Improvement in tone production and general musicianship through realization of assigned musical parts.

MUSE - 175: Symphonic Band

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Play an instrument in a wind ensemble, in rehearsal and performance, using proper technique and style.
2. Read, interpret, and perform wind band literature.

Modesto Junior College
Course Outline of Record

PHYS 112

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

PHYS 112—PROBLEM SOLVING SKILLS FOR PHYSICS 102 **1 UNITS**

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in PHYS 102.*

Designed to supplement Physics 102 in developing problem-solving skills, measuring and instrumentation techniques and applications of physical concepts and laws in a small group environment. Field trips are not required. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Fluid Mechanics

1. Pressure
2. Variation of Pressure with Depth
3. Buoyant Forces and Archimedes' Principle
4. Bernoulli's Equation
5. Other Applications of Fluid Dynamics

B. Oscillatory Motion

1. Motion of an Object Attached to a Spring
2. Mathematical Representation of Simple Harmonic Motion
3. Comparing Simple Harmonic Motion with Uniform Circular Motion
4. The Pendulum

C. Wave Motion

1. Propagation of a Disturbance
2. Sinusoidal Waves
3. The Speed of Waves on Strings
4. Reflection and Transmission

5. The Linear Wave Equation

D. Sound Waves

1. Speed of Sound Waves
2. Intensity of Periodic Sound Waves
3. The Doppler Effect

E. Superposition and Standing Waves

1. Superposition and Interference
2. Standing Waves in a String Fixed at Both Ends
3. Standing Waves in Air Columns
4. Beats: Interference in Time

F. Temperature

1. Temperature and the Zeroth Law of Thermodynamics
2. The Constant-Volume Gas Thermometer and the Absolute Temperature Scale
3. Thermal Expansion of Solids and Liquids

G. Heat and the First Law of Thermodynamics

1. Heat and Internal Energy
2. Specific Heat and Calorimetry
3. Latent Heat
4. Work and Heat in Thermodynamic Processes
5. The First Law of Thermodynamics
6. Some Applications of the First Law of Thermodynamics
7. Energy Transfer Mechanisms

H. The Kinetic Theory of Gases

1. Molar Specific Heat of an Ideal Gas
2. Adiabatic Processes for an Ideal Gas
3. The Boltzmann Distribution Law

I. Heat Engines, Entropy, and the Second Law of Thermodynamics

1. Heat Engines and the Second Law of Thermodynamics
2. Reversible and Irreversible Processes
3. The Carnot Engine
4. Entropy Changes in Irreversible Processes

J. The Nature of Light and the Laws of Geometric

1. Measurements of the Speed of Light
2. Huygens's Principle
3. Total Internal Reflection
4. Fermat's Principle

K. Image Formation

1. Images Formed by Flat Mirrors
2. Images Formed by Spherical Mirrors
3. Images Formed by Refraction
4. Thin Lenses
5. The Telescope

L. Interference of Light Waves

1. Young's Double-Slit Experiment
2. Interference in Thin Films
3. Intensity Distribution of the Double-Slit Inference Pattern

M. Diffraction Patterns and Polarization

1. Diffraction Patterns from Narrow Slits
2. Polarization of Light Waves
3. Resolution of Single-Slit and Circular Apertures

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in PHYS 102.

2. Requisite Skills

Before entering the course, the student will be able to:

A. State and apply Pascal's Principle and Archimedes' Principle in explaining, analyzing and solving problems involving hydrostatic phenomena.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures, class demonstrations and classroom exercises
2. Modeling of problem-solving strategies through interactive discussion sessions

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly problem solving homework assignments

B. Daily reading of text

C. Preparation for weekly quizzes and mid-term exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Given the optical bench set up at the table, describe which parameters you would measure and how you would make the measurements to accurately predict the angle of refraction and the angle of polarization.

B. Use the given Pressure vs. Volume diagram to calculate the heat input into the system, and the net work done by the system. Also, state whether any process given is adiabatic, isovolumetric, isothermal, or isobaric.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Giancoli, Douglas (2009). *Physics for Scientists and Engineers* (4th Edition/e). Upper Saddle River, New Jersey Pearson.
2. Manual: Course Instructor. Problem Solving and Technology for Physics 102. Self published

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. State and apply Pascal's Principle and Archimedes' Principle in explaining, analyzing and solving problems involving hydrostatic phenomena.

b. State and apply the Equation of Continuity and Bernoulli's Principle in explaining, analyzing and solving problems involving hydrodynamic phenomena.

c. Derive the equation of motion for the simple harmonic oscillator and apply kinematical concepts as well as energy conservation in order to solve simple harmonic motion problems.

d. Describe the physical pendulum, simple pendulum and torsional pendulum and use the simple harmonic motion model to determine pendulum frequencies and periods.

e. Calculate wave speeds from elastic and inertial properties of media as well as from the wave equation.

f. Describe the Doppler Effect and calculate the Doppler frequency when a wave source moves relative to an observer.

g. State the principle of superposition and apply it in order to determine the resultant wavefunction for situations involving spatial interference and temporal interference.

h. Define the concept of resonance and apply it to explain, analyze and solve problems related to physical phenomena.

i. State and apply the four laws of thermodynamics in explaining, analyzing and solving problems involving thermodynamic processes.

j. Use empirical models to explain and predict thermal expansion in solids, liquids and gases and use the ideal gas law and adiabatic gas law to describe and make predictions about gas behavior

k. Define the concepts of heat capacity and latent heat and apply these concepts in conjunction with the Law of Conservation of Energy to solve quantitative problems in calorimetry.

l. Use the wave model for light to describe and apply interference conditions to analyze, explain and solve problems involving double slit interference, thin films, single slit diffraction and diffraction gratings.

m. Use analytical techniques as well as ray diagrams to describe images formed by reflecting and refracting surfaces.

n. Use the ray model for light to state and apply the Law of Rectilinear Reflection and Snell's Law of Refraction in explaining and analyzing optical phenomena, such as dispersion and total internal reflection.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation and completion of in-class assignments covering course curriculum

B. SUMMATIVE EVALUATION

1. Workbook of all in-class exercises attempted and completed

PHYS - 112: Problem Solving Skills for Physics 102

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve problems and predict outcomes for vibrational, thermodynamic and optical systems through application of principles in classical mechanics, thermodynamics and wave theory (algebraic, trigonometric and calculus-based principles will be utilized in the process).
2. Use the scientific method to collect and analyze data for vibrational, thermodynamic and optical systems.
3. Verify physical principles involving oscillations, thermodynamics and optics through measurement and experimentation.
4. State and apply fundamental mechanical, thermodynamic and optical principles in in order to explain phenomena in our everyday world (emphasis will be placed upon relevant phenomena in the field of engineering).

Modesto Junior College
Course Outline of Record

PHYS 113

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

PHYS 113—PROBLEM SOLVING AND TECHNOLOGY FOR PHYSICS 103 1 UNITS

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in PHYS 103.*

Designed to supplement Physics 103 in developing problem-solving skills, measuring and instrumentation techniques and applications of physical concepts and laws in a small group environment. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Electric Fields

1. Properties of Electric Charges
2. Charging Objects by Induction
3. Coulomb's Law
4. The Electric Field of a Continuous Charge Distribution
5. Electric Field Lines
6. Motion of Charged Particles in a Uniform Electric Field

B. Gauss's Law

1. Electric Flux
2. Gauss's Law
3. Application of Gauss's Law to Various Charge Distributions
4. Conductors in Electrostatic Equilibrium

C. Electric Potential

1. Potential Difference and Electric Potential
2. Potential Differences in a Uniform Electric Field
3. Electric Potential and Potential Energy Due to Point Charges

4. Obtaining the Value of the Electric Field from the Electric Potential
5. Electric Potential Due to Continuous Charge Distributions
6. Electric Potential Due to a Charged Conductor

D. Capacitance and Dielectrics

1. Calculating Capacitance
2. Combinations of Capacitors
3. Energy Stored in a Charged Capacitor
4. Capacitors with Dielectrics

E. Current and Resistance

1. Electric Current and Resistance
2. Resistance and Temperature
3. Electrical Power

F. Direct Current Circuits

1. Resistors in Series and Parallel
2. Kirchhoff’s Rules
3. RC Circuits
4. Electrical Meters

G. Magnetic Fields

1. Magnetic Fields and Forces
2. Magnetic Force Acting on a Current-Carrying Conductor
3. Torque on a Current Loop in a Uniform Magnetic Field
4. Motion of a Charged Particle in a Uniform Magnetic Field
5. Applications Involving Charged Particles Moving in a Magnetic Field

H. Sources of the Magnetic Field

1. The Biot-Savart Law
2. The Magnetic Force Between Two Parallel Conductors
3. Ampere’s Law

4. The Magnetic Field of a Solenoid
5. Displacement Current and the General Form of Ampere's Law
6. Magnetism in Matter

I. Faraday's Law

1. Faraday's Law of Induction
2. Motional emf
3. Lenz's Law
4. Induced emf and Electric Fields
5. Maxwell's Equations

J. Inductance

1. RL Circuits
2. Energy in a Magnetic Field
3. Mutual Inductance
4. Oscillations in an LC Circuit
5. The RLC Circuit

K. Electromagnetic Waves

1. Maxwell's Equations and Hertz's Discoveries
2. Plane Electromagnetic Waves
3. Energy Carried by Electromagnetic Waves
4. Momentum and Radiation Pressure
5. The Spectrum of Electromagnetic Wave

L. Relativity

1. The Principle of Gailean Relativity
2. Einstein's Principle of Relativity
3. Consequences of the Special Theory of Relativity
4. The Lorentz Velocity Transformation Equations
5. Relativistic Linear Momentum and the Relativistic Form of Newton's Law

M. Introduction to Quantum Physics

1. Blackbody Radiation and Planck's Hypothesis
2. The Photoelectric Effect
3. The Compton Effect
4. Photons and Electromagnetic Waves
5. The Wave Properties of Particles
6. The Double-Slit Experiment Revisited
7. The Uncertainty Principle

2. Recommended Content:

A. Nuclear Physics and Radioactivity

1. Structure and Properties of the Nucleus
2. Binding Energy and Nuclear Forces
3. Radioactivity
4. Alpha, Beta and Gamma Decay
5. Conservation of Nucleon Number
6. Half Life and Decay Rates
7. Radioactive Dating
8. Nuclear Reactions and the Transmutation of Elements
9. Nuclear Fission
10. Nuclear Fusion

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in PHYS 103.

2. Requisite Skills

Before entering the course, the student will be able to:

A. To explain basic principles of electricity, magnetism, and relativity.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0

Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures, class demonstrations and classroom exercises
2. Modeling of problem-solving strategies through interactive discussion sessions

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly problem solving homework assignments

B. Daily reading of text

C. Preparation for weekly quizzes and mid-term exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Using the low voltage power supply, wire leads, resistors and capacitors, set up the circuit shown in your manual. Theoretically predict the voltage drop across all resistors and capacitors. Measure the actual voltage drop across all elements and then find the percent difference between your predicted values and your measured values.

B. Two point charges of 5.0 mC are placed 12.0 cm apart. Find the electric field at the point midway between them.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Giancoli, Douglas (2009). *Physics for Scientists and Engineers* (4th Edition/e). Upper Saddle River, New Jersey Pearson.

2. Manual: Instructor of Course. Problem Solving and Technology for Physics 103. Self published

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Describe properties of electric charges and methods of charging objects.

b. State and apply Coulomb's Law and the Law of Conservation of Charge in order to explain, analyze and solve problems in electrostatics.

c. Define the concept of an electric field and a line of force and use Coulomb's Law to calculate electric fields for systems of point particles and continuous charge distributions.

d. Use kinematical concepts to describe the motion of a charged particle in a uniform electric field.

e. State Gauss's Law and apply it in order to calculate the electric field of highly symmetric charge distributions and to describe properties of conductors in electrostatic equilibrium.

f. Define the concepts of electric potential, electric potential difference and electric potential energy and calculate these quantities for collections of point charges and continuous charge distributions.

g. Define the concept of an equipotential surface, explain its relationship to electric field lines, and calculate the value of the electric field given the electric potential of a charge distribution.

h. Define the concept of energy density and calculate the energy density of an electric field as well as the energy stored in a capacitor.

i. Calculate the electric power generated in a circuit.

j. Apply reduction techniques and Kirchoff's Laws in analyzing direct current circuits.

k. Describe causes and properties of magnetic fields; forces and torques acting on charged particles moving in magnetic fields; and common applications of technologies exploiting such forces and torques.

l. Apply both the Biot-Savart Law and Ampere's Law to calculate magnetic field configurations surrounding various current distributions.

m. State and apply Faraday's Law of Electromagnetic Induction in order to explain common technologies and to analyze problems related to various electromagnetic phenomena.

n. State and apply Maxwell's equations in order to derive a model for electromagnetic waves and to explain electromagnetic phenomena.

o. State the postulates of special relativity and explain and apply the consequences of these postulates (including relative simultaneity, time dilation, length contraction, twin paradox, relativistic Doppler effect, relativistic velocity addition, relativistic linear momentum, relativistic energy and rest energy) in explaining phenomena and solving quantitative problems.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation and completion of in-class assignments covering course curriculum

B. SUMMATIVE EVALUATION

1. Workbook of all in-class exercises attempted and completed

PHYS - 113: Problem Solving and Technology for Physics 103

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve problems and predict outcomes for electromagnetic and modern physical systems though application of principles in classical electromagnetism and modern physics (algebraic, trigonometric and calculus-based principles will be utilized in the process).
2. Use the scientific method to collect and analyze data for electromagnetic and modern physical systems.
3. Verify physical principles in electromagnetism and modern physics through measurement and experimentation.
4. State and apply fundamental electromagnetic and modern physical principles in in order to explain phenomena in our everyday world (emphasis will be placed upon relevant phenomena in the field of engineering).

Modesto Junior College
Course Outline of Record

PHYS 121

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

PHYS 121—PROBLEM SOLVING AND TECHNOLOGY FOR PHYSICS 101 1 UNITS

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in PHYS 101.*

Designed to supplement Physics 101 in developing problem-solving skills, measuring and instrumentation techniques, and applications of physical concepts and laws in a small group environment. Field trips are not required. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Physics and Measurement

1. Dimensional Analysis
2. Conversion of Units
3. Significant Figures

B. Motion in One Dimension

1. Position, Velocity, and Speed
2. Instantaneous Velocity and Speed
3. Acceleration
4. Motion Diagrams
5. One-Dimensional Motion with Constant Acceleration
6. Kinematic Equations Derived from Calculus – General Problem-Solving Strategy

C. Vectors

1. Coordinate Systems
2. Vector and Scalar Quantities
3. Vector algebra

D. Motion in Two Dimensions

1. The Position, Velocity, and Acceleration Vectors
2. Two-Dimensional Motion with Constant Acceleration
3. Projectile Motion
4. Uniform Circular Motion

E. Circular Motion and Other Applications of Newton's Laws

1. Newton's Second Law Applied to Uniform Circular Motion
2. Nonuniform Circular Motion
3. Numerical Modeling in Particle Dynamics

F. The Laws of Motion

1. The Concept of Force
2. Newton's First Law and Inertial Frames
3. Newton's Second Law
4. The Gravitational Force and Weight
5. Some Applications of Newton's Laws

G. Energy and Energy Transfer

1. Work Done by a Constant Force
2. The Scalar Product of Two Vectors
3. Work Done by a Varying Force
4. Kinetic Energy and the Work-Kinetic Energy Theorem
5. Power

H. Potential Energy

1. Potential Energy of a System
2. The Isolated System – Conservation of Mechanical Energy
3. Conservative and Nonconservative Forces
4. Energy Diagrams and Equilibrium of a System

I. Linear Momentum and Collisions

1. Linear Momentum and Its Conservation
2. Impulse and Momentum
3. Collisions in One Dimension
4. Two-Dimensional Collisions
5. The Center of Mass
6. Motion of a System of Particles

J. Rotation of a Rigid Object About a Fixed Axis

1. Angular Position, Velocity, and Acceleration
2. Rotational Kinematics: Rotational Motion with Constant Angular Acceleration
3. Angular and Linear Quantities
4. Rotational Kinetic Energy
5. Calculation of Moments of Inertia
6. Torque
7. Work, Power, and Energy in Rotational Motion
8. Rolling Motion of a Rigid Object

K. Angular Momentum

1. The Vector Product and Torque
2. Angular Momentum of a Rotating Rigid Object
3. Conservation of Angular Momentum
4. Angular Momentum as a Fundamental Quantity

L. Static Equilibrium and Elasticity

1. The Conditions for Equilibrium
2. Examples of Rigid Objects in Static Equilibrium
3. Elastic Properties of Solids

M. Universal Gravitation

1. Newton’s Law of Universal Gravitation
2. Measuring the Gravitational Constant
3. Free-Fall Acceleration and the Gravitational Force
4. The Gravitational Field

5. Gravitational Potential Energy
6. Energy Considerations in Planetary and Satellite Motion

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in PHYS 101.

2. Requisite Skills

Before entering the course, the student will be able to:

A. To explain introductory physics concepts, such as energy, motion, momentum, gravitation, and rotational mechanics.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures, class demonstrations and classroom exercises
2. Modeling of problem-solving strategies through interactive discussion sessions

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly problem solving homework assignments

B. Daily reading of text

C. Preparation for weekly quizzes and mid-term exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Given the ramp set up at the bench, make the appropriate measurements and calculations to predict how far the projectile will travel.

B. If a box is given a push on a rough floor and travels 4.2 meters before coming to rest, calculate the coefficient of sliding friction.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Giancoli, Douglas (2009). *Physics for Scientists and Engineers* (4th Edition/e). Upper Saddle River, New Jersey Pearson.

2. Manual: Course Instructor. Problem Solving and Technology for Physics 101. Self published

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Define the translational kinematic variables (time, distance, position, average speed, instantaneous speed, average velocity, instantaneous velocity, average acceleration and instantaneous acceleration) as well as apply them in order to explain, analyze, and solve one-dimensional motion problems.

b. Define and apply concepts related to measurement to include units, systems of units, metric prefixes, standards, unit conversions, dimensional analysis, order of magnitude estimates and significant figures.

c. Derive, state, and apply the 4 kinematic equations of motion in order to solve one-dimensional motion problems, such as that of the falling body.

d. Analyze position-time, velocity-time and acceleration time graphs using the concepts of slope and area.

e. Use the rules of vector algebra to add vectors, subtract vectors, resolve vectors into components, multiply vectors by scalars and multiply vectors by other vectors using both the scalar product and vector product operations.

f. Use vectors in conjunction with kinematical concepts to describe special cases of two-dimensional motion (including projectile motion, uniform circular motion and non-uniform circular motion) and apply kinematical concepts in order to explain, analyze and solve problems concerning physical phenomena.

g. State Newton's Three Laws of Motion and apply them in order to explain physical phenomena and solve quantitative problems in dynamics.

h. Define and differentiate among the concepts of work and power (for both constant and variable forces); kinetic energy and potential energy; conservative and non-conservative force as well as apply these concepts in order to explain, analyze and solve problems concerning physical phenomena.

i. Apply the Work-Kinetic Energy Theorem and Law of Conservation of Energy to explain physical phenomena and to extract quantitative kinematical information from mechanical systems.

j. Derive the impulse-momentum theorem from Newton's 2nd Law and use it to explain, analyze and solve problems concerning physical phenomena.

k. Define and determine the center of mass for a system of particles and continuous mass distribution, and use the center of mass concept to simplify and solve motion problems.

l. Define the analogous kinematical variables, kinematical equations and linear transformations for rotational motion and use them to explain, analyze and solve motion problems.

m. Calculate the rotational inertia for systems of point particles and continuous mass distributions and use the Parallel Axis Theorem to aid in calculations.

n. Apply Newton's Second Law, the conservation of energy and the conservation of angular momentum in order to explain, analyze and solve problems in rotational dynamics.

o. State the equilibrium conditions for a rigid body and apply them in solving statics problems for

various systems of rigid bodies.

p. State Newton's Law of Universal Gravitation and apply it in order to explain, analyze and solve problems related to physical phenomena.

q. Define the concept of a gravitational field and calculate the gravitational potential energy for a system of point particles.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation and completion of in-class assignments covering course curriculum

B. SUMMATIVE EVALUATION

1. Workbook of all in-class exercises attempted and completed

PHYS - 121: Problem Solving and Technology for Physics 101

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve problems and predict outcomes for moving objects though application of kinematics, Newton's laws of motion and conservation laws (algebraic, trigonometric and calculus-based principles will be utilized in the process).
2. Use the scientific method to collect and analyze data for moving objects.
3. Verify physical principles in classical mechanics through measurement and experimentation.
4. State and apply fundamental mechanical principles in order to explain phenomena in our everyday world (emphasis will be placed upon relevant phenomena in the field of engineering).

Modesto Junior College
Course Outline of Record

PHYS 152

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

PHYS 152—PROBLEM SOLVING SKILLS FOR PHYSICS 142 **1 UNITS**

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in PHYS 142.*

Designed to supplement Physics 142 in developing problem-solving skills, measuring and instrumentation techniques and applications of physical concepts and laws in a small group environment. Field trips are not required. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Fundamentals

1. Scientific methods and principles
2. Measurement – uncertainty
3. Converting units

B. Kinematics in One and Two Dimensions

1. Average velocity and acceleration
2. Instantaneous velocity and acceleration
3. Falling bodies
4. Vectors and scalars
5. Analytical and graphical addition of vectors

C. Dynamics

1. Problem solving with Newton's laws of Motion
2. Mass and Weight

D. Work and Energy

1. Problem Solving with the Conservation of Energy

2. Kinetic and Potential Energies

E. Linear Momentum

1. Problem solving with the Conservation of Linear Momentum
2. Impulse

F. Equilibrium

1. Statics and Conditions for equilibrium
2. Solving statics problems

G. Fluids

1. Problem Solving with Bernoulli's Principle and Archimede's Principle

H. Temperature and Kinetic Theory

1. Solving problems involving thermal expansion
2. Solving problems involving the gas laws and heat

I. The Laws of Thermodynamics

1. Solving problems involving The Laws of Thermodynamics
2. Solving problems involving Heat Engines

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in PHYS 142.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Identify and apply the vocabulary, formalisms and basic concepts of required topics in kinematics, mechanics, rotational mechanics, wave motion, and thermodynamics.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0

Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures, class demonstrations and classroom exercises
2. Modeling of problem-solving strategies through interactive discussion sessions

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly problem solving homework assignments

B. Daily reading of text

C. Preparation for weekly quizzes and mid-term exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Given the ramp set up at the table, describe which parameters you would measure and how you would make the measurements to accurately predict the range of the ball when rolled off the ramp.

B. A rock is dropped into a well and is heard to splash 3.2 seconds after being relased from rest. Using 340 m/s for the speed of sound, calculate the depth of the well.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Giancoli (2014). *Physics* (7th Edition/e). Glenview, Il Pearson.

2. Manual: Instructor of Course. Problem Solving and Technology for Physics 142. Self

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Define and apply concepts related to measurement (including units, systems of units, metric prefixes, standards, unit conversions, dimensional analysis, order of magnitude estimates and significant figures).

b. Define the translational kinematic variables (time, distance, position, average speed, instantaneous speed, average velocity, instantaneous velocity, average acceleration and instantaneous acceleration) as well as apply them in order to explain, analyze, and solve one-dimensional motion problems.

c. Apply graphical techniques and analytical techniques to solve one-dimensional motion problems.

d. Describe vector properties and use the rules of vector algebra to add vectors, subtract vectors, resolve vectors into components, multiply vectors by scalars and multiply vectors by other vectors using both the scalar product and vector product operations.

e. Use vectors in conjunction with kinematical concepts to describe special cases of two-dimensional motion (including projectile motion and uniform circular motion) and apply kinematical concepts in order to explain, analyze and solve two-dimensional motion problems.

f. State Newton's Three Laws of Motion and apply them in order to explain physical phenomena and solve quantitative problems in dynamics.

g. Define and differentiate among the concepts of work and power (for both constant and variable forces); kinetic energy and potential energy; conservative and non-conservative force as well as apply these concepts in order to explain, analyze and solve problems in mechanics.

h. Apply the Work-Kinetic Energy Theorem and Law of Conservation of Energy to explain physical phenomena and to determine quantitative kinematical information about mechanical systems.

i. Derive the impulse-momentum theorem from Newton's 2nd Law and use it to explain, analyze and solve problems concerning physical phenomena.

j. Derive the law of conservation of linear momentum from Newton's 3rd Law and use it to explain, analyze and solve problems involving collisions and other physical phenomena.

k. Define and determine the center of mass for a system of particles and use the center of mass concept to simplify and solve motion problems.

l. Define the analogous kinematical variables, kinematical equations and linear transformations for rotational motion and use them to explain, analyze and solve motion problems.

m. Define the concepts torque, work, rotational kinetic energy, power and angular momentum and apply these concepts in order to describe rotating systems.

n. Apply Newton's Second Law, the law of conservation of energy and the law of conservation of angular momentum in order to explain, analyze and solve problems in rotational dynamics.

o. State the equilibrium conditions for a rigid body and apply them in solving statics problems for various systems of rigid bodies.

p. State Newton's Law of Universal Gravitation and apply it in order to explain, analyze and solve problems related to satellite motion and other physical phenomena.

q. State and apply Pascal's Principle and Archimedes' Principle in explaining, analyzing and solving problems involving hydrostatic phenomena.

r. State and apply the Equation of Continuity and Bernoulli's Principle in explaining, analyzing and solving problems involving hydrodynamic phenomena.

s. Calculate wave speeds from elastic and inertial properties of media as well as from the wave equation.

t. Use energy considerations to describe reflection and transmission of waves at boundaries and to determine the power and intensity of various types of waves.

u. Describe how the psychological properties of pitch and loudness relate to physical properties of sound waves, and use the definition of sound level to calculate the loudness and/or intensity of a sound.

v. Describe the Doppler Effect and calculate the Doppler frequency when a wave source moves relative to an observer.

w. State and apply the four laws of thermodynamics in explaining, analyzing and solving problems involving thermodynamic processes.

x. Use empirical models to explain and predict thermal expansion in solids, liquids and gases and use the ideal gas law to describe and make predictions about gas behavior.

y. Define the concepts of heat capacity and latent heat and apply these concepts in conjunction with the Law of Conservation of Energy to solve quantitative problems in calorimetry.

a`. Describe and distinguish among the three methods of heat transfer and use empirical models to make predictions about the rate of energy transfer via conduction and radiation.

aa. Describe real heat engines, Carnot engines, heat pumps and refrigerators in thermodynamics terms and relate these processes along with the concept of entropy to the Second Law of Thermodynamics.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation and completion of in-class assignments covering course curriculum.

B. SUMMATIVE EVALUATION

1. Workbook of all in-class exercises attempted and completed.

PHYS - 152: Problem Solving Skills for Physics 142

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve problems and predict outcomes for mechanical, oscillatory and thermodynamic systems through application of principles in classical mechanics, thermodynamics and wave theory (algebraic and trigonometric principles will be utilized in the process.
2. Use the scientific method to collect and analyze data for mechanical, oscillatory and thermodynamic systems.
3. Verify physical principles involving classical mechanics, oscillations and thermodynamics through measurement and experimentation.
4. State and apply fundamental mechanical, oscillatory and thermodynamic principles in order to explain phenomena in our everyday world (emphasis will be placed upon relevant phenomena in the fields of the life sciences).

Modesto Junior College
Course Outline of Record

PHYS 153

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

PHYS 153—PROBLEM SOLVING AND TECHNOLOGY FOR PHYSICS 143 1 UNITS

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in PHYS 143.*

Designed to supplement Physics 143 in developing problem-solving skills, measuring and instrumentation techniques and applications of physical concepts and laws in a small group environment. Field trips are not required. Not repeatable. (P/NP Only) **Transfer:** (CSU, UC)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Electric Charge and The Electric Field

1. Conservation of charge
2. Coulomb's Law
3. Electric field lines

B. The Electric Potential and Capacitance

1. Equipotentials
2. Capacitance and Dielectrics

C. Electric Currents

1. Ohm's Law
2. Electric power
3. DC Circuits

D. Magnetism

1. Magnetic fields
2. Sources of magnetic fields and Ampere's Law
3. Forces on charged particles

E. Electromagnetic Induction

1. Induced EMF
2. Faraday's Law
3. Lenz's Law
4. Generators and transformers

F. Geometric Optics

1. The law of reflection
2. Index of refraction
3. Thin lenses and mirrors
4. Snell's Law

G. Wave Nature of Light

1. Interference of light
2. Dispersion
3. Diffraction
4. Polarization

H. Special Theory of Relativity

1. Galilean relativity
2. Einstein's postulates of special relativity
3. Time Dilation
4. Length Contraction
5. Energy and mass relationship

I. Early Quantum Theory

1. The properties of the electron
2. The photoelectric effect
3. Photon interactions
4. The Bohr model of hydrogen
5. The Heisenberg uncertainty principle

6. The periodic table of elements

J. Nuclear Physics

1. Structure of the nucleus
2. Fundamental forces
3. Binding Energy
4. Fission
5. Fusion
6. Radioactive Half-life
7. Nuclear radiation
8. Radioactive Dating and transmutations

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in PHYS 143.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Describe properties of electric charges and methods of charging objects.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures, class demonstrations and classroom exercises
2. Modeling of problem-solving strategies through interactive discussion sections

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly problem solving homework assignments

B. Daily reading of text

C. Preparation for weekly quizzes and mid-term exams

2. EVIDENCE OF CRITICAL THINKING
Assignments require the appropriate level of critical thinking

A. Using the digital multimeter, the low voltage supply, and electrical leads, construct and calculate the electric field 2.0-cm from the positive electrode in an electrical dipole.

B. Use Snell's law to calculate the index of refraction knowing that the incident angle is 42 degrees and the transmitted angle is 31 degrees.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. Book: Giancoli, Douglas (2014). *Physics* (7th Edition/e). Upper Saddle River, New Jersey Pearson.

2. Manual: Course Instructor. Problem Solving and technology for Physics 143. Self published

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives
Upon satisfactory completion of this course, the student will be able to:

a. Describe properties of electric charges and methods of charging objects.

b. State and apply Coulomb's Law and the Law of Conservation of Charge in order to explain, analyze and solve problems in electrostatics.

c. Define the concepts of electric potential, electric potential difference and electric potential energy and calculate these quantities for collections of point charges.

d. Define the concept of an equipotential surface, explain its relationship to electric field lines, and calculate the value of the electric field given the electric potential of a charge distribution.

e. Define capacitance, calculate the capacitance of various types of capacitors, and calculate the effective capacitance for arrangements of capacitors in series and parallel.

f. Describe the concepts of electric DC and AC current, resistance and resistivity; describe their relationship to voltage via Ohm's Law; and apply these concepts in order to explain, analyze and solve problems in electrodynamics.

g. Describe simple sources of electric power and calculate the electric power generated in a circuit.

h. Describe forces and torques acting on charged particles moving in magnetic fields as well as common applications of technologies exploiting such forces.

i. Using the ray model for light, state and apply the Law of Rectilinear Reflection and Snell's Law of Refraction in explaining and analyzing optical phenomena, such as dispersion and total internal reflection.

j. Use analytical techniques as well as ray diagrams to describe images formed by reflecting and refracting surfaces.

k. Using the wave model for light, describe and apply interference conditions to analyze, explain and solve problems involving double slit interference, thin films, single slit diffraction and diffraction gratings.

l. Describe experimental procedures and results supporting the quantum nature of radiation and matter, including Planck's Hypothesis, the Photoelectric Effect and the Compton Effect.

m. State the postulates of special relativity and explain and apply the consequences of these postulates (including relative simultaneity, time dilation, length contraction, twin paradox, relativistic velocity addition, relativistic linear momentum, relativistic energy and rest energy) in explaining phenomena and solving quantitative problems.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation and completion of in-class assignments covering course curriculum

B. SUMMATIVE EVALUATION

1. Workbook of all in-class exercises attempted and completed

PHYS - 153: Problem Solving and Technology for Physics 143

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Solve problems and predict outcomes for electromagnetic, optical and modern physical systems through application of principles in classical electromagnetism, classical wave theory and modern physics (algebraic and trigonometric principles will be utilized in the process).
2. Use the scientific method to collect and analyze data for electromagnetic, optical and modern physical systems.
3. Verify physical principles involving classical electromagnetism, classical wave theory and modern physics through measurement and experimentation.
4. State and apply fundamental electromagnetic, optical and modern physical principles in order to explain phenomena in our everyday world (emphasis will be placed upon relevant phenomena in the fields of the life sciences).

Modesto Junior College
Course Outline of Record

PHYS 166

I. OVERVIEW

The following information will appear in the 2016 - 2017 catalog

PHYS 166—PROBLEM SOLVING SKILLS AND TECHNOLOGY FOR PHYSICS 165 1 UNITS

18 Lecture Hours , 36 Outside-of-Class Hours = 54 Total Student Learning Hours
Corequisite: *Concurrent enrollment in PHYS 165.*

Designed to supplement Physics 165 in developing problem-solving skills, measuring and instrumentation techniques and applications of physical concepts and laws in a small group environment. Field trips are not required. Not repeatable. (P/NP Only) **Transfer:** (CSU)

II. LEARNING CONTEXT

Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goal specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

A. Measurements and the Scientific Method

1. Units and Unit Systems
2. Converting Units
3. Dimensional Analysis
4. Orders of Magnitude
5. Significant Figures

B. Kinematics of One-Dimensional Motion

1. Coordinate Systems and Reference Frames
2. Kinematical Variables: Position, Velocity and Acceleration
3. Solving Motion Problems with Constant Acceleration
4. Graphical Analysis of Motion
5. Falling Objects

C. Kinematics of Two-Dimensional Motion

1. Vectors and Scalars
2. Graphical Method of Vector Addition
3. Analytical Method of Vector Addition

4. Subtraction of Vectors
5. Multiplication of Vectors by Scalars
6. Projectile Motion

D. Dynamics

1. Newton's First Law of Motion
2. Force
3. Mass
4. Newton's Second Law of Motion
5. Newton's Third Law of Motion
6. Weight: The Force of Gravity
7. Free-body Diagrams
8. Friction and Inclines
9. Applications of Newton's Second Law

E. Work and Energy

1. Work Done by a Constant Force
2. Kinetic Energy
3. Potential Energies
4. Work-Energy Theorem
5. Conservation of Energy Principle
6. Transformation of Energies
7. Power

F. Linear Momentum

1. Definition of Linear Momentum
2. Conservation of Momentum
3. Collisions and Impulse
4. Conservation of Energy and Momentum in Collisions
5. Inelastic Collisions
6. Impulse-Momentum Theorem

2. Recommended Content:

A. Fluids

1. Density
2. Pressure
3. Archimedes' Principle
4. Fluids in Motion: Equation of Continuity
5. Bernoulli's Principle
6. Pascal's Principle

B. Vibrations and Waves

1. Simple Harmonic Motion
2. Conservation of Energy in Simple Harmonic Motion
3. The Simple Pendulum and the Mass-Spring System
4. Resonance
5. Wave Motion
6. Types of Waves: Transverse, Longitudinal and Surface
7. Reflection and Interference of Wave

C. Thermal Physics

1. Atomic Theory of Matter
2. Temperature and Thermometric Properties
3. Thermal Expansion
4. Gas Laws
5. Heat and the Laws of Thermodynamics
6. Heat as Energy Transfer
7. Distinction Between Temperature, Heat and Internal Energy
8. The Internal Energy of a Gas
9. Specific Heat
10. Calorimetry
11. Latent Heat
12. Methods of Heat Transfer: Conduction, Convection and Radiation

13. First Law of Thermodynamics
14. Second Law of Thermodynamics

D. Electrostatics

1. Properties of Electric Charge
2. Methods of Charging Objects: Friction, Conduction, and Induction
3. Insulators and Conductors
4. Coulomb's Law
5. Electric Fields and Lines of Force
6. Electric Potential and Electric Potential Energy

E. Electrodynamics

1. Electric Current
2. Electrical Resistance
3. Ohm's Law
4. Electric Power

F. Magnetism

1. Permanent Magnets and Their Properties
2. Magnetic Fields
3. Sources of Magnetism
4. Applications: Motors, Galvanometers, Loudspeakers
5. Electromagnetic Induction

B. ENROLLMENT RESTRICTIONS

1. Co-requisites

Concurrent enrollment in PHYS 165.

2. Requisite Skills

Before entering the course, the student will be able to:

A. Add vectors using the component method.

C. HOURS AND UNITS

1 Units		
INST METHOD	**TERM HOURS**	**UNITS**
Lecture	18	1.00
Lab	0	0
Discussion	0	0
Activity		0

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lectures which develop theoretical material
2. Demonstrations of mathematical techniques, concept applications and problem solving strategies by both instructor and students
3. Demonstrations of measuring techniques and instrumentation
4. Instructor-led discussion and in-class exercises requiring students to analyze and apply concepts in solving problems

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

A. Weekly problem solving homework assignments

B. Daily reading of text

C. Preparation for weekly quizzes and mid-term exams

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

A. Given the parallel circuit set up on the table, describe how you would use a digital multimeter to safely measure the current, resistance and voltage drop across each circuit element.

B. A cannonball is fired from the top of a cliff at a speed of 55 m/s and angle of 35 degrees with respect to the horizontal at a pirate ship some distance away. If the water is 25 m below the level of the cliff, predict how long the cannonball will be in the air as well as the horizontal range of the cannonball.

F. TEXTS AND OTHER READINGS (TYPICAL)

1. **Book:** Wilson & Buffa (2015). *Physics* (Custom Edition/e). Pearson.

2. Manual: Instructor of Course. Problem Solving Skills and Technology for Physics 165. Self published

III. DESIRED LEARNING

A. OBJECTIVES

1. Required Objectives

Upon satisfactory completion of this course, the student will be able to:

a. Identify and apply the vocabulary, formalisms and basic concepts of selected topics in

mechanics, wave motion, thermodynamics, electricity and magnetism.

b. Identify, compare and use the techniques of quantitative measurement in the topics noted above.

c. Apply several methods of problem solving using conceptual, analytical and experimental techniques.

d. Demonstrate graphical techniques of displaying and analyzing experimental data.

e. Evaluate data within the context of the physics concepts.

IV. METHODS OF EVALUATION (TYPICAL)

A. FORMATIVE EVALUATION

1. Participation and completion of in-class assignments covering course curriculum

B. SUMMATIVE EVALUATION

1. Workbook of all in-class exercises attempted and completed

PHYS - 166: Problem Solving Skills and Technology for Physics 165

Course Learning Outcomes

Upon satisfactory completion of this course, the student should be prepared to:

1. Apply quantitative measuring techniques in describing scientific systems and processes.
2. Solve problems and predict outcomes for mechanical, thermodynamic and/or electromagnetic systems through application of principles in classical mechanics, thermodynamics and/or electromagnetism (algebraic and trigonometric principles will be utilized in the process).
3. Use the scientific method to collect and analyze data for mechanical, thermodynamic and/or electromagnetic systems.
4. Verify physical principles involving classical mechanics, thermodynamics and/or electromagnetism through measurement and experimentation.
5. State and apply fundamental mechanical, thermodynamic and/or electromagnetic principles in order to explain phenomena in our everyday world.