

KERN COMMUNITY COLLEGE DISTRICT – CERRO COSO COLLEGE

SUBJECT C### COURSE OUTLINE OF RECORD

- A. DISCIPLINE AND COURSE NUMBER:
- B. COURSE TITLE:
- C. SHORT BANWEB TITLE:
- D. COURSE AUTHOR:
- E. COURSE SEATS:

- F. COURSE TERMS:
- G. CROSS-LISTED COURSES:
- H. PROPOSAL TYPE:
CC New Course
- I. START TERM:

- J. C-ID:
- K. CATALOG COURSE DESCRIPTION:
- L. GRADING METHOD
Default:
Optional:
- M. TOTAL UNITS:
- N. INSTRUCTIONAL METHODS / UNITS & HOURS:
Method
Min Units
Min Hours
Lecture
List hours
0
Lab
List hours
0
Activity
List hours
0
Open Entry/Open Exit
List hours
0
Volunteer Work Experience
List hours
0
Paid Work Experience
List hours
0
Non Standard
List hours
0
Non-Standard Hours Justification:
- O. REPEATABILITY
Type:
- P. MATERIALS FEE: RATIONAL:

- Q. CREDIT BY EXAM:

- R. CORE MISSION APPLICABILITY:
- S. STAND-ALONE:
- T. PROGRAM APPLICABILITY
 Required:
 Elective:
- U. GENERAL EDUCATION APPLICABILITY
 Local:
 IGETC:
 CSU:
 UC Transfer Course:
 CSU Transfer Course:
- V. STUDENT LEARNING OUTCOMES Upon completion of the course, the student will be able to
- W. REQUISITES:
- X. DETAILED TOPICAL OUTLINE:
- Y. METHODS OF INSTRUCTION--Course instructional methods may include but are not limited to
- Z. OUT OF CLASS ASSIGNMENTS: Out of class assignments may include but are not limited to
- AA. METHODS OF EVALUATION: Assessment of student performance may include but is not limited to
- BB. TEXTS, READINGS, AND MATERIALS: Instructional materials may include but are not limited to
 Textbooks
 Manuals
 Periodicals
 Software
 Other
- CC. METHOD OF DELIVERY:
- DD. MINIMUM QUALIFICATIONS:
- EE. APPROVALS:
 Origination Date mm/dd/yyyy
 Last Outline Revision
 Curriculum Committee Approval
 Board of Trustees
 State Approval
 UC Approval
 UC Approval Status
 CSU Approval
 CSU Approval Status
 IGETC Approval
 IGETC Approval Status
 CSU GE Approval
 CSU GE Approval Status
-

- Data Element Changes
- Data Justification
- Course Element Changes
- Course Change Justification
- Course ID (CB00)
- TOP Code (CB03)
- Course Credit Status (CB04)
- Course Transfer Status (CB05)
- Course Units of Credit Maximum High (CB06):
- Course Units of Credit Minimum Low (CB07):
- Course Basic Skills (BS) Status (CB08):

- **SAM Code (CB09):**
- **Cooperative Education Course Status (CB10):**
- **Course Classification Code (CB11):**
- **Course Special Status (CB13):**
- **CAN Code (CB14):**
- **CAN-Code Sequence (CB15):**
- **Course Prior to College Level (CB21):**
- **Course Non-Credit Category (CB22):**
- **Funding Agency Category (CB23):**
- **Course Program Status (CB24):**

Subject C### Content Review

Limitation on Enrollment (e.g. Performance tryout or audition)	
Advisory	
Prerequisite	
Co-requisite	
Honors	

Delivery Methods & Distance Education

College: Cerro Coso College Discipline: Cerro Coso College Course Title:
_____ Course Number _____

55202 - Course Quality Standards: "The same standards of course quality shall be applied to distance education as are applied to any portion of a course designed to be provided through distance education as are applied to traditional classroom courses, in regard to the course quality judgments made pursuant to the requirements of Section 55002 of this Part, and in regard to any local course quality determination or review process. Determination and judgments about the quality of distance education under the course quality standards shall be made with the full involvement of faculty in accordance with the provisions of subchapter 2 (commencing w/section 53200) of chapter 2."

Delivery Method

- Face to face
- Online (purely online no face-to-face contact)
- Online with some required face-to-face meetings ("Hybrid")
- Online course with on ground testing
- iTV – Interactive video = Face to face course with significant required activities in a distance modality
- Other

Rigor

Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used? For instance, if labs, field trips or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?

Effective Instructor-Student Contact

Good practice requires both asynchronous and synchronous contact for effective contact. Check the methods expected of all instructors teaching the course.

Moodle:

- Discussion Forums
- Moodle Message

Other Contact:

- Chat/Instant Messaging
- E-mail
- Face-to-face meeting(s)
- Newsgroup/Discussion Board
- Proctored Exam
- Telephone

- iTV - Interactive Video
- Other (specify)

Software and Equipment

What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

Accessibility

Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden".

I am using

- iTV—Interactive Video only
- Moodle
- Publisher course with Moodle interface.

Class Size

Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

KERN COMMUNITY COLLEGE DISTRICT – CERRO COSO COLLEGE

CHEM C221 COURSE OUTLINE OF RECORD

1. DISCIPLINE AND COURSE NUMBER:
CHEM C221
2. COURSE TITLE:
Organic Chemistry I
3. SHORT BANWEB TITLE:
Organic ~~Chemistry~~ Chem I
4. COURSE AUTHOR:
Stenger Smith, John D.
5. COURSE SEATS:
-
6. COURSE TERMS:
70 = Fall
7. CROSS-LISTED COURSES:
8. PROPOSAL TYPE:
CC Course Revision
9. START TERM:
70 = Fall, ~~2011~~2013
10. C-ID:
11. CATALOG COURSE DESCRIPTION:
This course covers structure and bonding, polar bonds, alkanes, cycloalkanes, stereochemistry, synthesis, structure and reactivity of alkenes, synthesis, structure and reactivity of alkynes, handedness in chemistry, synthesis, structure and reactivity of alkyl halides, carbocations, the concept of resonance, nucleophilic substitutions and eliminations, basic biochemistry, mass spectrometry, infrared, nuclear magnetic resonance and ultraviolet spectroscopy and aromaticity. This Organic Chemistry ~~for~~ ~~Majors~~ I course is taught according to standards developed by the American Chemical Society.

12. GRADING METHOD

Default:

S = Standard Letter Grade

Optional:

P = Pass/No Pass; A = Audit

13. TOTAL UNITS:

14. INSTRUCTIONAL METHODS / UNITS & HOURS:

Method

Min Units

Min Hours

Lecture

4

72

Lab

1

54

Activity

0

0

Open Entry/Open Exit

0

0

Volunteer Work Experience

0

0

Paid Work Experience

0

0

Non Standard

0

0

Non-Standard Hours Justification:

15. REPEATABILITY

Type:

Non-Repeatable Credit

16. MATERIALS FEE:

No

17. CREDIT BY EXAM:

No

18. CORE MISSION APPLICABILITY:

UC Transfer; Associate Degree Applicable (AA/AS); CSU Transfer

19. STAND-ALONE:

No

20. PROGRAM APPLICABILITY

Required:

Elective:

CC General Sciences (AA Degree Program)

CC General Sciences AA (AA Degree Program)

CC Liberal Arts: Mathematics & Science (AA Degree Program)

21. GENERAL EDUCATION APPLICABILITY

Local:

IGETC:

IGETC Area 5: Physical and Biological Sciences = 5A: Physical Science with Lab;

CSU:

CSU GE Area B: Physical and its Life Forms(mark all that apply) = B1 - Physical Science;

CSU GE Area B: Physical and its Life Forms(mark all that apply) = B3 - Laboratory Sciences;

UC Transfer Course:

CSU Transfer Course:

22. STUDENT LEARNING OUTCOMES Upon completion of the course, the student will be able to

1. Evaluate and apply the concepts of structure and reactivity to alkanes, alkenes, alkynes, alkyl halides, aromatic rings, cis-trans isomerism, enantiomers, and constitutional isomers. Demonstrate the ability to recognize and analyze chemical structures, and to propose viable synthetic routes to make various organic chemical compounds.
2. ~~Demonstrate comprehension of reaction mechanisms and apply~~ Apply the concepts of nucleophilic substitution, electrophilic substitution, carbocation mechanisms, carbanion mechanism, resonance, elimination, stereochemistry of reactions of all the functional groups covered in this course in order to provide accurate reaction mechanisms.
3. Provide the correct structures of organic chemicals from the respective Mass Spectrometry results, Infrared Spectrum, Ultraviolet Spectrum and Nuclear Magnetic Resonance Spectrum, as well as provide the key attributes of the respective spectra from the chemical structures.
4. Safely perform supervised hands-on laboratory experiments that involve analysis, purification and synthesis of organic compounds and to critically analyze and report the results of these experiments.
5. Demonstrate advanced proficiency in the Scientific Method, including the modern experimental and empirical methodologies characteristic of Science
6. Effectively communicate and analyze scientific results in writing, verbally and graphically.

23. REQUISITES

Prerequisite:

CHEM C111

24.DETAILED TOPICAL OUTLINE:

Lecture:

A. Structure and Bonding ~~(Objective A)~~

1. Atomic Structure
2. Covalent and Ionic Bonds
3. Hybridization

B. Bonding and ~~Properties (Objectives A, B and D)~~ Properties

1. Electronegativity
2. Polar Bonds and Dipole Moment
3. Resonance
4. Acids and Basis

C. Alkanes and ~~Cycloalkanes (Objectives A, B and D)~~ Cycloalkanes

1. Functional Groups
2. Alkane Isomers
3. Naming Alkanes and Cycloalkanes
4. Properties of Alkanes and Cycloalkanes
5. Cis-Trans Isomerism

D. Stereochemistry of Alkanes ~~(Objectives A, B and D)~~

1. Conformational Analysis
2. Newman Projections
3. Torsional, Steric and Ring Strain

E. Organic Reactions ~~Overview (Objectives A, B and D)~~ Overview

1. Kinds of Reactions
2. Radical Reactions
3. Polar Reactions
4. Equilibria, Rates and Energy
5. Energy Diagrams, Transition States, and Intermediates
6. Biochemical Reactions

F. ~~Alkenes (Objectives A, B, C and D)~~ Alkenes

1. Uses of Alkenes
2. Naming Alkenes
3. Structure and Isomerism in Alkenes
4. Electrophilic Addition to Alkenes
5. Carbocation Structure and Stability
6. Carbocation Rearrangements

G. Reaction of Alkenes — (Objectives A, B, C and D) Alkenes

1. Preparation of Alkenes
2. Addition of Halogens
3. Halohydrin Formation
4. Addition of Water
5. Addition of Carbenes
6. Hydrogenation
7. Addition of Radicals (Polymerization)

H. Alkynes — (Objectives A, B, C and D) Alkynes

1. Electronic Structures of Alkynes
2. Naming Alkynes
3. Preparation of Alkynes
4. Addition of HX and X₂
5. Hydration
6. Reduction
7. Oxidative Cleavage
8. Acidity of Alkynes
9. Alkylation of Acetylide Anions

I. Stereochemistry — (Objectives A, B, C and D) Stereochemistry

1. Enantiomers
2. Optical Activity
3. Rules for Stereochemistry
4. Diastereomers
5. Fischer Projections
6. Stereochemistry of Reactions
7. Stereochemistry in Biological Systems

J. Alkyl Halides — (Objectives A, B, C and D) Halides

1. Naming Alkyl Halides
2. Structure and Preparation of Alkyl Halides
3. Allyl Radicals: Another Look at Resonance
4. Alkyl Halides from Alcohols
5. Grignard Synthesis
6. Organometallic Coupling Reactions
7. Oxidation and Reduction

K. Reactions of Halides

- ~~(Objectives A, B, C and D)~~ 1. Nucleophilic Substitution and Elimination Overview
2. SN2 Reaction
 3. SN1 Reaction
 4. E2 Reaction
 5. E1 Reaction
 6. Biological Substitution Reactions

L. Infrared Spectroscopy and Mass Spectrometry ~~(Objectives C and D)~~ Spectrometry

1. Mass Spectrometry
2. Interpreting Mass Spectra
3. Infrared Spectroscopy
4. Interpreting Infrared Spectra

M. Nuclear Magnetic Resonance (NMR) ~~(Objectives C and D)~~

1. ¹³C NMR Chemical Shifts
2. ¹³C NMR Methods and Uses
3. ¹H NMR Chemical Shifts and Proton Equivalence
4. ¹H NMR Methods and Uses

N. Conjugated Dienes and Ultraviolet ~~(Objectives C and D)~~ Spectroscopy

1. Preparation and Structure of Conjugated Dienes
2. Allylic Carbocations
3. Thermodynamic Versus Kinetic Control
4. Diels-Alder Reaction
5. Natural and Synthetic Rubbers/Products

6. Ultraviolet Spectroscopy
7. Interpreting Ultraviolet Spectroscopy
8. The Spectroscopy of Colored Compounds

O. Benzene and ~~Aromaticity~~ (Objectives A, B, C and D) ~~Aromaticity~~

1. Aromaticity and the $4n+2$ Rule
2. Stabilization Energy
3. Polycyclic Aromatic Compounds
4. Molecular Orbital Structure of Benzene
5. Aromatic Substitutions
6. Alkylation and Acylations
7. Substituent and Additivity Effects
8. Nucleophilic Aromatic Substitution
9. Benzyne
10. Oxidation and Reduction of Aromatic Compounds
11. Trisubstituted Benzenes

Lab:

Hands-On Laboratory Experiments

1. Preparation of Reagents

2. Isolation and Purification

3. Analysis and Yield

4. Report Submission

The experiments performed in the laboratory portion of this course take place under the supervision of the instructor in a chemistry laboratory. All experiments are hands-on and are designed to reinforce concepts learned in the classroom as well as to teach standard organic synthesis, purification and analysis methods. Examples include experiments on simple and fractional distillation, crystallization, synthesis and alkenes and electrophilic aromatic substitution.

25. METHODS OF INSTRUCTION--Course instructional methods may include but are not limited to

1. Demonstration;
2. Discussion;
3. Field trip;
4. Group Work;
5. Guest Lecturers;
6. Instruction through examination or quizzing;
7. Laboratory;
8. Lecture;
9. Outside reading;
10. Problem Solving;
11. Written work;

26. OUT OF CLASS ASSIGNMENTS: Out of class assignments may include but are not limited to

Homework Assignments: Problem Solving of selected textbook problems. Example: Students predict the products of an electrophilic aromatic substitution reaction. Lab Reports: Written reports describing outcomes of experiments performed in the laboratory. Example: Students, after using both techniques, analyze the utility of simple versus fractional distillation. Research Papers: Analysis of scientific journal articles and media articles related to Science. Example: Students analyze the ongoing controversy about Arsenic-containing Bacteria. When conditions permit, a field trip to the China Lake NAWC Chemistry Division is undertaken in place of a laboratory experiment. Example: Students are given a tour of the facility and are required to identify an 'unknown' organic chemical from analysis techniques such as Infrared Spectroscopy or Nuclear Magnetic Resonance.

27. METHODS OF EVALUATION: Assessment of student performance may include but is not limited to

Graded Exams: 2 Midterm exams and a comprehensive final exam. ~~These exams are scored by a Rubric.~~ For example the final exam involves a problem in which the students must deduce a chemical structure from Nuclear Magnetic Resonance, Spectroscopy, and elemental analysis.

Graded Lab Reports: These reports evaluate the student's ability to collect and analyze data, provide a conclusion, report percent yield and account for any errors and/or explain success or failure.

Graded Homework Assignments: These assignments cover material in the text book and evaluate the student's ability to solve problems related to the current chapter.

Participation: Students are evaluated for their participation in the classroom and especially in the laboratory.

28. TEXTS, READINGS, AND MATERIALS: Instructional materials may include but are not limited to

Textbooks

McMurry, J. (~~2010~~2012) *Organic Chemistry*, 8th, Brookes/Cole ~~Williamson~~

Manuals

Fieser, H.J., and Fieser ~~Williamson, J.H.~~ (~~2008.~~ (2011-01-01 00:00:00.0) *Organic Experiments*, ~~10th~~, Houghton Mifflin

~~Manuals~~

Periodicals

Software

Other

29. METHOD OF DELIVERY:

Face to face;

30. MINIMUM QUALIFICATIONS:

Chemistry (Masters Required);

31. APPROVALS:

Origination Date

~~0803/1809/2010~~2012

Last Outline Revision

02/25/2011

Curriculum Committee Approval

~~0204/2520/2011~~2012

Board of Trustees

~~0406/14/2011~~2012

State Approval

~~05/02/2011~~

UC Approval

30 = Spring 2007
UC Approval Status
Approved
CSU Approval
50 = Summer 2000
CSU Approval Status
Approved
IGETC Approval
30 = Spring 2007
IGETC Approval Status
Approved
CSU GE Approval
30 = Spring 2007
CSU GE Approval Status
Approved

1. Data Element Changes
2. Data Justification
3. Course Element Changes
4. Course Change Justification
5. Course ID (CB00)
CCC000340819
6. TOP Code (CB03)
1905.00 - Chemistry, General;
7. Course Credit Status (CB04)
D - Credit - Degree Applicable;
8. Course Transfer Status (CB05)
A = Transferable to both UC and CSU
9. Course Units of Credit Maximum High (CB06):
5
10. Course Units of Credit Minimum Low (CB07):
5
11. Course Basic Skills (BS) Status (CB08):
N = Course is not a basic skills course.
12. SAM Code (CB09):
E = Non-Occupational;
13. Cooperative Education Course Status (CB10):
Not part of Coop Work Exp;
14. Course Classification Code (CB11):
Liberal Arts and Sciences;
15. Course Special Status (CB13):
N - Not Special;
16. CAN Code (CB14):
17. CAN-Code Seq (CB15):
18. Course Prior to College Level (CB21):

Not Applicable;

19. Course Non-Credit Category (CB22):
Not Applicable, Credit Course;

20. Funding Agency Category (CB23):
Not Applicable

21. Course Program Status (CB24):
1 - Program Applicable;

PHSC C125 Content Review

Advisory Reading - 1 Level Prior to Transfer and	Students in PHSC C125 must be able to read and comprehend a college-level scientific textbook and laboratory instructions. They are expected to identify central points, both explicit and implied, outline and summarize complex and technical scientific readings, interpret difficult and figurative language in academic discourse and scientific terminology. The reading advisory level provides the student with the requisite skills to meet these expectations.
Advisory Writing - 2 Levels Prior to Transfer and	Students in PHSC C125 must be able to write summaries of assigned readings from the course textbook and laboratory activities, answer homework questions using paragraph length responses, answer essay questions in clear and error free prose based on readings from various scientific texts, and write lab reports following a standard format. The writing advisory level provides the student with the requisite skills to meet these expectations.
Advisory Mathematics - 3 Levels Prior to Transfer	Students entering PHSC C125 are required to solve problems involving mathematical operations such as ratios, square roots, surface areas related to radius, and solving an equation for a single variable. The math advisory level provides students with the requisite skills to solve these problems.

KERN COMMUNITY COLLEGE DISTRICT – CERRO COSO COLLEGE

CHEM C221 COURSE OUTLINE OF RECORD

A. DISCIPLINE AND COURSE NUMBER:

CHEM C221

B. COURSE TITLE:

Organic Chemistry I

C. C-ID:

D. CATALOG COURSE DESCRIPTION:

This course covers structure and bonding, polar bonds, alkanes, cycloalkanes, stereochemistry, synthesis, structure and reactivity of alkenes, synthesis, structure and reactivity of alkynes, handedness in chemistry, synthesis, structure and reactivity of alkyl halides, carbocations, the concept of resonance, nucleophilic substitutions and eliminations, basic biochemistry, mass spectrometry, infrared, nuclear magnetic resonance and ultraviolet spectroscopy and aromaticity. This Organic Chemistry I course is taught according to standards developed by the American Chemical Society.

E. GRADING METHOD

Default:

S = Standard Letter Grade

Optional:

P = Pass/No Pass; A = Audit

F. TOTAL UNITS:

5

G. INSTRUCTIONAL METHODS / UNITS & HOURS:

Method

Min Units

Min Hours

Lecture

4

72

Lab

1

54

Activity

0

0

Open Entry/Open Exit

0

0

Volunteer Work Experience

0

0

Paid Work Experience

0

0

Non Standard

0

0

Non-Standard Hours Justification:

H. REPEATABILITY

Type:

Non-Repeatable Credit

I. MATERIALS FEE:

No

J. CREDIT BY EXAM:

No

K. CORE MISSION APPLICABILITY:

UC Transfer; Associate Degree Applicable (AA/AS); CSU Transfer

L. STAND-ALONE:

No

M. PROGRAM APPLICABILITY

Required:

Elective:

CC General Sciences (AA Degree Program)

CC General Sciences AA (AA Degree Program)

CC Liberal Arts: Mathematics & Science (AA Degree Program)

N. GENERAL EDUCATION APPLICABILITY

Local:

IGETC:

IGETC Area 5: Physical and Biological Sciences = 5A: Physical Science with Lab;

CSU:

CSU GE Area B: Physical and its Life Forms(mark all that apply) = B1 - Physical Science;

CSU GE Area B: Physical and its Life Forms(mark all that apply) = B3 - Laboratory Sciences;

UC Transfer Course:

CSU Transfer Course:

O. STUDENT LEARNING OUTCOMES Upon completion of the course, the student will be able to

1. Evaluate and apply the concepts of structure and reactivity to alkanes, alkenes, alkynes, alkyl halides, aromatic rings, cis-trans isomerism, enantiomers, and constitutional isomers. Demonstrate the ability to recognize and analyze chemical structures, and to propose viable synthetic routes to make various organic chemical compounds.
2. Apply the concepts of nucleophilic substitution, electrophilic substitution, carbocation mechanisms, carbanion mechanism, resonance, elimination, stereochemistry of reactions of all the functional groups covered in this course in order to provide accurate reaction mechanisms.
3. Provide the correct structures of organic chemicals from the respective Mass Spectrometry results, Infrared Spectrum, Ultraviolet Spectrum and Nuclear Magnetic Resonance Spectrum, as well as provide the key attributes of the respective spectra from the chemical structures.
4. Safely perform supervised hands-on laboratory experiments that involve analysis, purification and synthesis of organic compounds and to critically analyze and report the results of these experiments.
5. Demonstrate advanced proficiency in the Scientific Method, including the modern experimental and empirical methodologies characteristic of Science
6. Effectively communicate and analyze scientific results in writing, verbally and graphically.

P. REQUISITES

Prerequisite:

CHEM C111

Q. DETAILED TOPICAL OUTLINE:

Lecture:

- A. Structure and Bonding
1. Atomic Structure

2. Covalent and Ionic Bonds
3. Hybridization

B. Bonding and Properties

1. Electronegativity
2. Polar Bonds and Dipole Moment
3. Resonance
4. Acids and Bases

C. Alkanes and Cycloalkanes

1. Functional Groups
2. Alkane Isomers
3. Naming Alkanes and Cycloalkanes
4. Properties of Alkanes and Cycloalkanes
5. Cis-Trans Isomerism

D. Stereochemistry of Alkanes

1. Conformational Analysis
2. Newman Projections
3. Torsional, Steric and Ring Strain

E. Organic Reactions Overview

1. Kinds of Reactions
2. Radical Reactions
3. Polar Reactions
4. Equilibria, Rates and Energy
5. Energy Diagrams, Transition States, and Intermediates
6. Biochemical Reactions

F. Alkenes

1. Uses of Alkenes
2. Naming Alkenes
3. Structure and Isomerism in Alkenes
4. Electrophilic Addition to Alkenes
5. Carbocation Structure and Stability
6. Carbocation Rearrangements

G. Reaction of Alkenes

1. Preparation of Alkenes
2. Addition of Halogens
3. Halohydrin Formation

4. Addition of Water
5. Addition of Carbenes
6. Hydrogenation
7. Addition of Radicals (Polymerization)

H. Alkynes

1. Electronic Structures of Alkynes
2. Naming Alkynes
3. Preparation of Alkynes
4. Addition of HX and X₂
5. Hydration
6. Reduction
7. Oxidative Cleavage
8. Acidity of Alkynes
9. Alkylation of Acetylide Anions

I. Stereochemistry

1. Enantiomers
2. Optical Activity
3. Rules for Stereochemistry
4. Diastereomers
5. Fischer Projections
6. Stereochemistry of Reactions
7. Stereochemistry in Biological Systems

J. Alkyl Halides

1. Naming Alkyl Halides
2. Structure and Preparation of Alkyl Halides
3. Allyl Radicals: Another Look at Resonance
4. Alkyl Halides from Alcohols
5. Grignard Synthesis
6. Organometallic Coupling Reactions
7. Oxidation and Reduction

K. Reactions of Halides

1. Nucleophilic Substitution and Elimination Overview
2. S_N2 Reaction
3. S_N1 Reaction
4. E2 Reaction
5. E1 Reaction
6. Biological Substitution Reactions

L. Infrared Spectroscopy and Mass Spectrometry

1. Mass Spectrometry
2. Interpreting Mass Spectra
3. Infrared Spectroscopy
4. Interpreting Infrared Spectra

M. Nuclear Magnetic Resonance (NMR)

1. ^{13}C NMR Chemical Shifts
2. ^{13}C NMR Methods and Uses
3. ^1H NMR Chemical Shifts and Proton Equivalence
4. ^1H NMR Methods and Uses

N. Conjugated Dienes and Ultraviolet Spectroscopy

1. Preparation and Structure of Conjugated Dienes
2. Allylic Carbocations
3. Thermodynamic Versus Kinetic Control
4. Diels-Alder Reaction
5. Natural and Synthetic Rubbers/Products
6. Ultraviolet Spectroscopy
7. Interpreting Ultraviolet Spectroscopy
8. The Spectroscopy of Colored Compounds

O. Benzene and Aromaticity

1. Aromaticity and the $4n+2$ Rule
2. Stabilization Energy
3. Polycyclic Aromatic Compounds
4. Molecular Orbital Structure of Benzene
5. Aromatic Substitutions
6. Alkylation and Acylations
7. Substituent and Additivity Effects
8. Nucleophilic Aromatic Substitution
9. Benzyne
10. Oxidation and Reduction of Aromatic Compounds
11. Trisubstituted Benzenes

Lab:

Hands-On Laboratory Experiments

1. Preparation of Reagents
2. Isolation and Purification
3. Analysis and Yield
4. Report Submission

The experiments performed in the laboratory portion of this course take place under the supervision of the instructor in a chemistry laboratory. All experiments are hands-on and are designed to reinforce concepts learned in the classroom as well as to teach standard organic synthesis, purification and analysis methods. Examples include experiments on simple and fractional distillation, crystallization, synthesis and alkenes and electrophilic aromatic substitution.

R. METHODS OF INSTRUCTION--Course instructional methods may include but are not limited to

1. Demonstration;
2. Discussion;
3. Field trip;
4. Group Work;
5. Guest Lecturers;
6. Instruction through examination or quizzing;
7. Laboratory;
8. Lecture;
9. Outside reading;
10. Problem Solving;
11. Written work;

S. OUT OF CLASS ASSIGNMENTS: Out of class assignments may include but are not limited to

Homework Assignments: Problem Solving of selected textbook problems. Example: Students predict the products of an electrophilic aromatic substitution reaction. Lab Reports: Written reports describing outcomes of experiments performed in the laboratory. Example: Students, after using both techniques, analyze the utility of simple versus fractional distillation. Research Papers: Analysis of scientific journal articles and media articles related to Science. Example: Students analyze the ongoing controversy about Arsenic-containing Bacteria. When conditions permit, a field trip to the China Lake NAWC Chemistry Division is undertaken in place of a laboratory experiment. Example: Students are given a tour of the facility and are required to identify an "unknown" organic chemical from analysis techniques such as Infrared Spectroscopy or Nuclear Magnetic Resonance.

T. METHODS OF EVALUATION: Assessment of student performance may include but is not limited to

Graded Exams: 2 Midterm exams and a comprehensive final exam. For example the final exam involves a problem in which the students must deduce a chemical structure from Nuclear Magnetic Resonance, Spectroscopy, and elemental analysis.

Graded Lab Reports: These reports evaluate the student's ability to collect and analyze data, provide a conclusion, report percent yield and account for any errors and/or explain success or failure.

Graded Homework Assignments: These assignments cover material in the text book and evaluate the student's ability to solve problems related to the current chapter.

Participation: Students are evaluated for their participation in the classroom and especially in the laboratory.

U. TEXTS, READINGS, AND MATERIALS: Instructional materials may include but are not limited to

Textbooks

McMurry, J. (2012) *Organic Chemistry*, 8th, Brookes/Cole

Manuals

Fieser, J., and Williamson, H.. (2011-01-01 00:00:00.0) *Organic Experiments*, Houghton Mifflin

Periodicals

Software

Other

Delivery Methods & Distance Education

College: Cerro Coso College Discipline: Cerro Coso College Course Title: Astronomy
Course Number C125

55202 - Course Quality Standards: "The same standards of course quality shall be applied to distance education as are applied to any portion of a course designed to be provided through distance education as are applied to traditional classroom courses, in regard to the course quality judgments made pursuant to the requirements of Section 55002 of this Part, and in regard to any local course quality determination or review process. Determination and judgments about the quality of distance education under the course quality standards shall be made with the full involvement of faculty in accordance with the provisions of subchapter 2 (commencing w/section 53200) of chapter 2."

Delivery Method

- Face to face
- Online (purely online no face-to-face contact)
- Online with some required face-to-face meetings (Hybrid)
- Online course with on ground testing
- iTV – Interactive video = Face to face course with significant required activities in a distance modality
- Other
-

Rigor

Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used? For instance, if labs, field trips or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?

For the online version of PHSC C125, the telescope based activities listed in the COR's Topical Outline will be replaced with sky simulation activities of equal rigor and content. This is a standard approach for teaching telescope based astronomy in colleges and universities that lack access to telescopes or dark skies.

Effective Instructor-Student Contact

Good practice requires both asynchronous and synchronous contact for effective contact. Check the methods expected of all instructors teaching the course.

Moodle:

- Discussion Forums
- Moodle Message

Other Contact:

- Chat/Instant Messaging
- E-mail
- Face-to-face meeting(s)

- Newsgroup/Discussion Board
- Proctored Exam
- Telephone
- iTV - Interactive Video
- Other (specify)

Software and Equipment

What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

For the online version of PHSC C125, the sky simulation software "Stellarium" will be required for several lab activities. The software is open source and free to download for both Windows and Mac from: www.stellarium.org. Because the software is a popular open source project, it has extensive documentation and community support.

Accessibility

Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden".

I am using

- iTV - Interactive Video only
- Moodle
- Publisher course with Moodle interface.

Class Size

Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

KERN COMMUNITY COLLEGE DISTRICT – CERRO COSO COLLEGE

MATH C121 COURSE OUTLINE OF RECORD

A. DISCIPLINE AND COURSE NUMBER:

MATH C121

B. COURSE TITLE:

Elementary Probability and Statistics

C. SHORT BANWEB TITLE:

Elem Prob/Stats

D. COURSE AUTHOR:

Bernsten, Dean

E. COURSE SEATS:

-

F. COURSE TERMS:

50 = Summer; 70 = Fall; 30 = Spring

G. CROSS-LISTED COURSES:

H. PROPOSAL TYPE:

CC Course Revision

I. START TERM:

30 = Spring, 2012

J. C-ID:

K. CATALOG COURSE DESCRIPTION:

This course covers data analysis using descriptive and inferential statistics. Graphs and computations include measures of central tendency and dispersion, correlation and regression, and presentation of data on a histogram, scatter plot, box plot, and the normal curve. Probability concepts include those for discrete and continuous random variables. Sampling and hypothesis testing are covered for means and variances.

L. GRADING METHOD

Default:

S = Standard Letter Grade

Optional:

A = Audit; P = Pass/No Pass

M. TOTAL UNITS:

4

N. INSTRUCTIONAL METHODS / UNITS & HOURS:

Method

Min Units

Min Hours

Lecture

4

72

Lab

0

0

Activity

0

0

Open Entry/Open Exit

0

0

Volunteer Work Experience

0

0

Paid Work Experience

0

0

Non Standard

0

0

Non-Standard Hours Justification:

O. REPEATABILITY

Type:

Non-Repeatable Credit

P. MATERIALS FEE:

No

Q. CREDIT BY EXAM:

No

R. CORE MISSION APPLICABILITY:

UC Transfer; Associate Degree Applicable (AA/AS); Certificate of Achievement (COA); CSU Transfer; Career Technical Education (CTE)

S. STAND-ALONE:

No

T. PROGRAM APPLICABILITY

Required:

CC Business Administration (AA Degree Program)

Elective:

CC Computer Information Systems (AS Degree Program)

CC Computer Information Systems AS (AS Degree Program)

CC Computer Information Systems Cert (Certificate)

CC Computer Information Systems- (Certificate of Achievement)

CC General Education ()

CC Liberal Arts: Mathematics & Science (AA Degree Program)

CC Liberal Arts: Social & Behavioral Sciences (AA Degree Program)

CC Liberal Arts: Social & Behavioral Sciences AA (AA Degree Program)

CC Mathematics AA (AA Degree Program)

Computer Information Systems Associate of Science Degree (AS Degree Program)

Computer Information Systems Associate of Science Degree (AS Degree Program)

U. GENERAL EDUCATION APPLICABILITY

Local:

CC GE Area IV: Language and Rationality = Analytical Thinking;

IGETC:

IGETC Area 2: Math Concepts and Quantitative Reasoning = 2A: Mathematic;

CSU:

CSU GE Area B: Physical and its Life Forms(mark all that apply) = B4 - Mathematics/Quantitative Thinking;

UC Transfer Course:

CSU Transfer Course:

V. STUDENT LEARNING OUTCOMES Upon completion of the course, the student will be able to

1. Identify the uses and limitations of statistical methods.
2. Recognize and describe different areas of probability and statistics.
3. Follow and evaluate a statistical line of reasoning.
4. Choose and apply appropriate statistical techniques to real world data problems.

W. REQUISITES

Prerequisite:

MATH C055

X. **DETAILED TOPICAL OUTLINE:**

Lecture:

The Mathematics Department has adopted the following best practices for teaching this course: offering or awarding extra-credit is forbidden, the allowance of multiple attempts at exams is forbidden, and an approved on-site proctor for online course exams is required.

A. Introduction

B. Organizing Data

1. Grouping

2. Graphing

C. Descriptive Measures

1. Measures of central tendency.

2. Measures of dispersion.

3. Population vs. sample statistics.

D. Probability

1. Relative frequency.

2. Conditional probability.

3. Independence.

4. Graphical and computational approaches.

A. Discrete Random Variables

1. Distinguishing between discrete and continuous random variables.

2. Binomial coefficients and distribution.

B. Normal Distribution

1. Standard normal curve.

2. Normally distributed populations.

3. Normally distributed random variables.

C. Sampling Distribution of the Mean

H. Estimating Means and Proportions

1. Estimating population means.
2. Confidence intervals.
3. Determining sample size.
4. Estimating population proportions.

I. Hypothesis Testing: Means and Proportions

1. Null and Alternative hypotheses.
2. Z-test.
3. T-test.
4. Tests for population proportions.

J. Hypothesis Testing: Two Populations

1. Two population means.
2. Two population proportions.

K. Descriptive Methods in Linear Regression

1. Review of linear equations.
2. The regression equation.
3. Coefficient of determination.
4. Linear correlation.
5. Regression.

L. Analysis of Variance

1. Introduction of Fisher's F-distribution.
2. One-way analysis of variance (ANOVA).
3. Two-way analysis of variance.
4. Discussion of two-factor problems.

Y. METHODS OF INSTRUCTION--Course instructional methods may include but are not limited to

1. Discussion;
2. Lecture;
3. Other Methods: A. Textbook readings B. Lectures C. Online course management system
D. Discussions

Z. OUT OF CLASS ASSIGNMENTS: Out of class assignments may include but are not limited to

A. Daily homework assignments Example: Students work mathematics problems assigned from the text and from hand-outs to reinforce concepts and skills discussed in lecture. B. Online Course Management System Example: Assignments on Course Compass

AA. METHODS OF EVALUATION: Assessment of student performance may include but is not limited to

A. Daily in-class assignments

Example: Students work mathematics problems assigned from the text and from hand-outs to reinforce concepts and skills discussed in lecture.

B. Weekly Quizzes

Weekly quizzes over the previous week's lecture material, homework, and in-class assignments assess the student's understanding.

C. Chapter Exams

Chapter exams over the previous chapter's lecture material, homework, and in-class assignments assess the student's understanding.

BB. TEXTS, READINGS, AND MATERIALS: Instructional materials may include but are not limited to

Textbooks

Triola, M.. (2010) *Elementary Statistics* , 11th , Addison-Wesley Publishing Company

Manuals

Periodicals

Software

Other

CC. METHOD OF DELIVERY:

Online with some required face-to-face meetings (Hybrid); iTV Interactive video = Face to face course with significant required activities in a distance modality ;Online course with on ground testing;Face to face;

DD. MINIMUM QUALIFICATIONS:

Chemistry (Masters Required);Engineering (Masters Required);Mathematics (Masters Required);Physics/Astronomy (Masters Required);

EE. APPROVALS:

Origination Date

10/28/2011

Last Outline Revision

02/24/2012

Curriculum Committee Approval

02/24/2012

Board of Trustees

05/03/2012

State Approval

UC Approval

50 = Summer 2000

UC Approval Status

Approved

CSU Approval

50 = Summer 2000

CSU Approval Status

Approved

IGETC Approval

50 = Summer 2000

IGETC Approval Status

Approved

CSU GE Approval

50 = Summer 2000

CSU GE Approval Status

Approved

- **Data Element Changes**
- **Data Justification**
- **Course Element Changes**
- **Course Change Justification**
- **Course ID (CB00)**
CCC000334672
- **TOP Code (CB03)**
1701.00 - Mathematics, General;
- **Course Credit Status (CB04)**
D - Credit - Degree Applicable;
- **Course Transfer Status (CB05)**
A = Transferable to both UC and CSU
- **Course Units of Credit Maximum High (CB06):**
4
- **Course Units of Credit Minimum Low (CB07):**
4
- **Course Basic Skills (BS) Status (CB08):**
N = Course is not a basic skills course.
- **SAM Code (CB09):**
E = Non-Occupational;
- **Cooperative Education Course Status (CB10):**
Not part of Coop Work Exp;
- **Course Classification Code (CB11):**
Liberal Arts and Sciences;
- **Course Special Status (CB13):**
N - Not Special;
- **CAN Code (CB14):**
- **CAN-Code Seq (CB15):**
- **Course Prior to College Level (CB21):**
Not Applicable;
- **Course Non-Credit Category (CB22):**
Not Applicable, Credit Course;
- **Funding Agency Category (CB23):**
Not Applicable
- **Course Program Status (CB24):**
1 - Program Applicable;

MATH C141 CB Codes

CB00 State ID	CCC000316010
CB03 TOP Code	1701.00 - Mathematics, General
CB04 Course Credit Status	C - Credit - Not Degree Applicable
CB05 Course Transfer Status	A = Transferable to both UC and CSU
Course Units of Credit Maximum High (CB06):	4
Course Units of Credit Minimum Low (CB07):	4
CB08 Course Basic Skill Status (PBS Status)	2N = Course is not a basic skills course.
CB09 SAM Code	Non-Occupational
CB10 Course COOP Work Exp-ED	NCOOP = Not part of Coop Work Exp
CB11 California Classification Codes	A - Liberal Arts and Sciences
CB13-Special Class Status	N - Not Special
CB14 CAN Code	
CB15 CAN Code Seq	
CB21 Levels Below Transfer	Y = Not Applicable
CB22 Non Credit Course Category	Y - Not Applicable, Credit Course
CB23 Funding Agency Category	Y = Not Applicable
CB24-Program Course Status	1 = Program Applicable

MATH C141 General Education

Intersegmental Gen Ed Transfer Curriculum IGETC Area 2: Math Concepts and Quantitative Reasoning	
	2A: Mathematic
CSU GE Area B: Physical and its Life Forms(mark all that apply)	
	B4 - Mathematics/Quantitative Thinking
CC GE Area IV: Language and Rationality	
	Analytical Thinking
UC Approval Date	Term: 50 = Summer Year: 2000
UC Approval Status	Approved
CSU Approval Date	Term: 50 = Summer Year: 2000
CSU Approval Status	Approved
IGETC Approval Date	Term: 50 = Summer Year: 2000
IGETC Approval Status	Approved
CSU GE Approval Date	Term: 50 = Summer Year: 2000
CSU GE Approval Status	Approved