PALOMAR COLLEGE
COURSE OUTLINE OF RECORD FOR
DEGREE CREDIT COURSE

_X_ Transfer course _X_ A.A. degree applicable course

(check all that apply)

COURSE NUMBER AND TITLE: CHEM 105 - Fundamentals of Organic Chemistry

UNIT VALUE: 4

MINIMUM NUMBER OF SEMESTER HOURS: 96

BASIC SKILLS REQUIREMENTS:
Appropriate language and computational skills.

ENTRANCE REQUIREMENTS:

PREREQUISITE: CHEM 100 or CHEM 110 and 110L

COREQUISISTE: None

RECOMMENDED PREPARATION: None

SCOPE OF COURSE: An introduction to the study of organic chemistry with an emphasis on classification, reactions, and application to allied fields. Laboratory includes techniques of isolation, identification, and synthesis of organic compounds.

SPECIFIC COURSE OBJECTIVES:
The successful student will be able to:
1. Apply principles of organic chemistry to studies in fields of nursing, physical therapy, nutrition, and other related medical fields.
2. Identify, classify and evaluate different organic chemical mechanisms.
3. Devise synthetic strategies for production of chemical products.
4. Acquire adequate background information and laboratory expertise to continue further studies in higher level organic chemistry and biochemistry courses.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:
1. Molecular orbital theory and chemical bonding (atomic orbitals, hybrid orbitals, molecular orbitals, pi and sigma bonds).
2. Lewis dot structures, VSEPR-theory, lone and bonded electron pairs, arrow formalism for moving electron pairs, polarity of individual bonds and vector analysis for determination of overall molecular polarity.
3. Molecular modeling with 3D model kits and computer programs.
4. Molecular, structural, condensed structural, and abbreviated structural formulas. Homologous series and their corresponding general formulas.
5. Nomenclature rules (common names and the IUPAC system).

6. Classification system of organic compounds according to framework and functional groups.
   a. Acyclic, carbocyclic, and heterocyclic coumpounds.
   b. Aromatic ringsystems (Hueckel Rule).
   c. Alkanes, Alkenes, Alkynes, Alcohols, Aldehydes, Ketones, Carboxylic Acids, Amines, Ethers, Esters, Amides, Nitriles, Thiols, Thioethers, Nitro- and Sulfo-derivatives.
   d. Saturated and unsaturated compounds.
7. Reaction types and mechanisms.
   a. Electrophilic addition, free-radical addition and polymerization (Markovnikov rule, Diels-Alder reaction, Cycloaddition).
   b. Substitution (electrophilic, nucleophilic - first and second order kinetics, Friedel-Crafts reaction, induction effects, resonance structures).
   c. Elimination (E1 and E2).
   d. Energy considerations and catalysis.
   e. Substrate and reagent interaction (electrophile, nucleophile, leaving group, carbocation, carbanion, steric hindrance, chiral inversion).
   f. Oxidation/reduction, combustion.
8. Types of Isomerism.
   a. Constitutional
   b. Configurational (cis-trans, E/Z, stereoisomerism, chirality, optical isomers, Fisher D/L and Ingold-Prelog R/S-classification, diastereomers, enantiomers, and mesoforms).
   c. Conformational (ecliptic/staggered, syn, anti, gauche conformers or rotamers, boat/chair cycloalkanes, axial and ecliptic group orientation.
   d. Structural representations for 3D (perspective formulas, dash-wedge formalism, Newman-structures, sawhorse-structures).
9. Structure and function.
   a. Hydrophilic and hydrophobic interactions.
   b. Electronegative atoms and molecular polarity.
   c. Solubility and miscibility.
   d. Intermolecular forces and physical properties.
   e. Saturation and reactivity (isolated, conjugated, and cumulated multiple bonds).
   f. Conjugated pi-systems and optical properties.
   g. Acid-Base theories (Bronsted-Lowry, Lewis, pK-values).
   h. Ring-activation and deactivation effects.
10. Analytical procedures and techniques.
   a. Chromatography (GC, TLC, PC).
   b. Spectroscopic methods (UV, IR, NMR).
   c. Solvent extraction, distillation, sublimation, recrystallization.
   d. Melting and boiling point determination.

REQUIRED READING:

Hart, Harold. Organic Chemistry, A Short Course. 9th edition. Boston: Houghton Mifflin.

SUGGESTED READING:
Hart, Harold and David J. Hart. Study Guide & Solutions Book. 9th edition. Boston: Houghton Mifflin, 1995.

Hart, Harold and Leslie E. Craine. Laboratory Manual. 9th edition. Boston: Houghton Mifflin, 1995.

REQUIRED WRITING:
One or two written paragraphs with the help of drawings and reaction schemes to illustrate the student's abilities to conceptionalize chemical ideas will be required on the essay exam questions.

OUTSIDE ASSIGNMENTS:
Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

Maintaining a commentated chemical journal of news items, articles, food labels, etc. Reading chapters, answering chapter questions, preparing for experiments, and writing lab reports.

INSTRUCTIONAL METHODOLOGY:

Check all that apply:
_X_ lecture
_X_ laboratory
___ lecture-laboratory combination
___ directed study

This course may be offered as a distance education course and meet Title 5 regulation 55370, 55372, 55374, 55376, 55378, and 55380.
Yes___ No_X_.

If yes, check all that apply. (See guidelines for preparation for definitions.)
___ telecourse
___ mediated instruction
___ computer assisted instruction

GRADING POLICY AND STANDARDS (include methods of determining whether the stated objectives have been met my students):

Homework assignments	0 - 20%
Exams	50 - 75%
Final exam	20 - 40%
Laboratory	25%

IS THE COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICCIENT GRADE?
Yes___ No_X_ Number of times course may be taken for credit: _1_.

If yes, identify specific provision of Title 5 Division 2 section(s) 55761-55763 and 58161 which qualifies course as repeatable:

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