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Text book : Foundations of General, Organic, and Biochemistry(1<sup>st</sup> Edn)  
By Denniston andTopping  
Laboratory: A Laboratory Manual for General, Organic and  
Biochemistry(6<sup>th</sup> Edn)  
By Henrickson, Byrd and Hunter

CHEM 104 COURSE SYLLABUS  
KASKASKIA COLLEGE  
NAME \_\_\_\_\_

TERM \_\_\_\_\_

YEAR \_\_\_\_\_



*HAPPY STUDYING: Never get  
Tired of learning*



**Exams:** There will be total 4 exams. You cannot choose another date or time for your exam to be taken until any emergency arises. Proper documents must be **submitted** to prove your emergency. The Final exam will be **comprehensive**.

Quizzes: Please find your quiz schedule on your blackboard

**Attendance Policy:** The students are required to attend every class unless any emergency reason. Proper documents needed to prove the emergency occurrence. 3 regular absences in the whole semester will be accepted. Points will be taken off for each absnce(30 points) after 3 regular absences if no proper documentation is submitted for emergency. Students coming to the class 10 minutes(or higher) late or leave the class earlier will be considered as late(L) in the grade book and each 3 lates will be equal to 1 full

absence(a). Also, the student will miss the lecture comprehension quiz for making every absence.

**Inside the Class Room policy:**

- (1) Not talking in the class except class materials
- (2) Not sleeping during the class time
- (3) Seriously working in the class and in the lab
- (4) Regular Note-keeping
- (5) No cell phones, CD players, or other listening or recording or cameras are allowed in the class room. The violators might loose points from the total points.
- (6) No eating food inside the class
- (7) Must bring scientific calculators and books.
- (8) The students must be seated separately enough during the quiz or exam period.

**Class Environment:** Talking is completely prohibited except you ask any questions regarding the class materials or you are asked any questions by the Instructor. Private talking in the class will hurt your understanding and also will hurt others. No sleeping in the class room allowed

**Objectives of the course:** *The principal objectives of this course is to get familiar with the C compounds, their nomenclature, functional groups, structures, stereochemistry, their syntheses and reactions. The C compounds include both aliphatic and aromatic. The understanding of the organic reactions include the reaction mechanism and kinetics. The laboratory experiments in organic chemistry include the synthesis, purification, and characterization of various kinds of organic compounds by different methods.*

**COURSE SYLLABUS:**

**Chapter 10:** Definition of organic chemistry, The chemistry of carbon, Differences between organic and inorganic compounds, Families of organic compounds, Chemical bonding, hybridization, structures and shapes of C compounds, Saturated hydrocarbons, their structures and nomenclature, Conformations of alkanes and cycloalkanes, Reactions of alkanes and cycloalkanes. **Homework 1: 10.27, 10.30, 10.31, 10.32, 10.36, 10.40, 10.42, 10.43, 10.45, 10.56, 10.58, 10.62, 10.69, 10.70**

**Chapter 11:** Alkenes and Alkynes: structures and bonding, naming, and reactions, geometric isomerism, aromatic hydrocarbons and their differences from aliphatic hydrocarbons, their reactions and synthesis. Heterocyclic aromatic compounds, their nomenclature and uses.  
. **Homework 2 : 11.25, 11.26, 11.34, 11.36, 11.39, 11.40, 11.41, 11.51, 11.70**

## **EXAM I: June 20**

**Chapter 12:** Alcohols, their nomenclature, structures, classification, reactions and synthesis. Phenols and thiols and their differences from alcohols. Oxidation and Reduction of Alcohols in biological systems.

Aldehydes and ketones, their structures and naming, carbonyl group, redox reactions of organic compounds, detection of aldehydes and ketones, addition reactions, acetal formation and glucose, aldol condensation, uses of aldehydes and ketones.

**Homework 3:** 12.41, 12.42, 12.44, 12.51, 12.52, 12.58, 12.74, 12.76, 12.84

## **EXAM II: July 2nd**

**Chapter 13:** Carboxylic acid, resonance structures, naming, fatty acids, acidity of carboxylic acids, salt formation, soaps and detergents, esters, acid anhydrides, naming, hydrolysis. Amines, naming, classification, preparation, amides, basicity, reactions, heterocyclic amines, hydrolysis of amides

**Homework 4:** 13.29, 13.30, 13.34, 13.35, 13.39, 13.43, 13.44, 13.57, 13.61, 13.62, 13.63, 13.64, 13.70

**Chapter 14:** Types of carbohydrates, Stereoisomers, Glucose, Fructose and Sucrose, Starch, Glycogen, and Cellulose

**Homework 5:** 14.29, 14.30, 14.33, 14.37, 14.38, 14.42, 14.48, 14.49, 14.50, 14.57, 14.61, 14.62

## **EXAM III: July 18**

**Chapter 15:** Structure and Functions of Fats and Lipids

**Homework 6:** 15.27, 15.29, 15.30, 15.57, 15.58, 15.67, 15.70

**Chapter 16:** Structure and Functions of Amino acids and Proteins

**Homework 7:** will be assigned later

**, 17, 18, and 19 and 20:** Introduction to carbohydrates, fats and proteins, enzymes and nucleic acids.

**Homework 8:** will be assigned later

## **FINAL EXAM:: Comprehensive: July 25**

### **Laboratory Experiments of CHEM 104**

Experiment 22: Hydrocarbons: (A structural Study with Molecular Modeling)

Experiment 23: The Physical and Chemical Properties of Hydrocarbons

Experiment 24: Halocarbons, Alcohols, and Ethers: A Structural Study

Experiment 25: The Physical and Chemical Properties of Alcohols and Ethers

Experiment 26: Aldehydes and Ketones: A Structural Study

Experiment 27: The Physical and Chemical Properties of Aldehydes and Ketones

Experiment 28: Carboxylic Acids, Esters, and Anhydrides

Experiment 29: Amines and Amides

Experiment 30: Carbohydrates: A Structural Study

Experiment 31: The Physical and Chemical Properties of Carbohydrates

Experiment 32: Triglycerides and Cholesterol

## Experiment 33: Color Tests for Amino Acids and Proteins

### **Learning Outcomes for CHEM 104:**

1. The students should be able to understand the structure, bonding, hybridization types, classification and nomenclature of hydrocarbons, alcohols, aldehydes, ketones, carboxylic acids, esters, and amines. Discuss their synthesis also. They should be able to understand and draw the different conformations of hydrocarbons and their stability. They
2. should be able to understand the structures through molecular modeling.
3. should be able to memorize and understand the functional groups and their classifications.
4. should be able to understand the differences between the aliphatic alkenes and aromatic compounds through reactions and stability.
5. should be able to understand the differences between geometrical isomerism and conformations.
6. should be able to understand the mechanism of addition and elimination reactions with examples.
7. should be able to understand and memorize synthesis, structure, & nomenclature of aldehydes and ketones.
8. should be able to understand aromaticity, Huckel's rule and resonance structures and substitution reactions.
9. should be able to understand and memorize syntheses, structures, and nomenclature of carboxylic acids and their derivatives. They should be able to identify the products of hydrolysis of esters, and anhydrides with mechanism.
10. should be able to understand the syntheses, structures, and nomenclature of amines, and hydrolysis of amides.
11. should be able to understand the structures, stereochemistry, and classification of carbohydrates. They should be able to understand the biological role of carbohydrates including the tests of carbohydrates.
12. should understand and memorize the classification of lipids. How fatty acids are produced from fats.
  
13. should be able to differentiate between the hydrophobic tail and and hydrophilic head of fatty acid molecules.
14. should be able to understand the mechanism of enzyme action. Discuss the role of coenzymes or vitamins.
15. should be able to understand the structure and function of nucleic acids, DNA and RNA.

Grading policy:

Quizzes and Homework	200
Laboratory	100
Exams	700

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TOTAL

1000

**EXAM I 200 points**

**EXAM II 100**

**EXAM III 200**

**FINAL 200**

Scores

900-1000

800-899

700-799

600-699

<600

Letter grade

A

B

C

D

F



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