Wayne County Community College District

COURSE SYLLABUS

CHM 155 Survey Organic & Biochemistry

CREDIT HOURS: 4.00 **CONTACT HOURS:** 60.00 HL / 30 HLB

COURSE DESCRIPTION:
A lecture and laboratory course introducing the student to elementary structural organic chemistry as it relates to understanding biochemical reactions. The structure and function of protein, carbohydrates, lipids and nucleic acids are presented. The major metabolic pathways are explored. The role of food nutrition in optimizing metabolism and energy production is discussed (meets six hours per week; four hours lecture and two hours laboratory).

PREREQUISITES: *CHM 105 or CHM 136; Lab fee.*

EXPECTED COMPETENCIES:
Upon successful completion of this course, the student will:

1. Convert between names expanded structural formulas, and line angle formulas of hydro carbons and halogenated hydrocarbons.
2. Compare and contrast physical properties (boiling point, solubility, etc.) within and between classes of organic compounds.
3. Identify common sources, functions and uses of various classes of organic compounds.
4. Determine the identity of a missing component for common reactions of hydrocarbons.
5. Convert between names, expanded structural formulas, condensed structural formulas, and line angle formulas of alcohols, phenols, ethers, thiols, and thioethers.
6. Determine the identity of a missing component for common reaction that involves alcohols or thiols as either reactants or products.
7. Convert between names, expanded structural formulas, condensed structural formulas, and line angle formulas of aldehydes and ketones.
8. Determine the identity of a missing component for common reactions that involve aldehydes or ketones.
9. Convert between names, expanded structural formulas, condensed structural formulas, and line angle formulas of carboxylic acids, esters, acid chlorides and acid anhydrides.
10. Determine the identity of a missing component for common reactions that involve carboxylic acids, esters, thioesters, and esters of inorganic acids.

11. Convert between names, expanded structural formulas, condensed structural formulas, and line angle formulas of amines and amides.

12. Determine the identity of a missing component for common reactions that involve amines and amides.

13. Identify the relationship between two structures as one or more of the following., Constitutional, isomers, skeletal isomers, positional isomers, functional group isomers, stereoisomers, enantiomers, diastereomers, Cis-trans isomers, epimers, identical compounds, not isomers.

14. Identify common sources and functions of bioorganic substances.

15. Explain how the structure of a mono-, di-, or polysaccharide relates to its physical and chemical properties.

16. Describe the structure and the biological function of five major types of lipids.
17. Describe the structure and biological function of protein.
18. Describe the structure and biological function of enzymes.
19. Compare and contrast protein hydrolysis and protein denaturation.
20. Compare and contrast how the following conditions and substances affect enzyme activity: temperature, pH, substrate concentration, enzyme concentration, competitive inhibitors, noncompetitive inhibitors, irreversible inhibitors, antibiotics.

21. Contrast the roles of allosteric enzymes and zymogens with respect to the regulation of enzyme activity.

22. Compare and contrast the structure and biological function of water-soluble vitamins to those of fat soluble vitamins.

23. Describe the structure and biological function of nucleic acids.

24. Describe the common metabolic pathway and its role in biochemical energy production.

25. Compare and contrast the following metabolic pathways involving glucose: glycosis, glycogenis, glycogenolysis, gluconeogenisis, and pentose phosphate pathway.

26. Describe how the hormones insulin, glucagon, and epinephrine affect carbohydrate metabolism.

27. Describe the major metabolic pathways involving lipids.
28. Describe the major metabolic pathways involving proteins.
29. Describe the relationship between carbohydrate, lipid, and protein metabolism.

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ASSESSMENT METHODS:
Student performance may be assessed by examination, quizzes, case studies, oral conversation, group discussion, oral presentations. The instructor reserves the option to employ one or more of these assessment methods during the course.

GRADING SCALE:
90%-100% = A
80%-89.9%= B
70%-79.9%= C
60%-69.9%= D
<60% = E