Course Description of Organic Chemistry V (Biochemistry)

The program, which is offered as part of the Biochemistry program, aims to meet the objectives of the program and the teaching staff in the following ways:
- The program is designed to help student-teachers achieve the following goals:
  - Discuss the concept of biomolecules.
  - Correlate between the structure and chemistry of carbohydrates.
  - Distinguish between lipids, proteins, and carbohydrates.
  - Describe the peptide linkage.
  - Differentiate between different types of carbohydrates.
  - Define the structure of nucleic acids and DNA and their essential role in life.

1) General goals of the course

- The course is designed to help student-teachers achieve the following goals:
  - Discuss the concept of biomolecules.
  - Correlate between the structure and chemistry of carbohydrates.
  - Distinguish between lipids, proteins, and carbohydrates.
  - Describe the peptide linkage.
  - Differentiate between different types of carbohydrates.
  - Define the structure of nucleic acids and DNA and their essential role in life.

2) Operational learning objectives of the course

By the end of this course, student teachers are expected to achieve the following objectives:

A) Knowledge and Comprehension:
- Recognize structure and chemical properties of different carbohydrates.
- Understand the importance of biomolecules to both plant and animal life.
- Describe the structure of lipids, proteins, nucleic acids, and DNA.
Define the differences and similarities between fats, and phospholipids.
Define the role of detergents in dissolving fats (grease).
Identify the different types of biomolecules.
Determine the saponification number and acid values of triglycerides.
Classify different carbohydrates and their uses.
Elucidate the molecular structure of carbohydrates.
Differentiate between different types of carbohydrates.
Identify cyclic and open structures of monosaccharides.
Determine the structure and activities of proteins.
Understand the types of biomolecules that are essential for life.
Understands that DNA is the substance, which stores and transmits the genetic information.

B) Cognitive Skills:
- Apply mathematics, including calculus and statistics, to investigations in chemistry and the analysis of data.
- Relate the concepts of chemistry to contemporary, historical, technological, and societal issues; in particular, relate concepts of chemistry to current controversies, such as those around energy uses and medical research, as well as other issues.

C) Practical Skills:
- Locate resources, design and conduct inquiry-based open-ended investigations in chemistry, interpret findings, communicate results, and make judgments based on evidence
- Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of science in human affairs.
- Understand and promote the maintenance of a safe science classroom, including the appropriate use and storage of scientific equipment, and the safe storage, use, and disposal of chemicals.

D) Enabling Skills:
- Demonstrate competence in the practice of teaching as defined within the Entry-Level Standards.
- Create and maintain an educational environment in which conceptual understanding will occur for all science students.
- Demonstrate competence in the practice of teaching through investigative experiences and by demonstrating the application of the scientific process and assessing student learning through multiple processes.
- Develop an understanding and appreciation for the nature of scientific inquiry.
- Understand chemistry as the study of the composition, structure, properties, reactions of matter, and the dynamic interrelations of matter.

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<td>- Fats: fatty acids (lipids)</td>
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Laboratory:
Separation, identification, and determination of some
naturally occurring biomolecules.

Laboratory:
Synthesis of some biomolecules

First Assessment

Activities, tasks and assignments:

- Solve and discuss problem sets.
- Submission and class presentation of term papers.
- Visits to pharmaceutical and relevant sites.
- Computer aided molecular modeling, and web-based assignments to model and elucidate molecular structure and reactivity.

Laboratory work, group discussions, and reports on:
Extraction of biologically active molecules from natural sources, identification, and chemical reactivity.

Assessment  | Score  | Weight  | Activities and assignments
--- | --- | --- | ---
1. Final exam | %70 | 70% | Extraction of biologically active molecules from natural sources, identification, and chemical reactivity.
2. Practical exam | %20 | 20% | Computer aided molecular modeling, and web-based assignments to model and elucidate molecular structure and reactivity.

Summative Evaluation table

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病毒学

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References:

1. *Advanced organic chemistry* - Page 1259 by Francis A. Carey, Richard J. Sundberg


3. *Handbook of organic chemistry* by W. Brich, R. Michaelis

4. *Beilstein Handbook of organic chemistry*

   by Beilstein-Institut für Literatur der Organischen Chemie - Science - 1993 - 815

المجلات العلمية وموافق النتائج:

www.organicworldwide.net
Educational sources

- Chemistry Library
- Textbooks
- Handouts and problem sets.
- Electronic, web, and multimedia based resources.
- Lab work.

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Head of the Department: أ.د مذنب شاكر

Date: 11/10/2009م