SC200

Organic Chemistry

3 Credits

Instructor: Ryan Pearce
780 853 8585

Original Developer: Dr. Farideh Malek

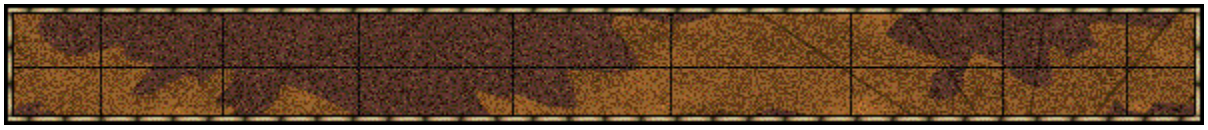
Current Developer: Ryan Pearce

Reviewer: Kris Novak

Created: 01/10/1990
Revised: 25/05/2019
Approval: 07/06/2019
Alternate Delivery: No

The Implementation Date for this Outline is 01/01/2018

SC200 Version: 19



Organic Chemistry

Calendar Description

This course is a study of the structure, properties and reactions of the main classes of organic compounds and their relationship to living organisms and the environment. Laboratory techniques, including tests required for the assessment of environmental quality, are covered.

Rationale

This course is required for first year students within the Environmental Sciences diploma. This course is designed to provide a background in the fundamentals of organic chemistry, and develop an understanding of how to apply these principles in the analysis of environmental samples (water, soil, and plant) using standard techniques employed by environmental technologists in the fields of pollution monitoring, water quality evaluation, and soil reclamation.

Prerequisites

SC110

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. distinguish an organic chemical from an inorganic one.
2. distinguish between the main classes of organic chemicals.
   - Alkanes
   - Alkenes
   - Alkynes
   - Aromatic hydrocarbons
   - Halogenated hydrocarbons
   - Alcohols
   - Ethers

- Aldehydes
- Ketones
- Acids
- Esters
- Amides
- Amines

3. describe the physical properties of members of each class of organic chemicals.
4. name chemicals using IUPAC nomenclature.
5. write structural formulas from given IUPAC nomenclature.
6. recognize and describe functional groups in organic compounds and predict their reactions.
7. give an example (or examples) of chemicals with particular environmental significance for each of the major classes of organic chemicals.
8. explain why some organic compounds are environmentally significant.
9. describe the chemical properties of members of each class of organic compounds.
10. describe the extraction, separation, and identification of basic organic compounds.
11. carry out simple laboratory manipulations routinely used in environmental chemistry.
    - Weighing chemicals.
    - Preparing solutions.
    - Preparing solutions with a given normality.
    - Using a pH meter (standardization and measurement).

Essential Employability Skills

Essential employability skills are critical for workplace success and lifelong learning. Lakeland College prepares its graduates for the workplace and lifelong learning by integrating and promoting essential employability skills development in its curricula. Each credit course offered at Lakeland College emphasizes one or more of the following five essential employability skills:

A. **Communication Skills** that enable individuals to listen, interpret, express, and convey knowledge and ideas so that they are received and understood.
B. **Teamwork Skills** that enable individuals to respect the thoughts and opinions of others as they work together to plan activities, meet deadlines, complete projects, and contribute to an organization's goals.
C. **Critical Thinking Skills** that enable individuals to conceptualize and analyze issues from various perspectives while rationally evaluating the strengths and limitations of each perspective and deciding what action to take.

D. **Adaptability Skills** that enable individuals to respond quickly, willingly, and positively to new conditions and changing times.
E. **Positive Attitude and Behavioural Skills** that enable individuals to be confident about themselves and to deal with people, problems, and situations with honesty, integrity, and personal ethics.

Resource Materials

***Required Texts*:**
Bettelheim, Brown, Campbell, Farrell, and Torres. 2020. Introduction to General, Organic and Biochemistry. 12th ed. Cengage Learning, Boston, MA.

Organic Chemistry SC 200 Lab Manual that is available in the bookstore.

***Reference Texts*:**
General reference material may be found in sections of the College Resource Centre.

***Laboratory Supplies*:**

Glasses -- safety or prescription with side shields.

Lab coats -- knee length of cotton or fire resistant material.

Lab Notes Book

Conduct of Course

This course is presented using a combination of lectures and discussions (42 hours) and laboratory exercises (28 hours). Students are encouraged to ask questions and participate in discussion throughout the course.

Evaluation Procedures

The final grade is an aggregate of the following components:

Quizzes	10%
Midterm Exam	30%
Final Exam	35%
Labs and Assignments	25%
Total	100%

To obtain credit in this course, all assignments must be completed and handed in on time. Late assignments are given a late penalty of -20% if not handed in on the assigned day and time, and an additional -10% is removed for every subsequent day they are late.

You must complete all required laboratory components to receive credit in this course. Proper safety personal protective equipment must be worn to participate in the labs. It is the student's responsibility to bring their own safety equipment to each lab period. If the student does not bring the required safety equipment, or does not wear the outlined personal protective equipment in each lab they will be asked to leave the lab and receive a grade of zero (0).

Knowledge/Skills Matrix

Students apply and demonstrate their knowledge and skills to use

A. Communication Skills

A1. by listening, reading, interpreting information, and communicating effectively
Evaluation(s)/Goal(s): Midterm and Final Exam/Goal 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; Labs and Assignments/Goal 10, 11
A2. by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience
Evaluation(s)/Goal(s): Quizzes/Goal 2, 3, 4, 5, 6, 7, 8, 9; Labs and Assignments/Goal 10, 11
A3. by using libraries, Internet, technical publications, journals and other sources to find pertinent information
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11

B. Teamwork Skills

B1. by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11
B2. by using interpersonal skills to resolve conflict, relate to others, and assist others
Evaluation(s)/Goal(s): NA
B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines
Evaluation(s)/Goal(s): NA
B4. by treating other members of the group open-mindedly and fairly
Evaluation(s)/Goal(s): NA
B5. by developing tactics/strategies to accomplish tasks
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11; Quizzes/Goal 2, 3, 4, 5, 6, 7, 8, 9

C. Critical Thinking Skills

C1. by seeing critical thinking as a lifelong process of self-assessment
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11; Quizzes/Goal 2, 3, 4, 5, 6, 7, 8, 9; Midterm and Final Exam/Goal 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
C2. by examining problems closely
Evaluation(s)/Goal(s): Midterm and Final Exam/Goal 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts
Evaluation(s)/Goal(s): NA
C4. by seeking out the truth
Evaluation(s)/Goal(s): NA
C5. by finding solutions; make decisions
Evaluation(s)/Goal(s): N/A
C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic
Evaluation(s)/Goal(s): Final Exam/Goal 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11

D. Adaptability Skills

D1. by working independently or as part of team
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11; Quizzes/Goal 2, 3, 4, 5, 6, 7, 8, 9
D2. by carrying out multiple tasks or projects
Evaluation(s)/Goal(s): NA
D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done
Evaluation(s)/Goal(s): NA
D4. by being open and respond constructively to change and uncertainty
Evaluation(s)/Goal(s): NA

E. Positive Attitude and Behavioural Skills

E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics
Evaluation(s)/Goal(s): NA
E2. by showing interest, initiative, and effort
Evaluation(s)/Goal(s): Labs and Assignments/Goal 10, 11; Quizzes/Goal 2, 3, 4, 5, 6, 7, 8, 9
E3. by affirming the need for positive solutions and encourage positive interaction and feedback
Evaluation(s)/Goal(s): NA
E4. by balancing personal and family activities with job-related activities
Evaluation(s)/Goal(s): NA

Grade Equivalents and Course Pass Requirements

A minimum grade of D (50%) (1.00) is required to pass this course.

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.

Attendance

Classroom and laboratory attendance is considered vital to the learning process and as significant to the students' evaluation as examinations and reports, therefore absenteeism is recorded.

a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours can be required to withdraw and would then automatically receive a "RW" (required withdrawal) for the course, regardless of any other evaluation results. (RW is a failing grade).
b. An excused absence is one that is verified with your instructor. Verification should be prior to the absence or the next class day following the absence. Verification of the absence may take the form of a note from your doctor/College nurse regarding illness, or a note from another instructor regarding a field trip or other activity, or authorization by your instructor following an in-person meeting. Be sure to contact your instructor and ask what they will require from you as verification for each absence. An unexcused absence is anything NOT verified by the instructor prior to the absence or the next class day following the absence.

NOTE: Any exceptions to the above attendance policy (e.g. timetable conflicts, work-related issues) must be approved in writing by the Department Chair prior to the beginning of the course.

It is the students' responsibility to know their own absentee record.

Normal hours are 8:30 a.m. to 6:30 p.m., with potential for evening courses, exams or extended field trips. Students are expected to be available for classes during these times.

Course Units/Topics

Lecture Material:

1. Introduction to organic chemistry
2. Saturated hydrocarbons: Alkanes and cycloalkanes
3. Unsaturated hydrocarbons: Alkenes and cycloalkenes
4. Alkynes
5. Aromatic hydrocarbons
6. Alcohols, Ethers and Thiols
7. Amines
8. Aldehydes and Ketones

9. Caboxylic Acids
    a) Soaps and detergents
10. Carboxylic Anhydrides, Esters, and Amides

Laboratory Material:

1. Structures in Organic Compounds
2. Identification of Hydrocarbons
3. Identification of Alcohols and Phenos
4. Properties of Amines and Amides
5. Identification of Aldehydes and Ketones
6. Properties of Carboxylic acids and Esters

2602 - 59 Avenue, Lloydminster, Alberta, Canada T9V 3N7. Ph: 780 871 5700
5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400
Toll-free in Canada: 1 800 661 6490 E-mail: admissions@lakelandcollege.ca