



**CHEM 2000 (Organic Chemistry with Lab)**  
**ACADEMIC YEAR 2018-2019**  
**Fall 2018**

**COURSE SYLLABUS**

<b>1. COURSE INFORMATION</b>
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Classes held:                    MW 8:00 am - 9:20 am; 307H

Credits:                            4

Prerequisite:                    Satisfactory completion of Chemistry I and II

<b>2. FACULTY INFORMATION</b>
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Faculty Name:	Dr. Waziha Farha
Email:	<a href="mailto:waziha.farha@auw.edu.bd">waziha.farha@auw.edu.bd</a>
Office Location:	610H (UG Faculty)
Office Hours:	MWTR 10:00 am - 11:30 am; T 2:30pm – 4:30pm, or by appointment
Qualifications:	Ph.D. in Agricultural Chemistry, M.Sc. in Organic Chemistry, B.Sc. in Chemistry
Areas of Expertise:	Bio-chemistry, Organic Chemistry, Medicinal Chemistry, Environmental Chemistry, Plant Science
Profile:	A strong theoretical and research knowledge of organic, inorganic, analytical, and environmental chemistry. Successfully trained in systematic approach and diligent handling of Chemicals and Chemistry laboratory equipment and observation 5 years of research experience, collaborated with supporting institutions, fellow scientists, and undergraduate research students
<b>Research Interest:</b>	Green chemistry; Pesticide science, Plant science, Food safety

3. TEXT AND OTHER COURSE MATERIALS
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**Recommended Text:**

(1) *Introduction to Organic Chemistry*, William Brown and Thomas Poon, latest Edition. (2) *Organic Chemistry*, Robert Thornton Morrison & Robert Neilson Boyd, PEARSON, latest Edition. (3) *Organic Chemistry*, John McMurray, Latest Edition. (4) *General Chemistry: Principles and Modern Applications*, Petrucci, Herring, Madura, and Bissonnette, Latest Edition.

-----Students will be provided with documents and links of the content on requirement.

4. COURSE OBJECTIVES AND DESCRIPTION
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- Organic Chemistry is the chemistry for Carbon compounds,
- Scientific study of the structure, properties, composition, reactions and preparation of carbon-based compounds, hydrocarbons & their derivatives.
- Simply, Organic Chemistry is like building-up with molecular Legos.
- This course is designed to provide a fundamental overview of Organic Chemistry to students interested in pursuing a career in the sciences.
- This course consists of lectures, quizzes, assignments/homework and lots of discussion.
- It covers topics such as electronic structure and bonding, different types of organic reactions, hydrocarbons, stereochemistry, alcohols, aldehyde-ketones, acids, amines, aromatic compounds and so on.

5. LEARNING OUTCOMES
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*Upon completion of this course students will be able to-*

- ◆ promote knowledge on the basic concepts of the Organic Chemistry to enter the field of advanced Organic Chemistry
- ◆ explain the fundamentals of carbon Chemistry
- ◆ understand and comprehend the physical and chemical properties of Organic molecules taught
- ◆ analyze and compare the reactivity of various functional groups
- ◆ write detailed mechanism of different reactions
- ◆ outline the synthesis of simple organic synthesis

6. ATTENDANCE REQUIREMENT & GRADING POLICY
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Regular and punctual *attendance* at all scheduled classes and activities is expected of all students and is regarded as integral to course credit. It is expected that attendance will be taken at each class lecture.

- **Proper medical documents should be placed in case of absence in the lab due to illness.**

**Assignments:**

*Homework/assignments* usually will be taken during the semester.

**Quizzes:**

There will be *two* unannounced *quizzes* throughout the semester.

**Exam:**

There will be three exams; 2 *Midterms* and a *Final* during the term.

**Grades:**

*Student grades will be determined by the following method:*

1. Class Attendance	=10%
2. Homework/Assignments	=20%
3. Quizzes	=20%
4. Midterm	=20%
5. Final Exam	=30%
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<b>TOTAL</b>	<b>= 100% (67% of course grade)</b>

**Noted:** Students must pass both the *lecture* and the *LAB* to pass the course.

**You are expected to abide by the academic code of honesty for all of your works.**

Letter Grade	GPA	Percentage
A+	4.3	98-100
A	4.0	94-97
A-	3.7	90-93
B+	3.3	87-89
B	3.0	84-86
B-	2.7	80-83
C+	2.3	77-79
C	2.0	74-76
C-	1.7	70-73
D+	1.3	67-69
D	1.0	64-66
D-	0.7	60-63
F	0.0	Less than 60

7. CONTACT WITH YOUR PROFESSOR
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Face to face conversation with the instructor during office hours or by fixing appointment through email is preferred. In case of an emergency you may email your instructor after office hours accepting some delay in response.

In terms of a group response or reporting experimental observations, one or more representatives will communicate with the instructor by face to face meeting or by email during office hours.

Instructor will give the feedback on academic progress of students in the class or by email.

8. COURSE SCHEDULE
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**WEEK 1: Introduction to Organic Chemistry, the study of Carbon compounds**

<b>Student Learning Objective:</b>	Organic and inorganic chemistry, basic introduction to organic chemistry, Importance of Carbon chemistry
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 2: Covalent bonding & Shapes of molecule**

<b>Student Learning Objective:</b>	Electronic structure of atoms, bonding in molecules & shapes, Atomic Orbitals – Hybridization, Valence Bond and VSEPR Theory, hybridization, carbon molecular orbitals in organic compounds, inductive effect, resonance & conjugation effect, electromeric effect, hyperconjugation and steric effect, empirical & molecular formulae.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 3: Hydrocarbons –Alkanes**

<b>Student Learning Objective:</b>	Structure, nomenclature, isomerism, physical & chemical properties, preparations, reactions, photochemical
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	halogenation with mechanism, the Grignard reaction, Wurtz reaction
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

#### **WEEK 4: Hydrocarbons – Alkenes and Alkynes**

<b>Student Learning Objective:</b>	Alkenes: Structure, nomenclature, physical & chemical properties, preparations, reactions, mechanism of addition in double bond; the Markonikoff and anti-Markonikoff addition, peroxide effect, reduction, oxidation, ozonolysis of olefins. Alkynes: shapes, nomenclature, physical properties, preparations, reactions and acidity of hydrocarbons.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

#### **WEEK 5: Cyclic Aliphatic Hydrocarbons**

<b>Student Learning Objective:</b>	Introduction, nomenclature, preparations, reactions & general properties of cycloalkanes, conformation and stability of cycloalkanes.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

#### **Review and Mid-Term**

#### **WEEK 6: Carboxylic Acids:**

<b>Student Learning Objective:</b>	Nomenclature, physical properties, acidity, general methods of preparation and reactions of carboxylic acids, hydroxyl acids, unsaturated acids and keto acids.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 7: Aromatic compounds:**

<b>Student Learning Objective:</b>	Source of aromatic compounds, nomenclature, structure of benzene, resonance energy of benzene, aromaticity, chemical reactions of benzene, electrophilic substitution reaction, Friedel-crafts reactions, addition reactions and oxidation reactions.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 8: Alcohols, Ethers, Thiols and Epoxides**

<b>Student Learning Objective:</b>	Alcohols: nomenclature, hydrogen bonding, physical properties, preparations, general reactions, test of alcohols and distinction between primary, secondary and tertiary alcohols. Ethers: nomenclature and preparation, the Williamson's synthesis, physical properties and reactions. Thiols, Epoxides: nomenclature, reactions and applications.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 9: Aldehydes and Ketones:**

<b>Student Learning Objective:</b>	Nomenclature of aldehydes and ketones, physical properties, hemiacetals/acetals, keto-enol tautomerism, general methods of preparations of aldehydes and ketones, reactions of aldehydes and ketones, Grignard reagents, oxidation and reduction, nucleophilic addition to carbonyl compounds.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**Review and Mid-Term****WEEK 10: Amines:** [tentative – Semester Break]

<b>Student Learning Objective:</b>	Nomenclature, physical properties, preparation, reaction of amines, Hofmann degradation of amides.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 11: Stereochemistry:**

<b>Student Learning Objective:</b>	General concept, definition, chirality, etc. nature of geometrical isomerism, nomenclature of geometrical isomers, enantiomers, diastereoisomers, <i>meso</i> compounds, racemic modification, walden inversion, asymmetric synthesis, absolute and relative configurations, R/S system. Configuration and conformation, factors affecting of conformations.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 12: Organic Reactions Mechanism I :**

<b>Student Learning Objective:</b>	Reaction mechanism, types of organic reactions, addition reactions, nucleophilic substitution reactions ( $S_N1$ and $S_N2$ ), rearrangements, hemolytic and heterolytic cleavage, acids and bases, hard and soft acids and bases.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

**WEEK 13: Organic Reactions Mechanism II :**

<b>Student Learning Objective:</b>	Reaction mechanism, types of organic reactions, addition reactions, elimination reactions (E1 and E2 mechanism), rearrangements, hemolytic and heterolytic cleavage, acids and bases, hard and soft acids and bases.
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

### **WEEK 14: Haloalkanes, Halogenation**

<b>Student Learning Objective:</b>	Structure, nomenclature, isomerism, physical & chemical properties, preparations, reactions, halogenation with mechanism, allylic halogenation, radical halogenation
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

### **WEEK 15: Final Review**

<b>Student Learning Objective:</b>	Reviewing and discussing the topics studied, thorough revision of the syllabus before final exam
<b>Required Readings:</b>	Study materials suggested and/or provided in the class

. Additional text books and contents or links will be provided by the instructor when required.

. **Note:** This schedule is subject to changes during the semester and topics. Each missed class by the instructor will be made up in appropriate time during the semester.

Assessment methods: Attendance, Class activities, Unannounced Quiz, Article presentation, Midterms, Final Exam.

The type of questions includes brief discussions, analytical questions and calculations, drawing figures and graphs.

No assignments, quizzes and exams will be taken as a supplement (in case of absence) if the instructor is not previously informed or excuse the absence.

#### 10. KEY DATES & DEADLINES

Aug 26	Semester Begins
Sept 10	Deadline for Add/Drop
Oct 18	Last day of withdrawal of course with 'W' grade
Oct 21-25	Fall break
Oct 31	Writing assignment deadline
Dec 6	Last day of class
Dec 9-13	Assessment

#### 11. PLAGIARISM & ACADEMIC INTEGRITY

All members of the AUW Community are bound by the Academic Honor Code published in the Academic Bulletin (<http://www.auw.edu.bd/academics/course-bulletin/>).

The integrity of students' academic work is very important to AUW faculty. Universities are based upon the fundamental principle that the work presented truly belongs to the author, because the academic community revolves around ideas and creativity. Each person's ideas are his or her contribution to the academic community. Therefore, taking another person's ideas and representing them as one's own is a serious form of dishonesty. Similarly, cheating (copying someone else's work, asking for answers, sharing answers, etc.) and other forms of dishonesty (falsifying data, making up references, etc.) are also serious breaches of this honor code.

Plagiarism is intentionally or unintentionally taking credit for another's words or ideas. You may not plagiarize in your academic work, and you must adhere to the following:

- When you use someone else's words (whether they are from a distinguished author or a classmate's paper), place the words you have copied in quotation marks and provide the appropriate citation of author and source. A good guideline to use to avoid plagiarism is to make sure quotes of three or more sequential words from someone else are put into quotation marks.
- If you paraphrase (reword) another person's ideas, then you must also cite the source.

- Paraphrasing must involve changing the words and sentence structure of the original source.
- Cite materials you copy or paraphrase from the Internet, even if the author is not identified.

The various academic disciplines (humanities, social sciences, sciences) use slightly different formats for footnotes, endnotes, and bibliographies. Your professor for a particular class will tell you which format he or she wants you to use in that class.

Copying, asking for answers, sharing answers, and any other form of cheating (misrepresenting your own work and knowledge) on exams or quizzes are all forms of academic dishonesty.

### Other Forms of Academic Dishonesty

1. Making up references, quoting wrong sources, etc.
2. Falsifying data.
3. Misrepresenting your situation to be excused from academic work.
4. Submitting the same paper in more than one class.
5. Informing a student in a later class about questions on tests or quizzes.
6. Misrepresenting your academic work or qualifications in any way.

Full details about plagiarism, academic dishonesty and penalties are available in the Academic Honor Code in the Academic Bulletin.

### 12. STRATEGIES TO PREVENT PLAGIARISM & VIOLATIONS OF ACADEMIC INTEGRITY

“Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Appropriate Personnel/Committee. During regular class sessions, cell phones must be either in “vibrate mode” or turned off. Calls cannot be answered. Cell phones must be **turned off** and **enclosed** in a case, book bag, briefcase, or the like during tests and exams. YOU are responsible for ensuring this policy is followed. Students **MAY NOT** have cell phones, electronic dictionaries, calculators, pagers or other “information rich” devices (anything that can receive and/or store many pages of text) in their possession during tests and exams.

### 13. CLASS BEHAVIOUR

- . Students **WILL NOT** use their cellphone during class
- . Students **WILL NOT disrupt** the class
- . Students **MUST be punctual** for the class

### 14. OTHER IMPORTANT INFORMATION

Announcements related to the course will be sent through group email.