Universidad de Navarra

Fundamentals of Organic Chemistry

Guía docente 2026-27

INTRODUCTION

Course description: This course provides the foundations for understanding the structure, physical properties, reactivity, and biological relevance of organic compounds.

- **Degree Program**: Biochemistry
- **Module/Subject:** Mathematics, Physics and Chemistry for Molecular Biosciences
- **Credits:** 3 ECTS
- **Year:** 1st year, 1st semester
- **Type of course:** Basic subjectI
- **Instructor:** Nuria Martínez Sáez
- **Language:** English
- **Schedule (Classroom):** Monday, 10:00–10:50 (Room 17); Tuesday ,10:00-10.50 (Room 22, only October);Thursday, 11: 00–11:50 (Room 35); and Friday, 11:00–11:45 (Room 32).

LEARNING OUTCOMES (Competencies)

- **RA3:** Explain the foundations of Physics and Chemistry relevant to understanding biological and biochemical processes.

PROGRAM

1. **Structure of organic molecules:** hybridization, molecular shape, polarity. Resonance. Nucleophilicity and electrophilicity.
2. **Isomerism and stereoisomerism:** types of isomerism. Geometric and optical stereoisomers. Absolute configuration. Fischer projections. Stereochemistry of chemical reactions. Molecules with multiple stereocenters.
3. **Alkanes and haloalkanes:** properties and conformations. Substitution reactions: SN2, SN1. Elimination reactions: E1, E2.
4. **Alkenes and alkynes:** structure. Unsaturation elements. Electrophilic addition to alkenes.
5. **Aromatic compounds:** aromaticity and stability. Electrophilic aromatic substitution (EAS).
6. **Alcohols, thiols, phenols, and ethers:** structure. Acidity and basicity of alcohols and phenols. Reactions of alcohols. Oxidation-reduction. Dehydration. Williamson synthesis. Ester formation.
7. **Carbonyl compounds:** structure. Reactivity. Nucleophilic addition. Acetals and hemiacetals.
8. **Carboxylic acids and derivatives:** structure. Acidity and salt formation. Reactions of carboxylic acids and their derivatives.
9. A**mines: structure.** Basicity. Reactions. Formation of Schiff bases.

EDUCATIONAL ACTIVITIES

CLASSROOM ACTIVITIES

Theoretical classes (21 hours)

The contents indicated in the program will be explained during the theoretical classes. Before each session, students will have access to the class materials through the ADI virtual classroom platform. Various resources will be used, such as the blackboard, presentations, a digital Wacom

tablet, and others. Student participation will be encouraged through questions and prompts that help them reflect on and understand the concepts covered.

Problem-solving seminars: 7 hours

Assigned problems will be solved in class. The material will be provided sufficiently in advance, and students are encouraged to work on it individually or in groups before the in-class resolution.

Formulation exercises and questions via the ADI virtual classroom (2 hours):

After each topic, students will be given 5–10 questions through the ADI virtual classroom. The grade obtained in each topic will count toward the final evaluation.

Examinations (4 hours)

Ordinary exam: 2 hours, and extraordinary exam: 2 hours.

OUT OF CLASSROOM ACTIVITIES

Independent study (41 hours)

Study of the topics covered and completion of problems.

ASSESSMENT

ORDINARY CALL

- **Organic nomenclature/formulation test** (10 formulas to name and 10 names to convert into structures): 10%.
- **Exercises completed through the ADI virtual classroom after each topic:** 10%.
- **Final exam:** Multiple-choice questions, exercises, and problems similar to those solved in class: 80%.

EXTRAORDINARY CALL

- **Final exam:** 100%. Multiple-choice questions, exercises, and problems similar to those solved in class.

Students with **special needs** must contact the Faculty of Sciences Study Coordination in advance to obtain authorization for the relevant accommodations, such as extra time in examinations. This authorization must be sent by the student to the instructor. It is recommended that this process be completed at the beginning of the semester.

Any attempt at fraud, copying, plagiarism, or other irregular conduct constitutes a serious violation, as set out in Title IV, “Rules on Academic Discipline of Students,” within the University of Navarra’s system of rules on coexistence.

OFFICE HOURS

Dra. Nuria Martínez Sáez (nmartinezsa@unav.es)

- Office 3E05, Sciences Building, 3rd floor.
- Tutoring hours: by appointment only, arranged in advance by email.

BIBLIOGRAPHY AND RESOURCES

- **Recommended textbook:** *Organic Chemistry*, L.G. Wade, 9th edition, Pearson, 2017.