Organic Chemistry

1. **Course number and name:** 020CORNI3 Organic Chemistry

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours

3. **Name(s) of instructor(s) or course coordinator(s):** Marie-Jose Zacca, Alexandre Monnier, Fadel Chamsseddine.

4. **Instructional materials:** Course handouts; in-class problems

5. **Specific course information**
   a. **Catalog description:**
      This course begins with an introduction to organic chemistry, naming of organic molecules and their spatial representation. It enables students to master stereoisomerism and the reactivity of molecules: inductive and mesomeric effects, nucleohilic and electrophilic reagents. Then the reaction in organic chemistry is explained and the following organic compounds are studied: halogenated derivatives –alkenes and alkynes – benzene and aromatic compounds – Alcohols (substitution, elimination, oxidation) – carbonyl compounds (substitution on the acyl group) – reactions of aldehydes and ketones – Carboxylic acids, esters, amides and amines. After each part addressed, tutorials are treated in order to master the concept.

   b. **Prerequisites:** None

   c. **Required/Selected Elective/Open Elective:** Required

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
      - Master stereoisomerism (perspective representation, Cram convention, Newman projection, Fisher projection).
      - Distinguish configuration stereoisomers from conformational stereoisomers, and within configuration stereoisomers, distinguish enantiomers from diastereoisomers while being able to give their absolute configuration.
      - Know how to interpret and find inductive and mesomeric effects. Distinguish between homolytic and heterolytic reaction, nucleophiles and electrophiles, carbocations and carbanions.
      - Write the products of pericyclic, substitution, addition, elimination, rearrangements and oxidation/reduction reactions.
      - Write the mechanisms of SN1, SN2, E1 and E2.
      - Name, give the properties and write the chemical reactions of alkanes, cycloalkanes, halogenoalkanes, alkenes, alkynes, alcohols, ethers, benzene and its derivatives, aldehydes and ketones (carbonyl compounds).
      - Have a general idea about carboxylic acids, esters, amides and amines.

b. PI addressed by the course:

PI	1.3	3.2	7.1
Covered	x	x	x
Assessed	x	x	x

7. Brief list of topics to be covered

- Chapter 1 : Stereoisomerism + exercises (3 lectures)
- Chapter 2 : The reaction in organic chemistry + exercises (4 lectures)
- Chapter 3 : Saturated hydrocarbons + exercises (3 lectures)
- Chapter 4 : Unsaturated hydrocarbons + exercises (2 lectures)
- Chapter 5 : Alcohols + exercises (3 lectures)
- Chapter 6 : Benzene and its derivatives + exercises (3 lectures)
- Chapter 7 : Carbonyl compounds (Aldehydes and Ketones) + exercises (3 lectures)
- Chapter 8 : Carboxylic acids, esters, amides and amines + exercises (3 lectures)