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**COURSE: Complement of organic chemistry**

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**ACADEMIC YEAR: 2019-2020**

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**TYPE OF EDUCATIONAL ACTIVITY: optional**

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**TEACHER: Lucia CHIUMMIENTO**

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phone: +39 0971 205492

mobile (optional):

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Language: **italian**

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ECTS: **6** (lessons e  
tutorials/practice)n. of hours: **48** (lessons e  
tutorials/practice)Campus: **Potenza**  
Dept./School: **Dipartimento di  
Scienze** Program:Semester: II  
(date): **from 01.03.2020  
to 31.05-30.06.2020**

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**EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**

Student has to demonstrate understanding and being able to plan synthetical strategies for organic compounds with care to the stereochemistry of the desired compound. He should be able to suggest eventual transformations of functional groups. He should recognize the difficulties and limits of the proposed strategy considering the regio- and the chemo-selectivity of the transformations. He has to suggest appropriate asymmetric methodologies if some chirality elements is present in the molecule.

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**PRE-REQUIREMENTS**

It is necessary that students knows the basic concepts of organic chemistry, including nucleophilic substitution, elimination reactions, central chirality, transforming group methodologies (ie, esters-alcohols, alcohols-ethers, alcohols-alkyl halide)

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**SYLLABUS**

The course deals with topics of advanced organic chemistry and asymmetric synthesis.

Organic synthesis: retrosynthetic analysis. Selectivity: chemo-, regio-, diastereo- and enantioselectivity.

Stereospecific reactions. Main protective groups.

Symmetry and stereogenic structures:

Stereochemical control: Controlling stereochemistry in cyclic compounds.

Fused and condensated rings. Diastereoselectivity in acyclic systems.

Additions to carbonyl groups: Cram rules and Felkin-Ahn model

Enolates: Stereoselective enolization, boron enolates and Zimmerman-Traxler transition state.

Asymmetric synthesis: resolution, chiral reagents: Brown's allylation and crotylation. Biocatalysis: enzymes.

Chiral auxiliaries: oxazolidinones, chiral catalysts: catalytic hydrogenation. Advantages and disadvantages.

Kinetic resolution and dynamic kinetic resolution.

Strategy for the synthesis of saturated heterocyclic steric and stereoelectronic effects. Baldwin rules. Thorpe-Ingold effect.

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**TEACHING METHODS**

Theoretical lessons, Classroom tutorials.

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**EVALUATION METHODS**

Oral examination can be performed by debating on published papers about a particular asymmetric or not organic methodology and student has to discuss about the advantages and limits to use it and should be able to suggest alternative pathways and strategies retrosynthetic pathways. All the topics could be debated.

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**TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL**

- J. Clayden, N. Greeves, S. Warren, P. Wothers: **Organic Chemistry**, Oxford press
  - P. Wyatt, S. Warren: *Organic synthesis: strategy and control*, John Wiley& Sons Ltd
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**INTERACTION WITH STUDENTS**

Teacher meets students for details about items of the course in own office each Monday: from 11:30 to 13:30.

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**EXAMINATION SESSIONS (FORECAST)**

19/06/2020, 24/07/2020, 25/09/2020, 23/10/2020, 18/12/2020

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SEMINARS BY EXTERNAL EXPERTS    YES    NO    X

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