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**COURSE: Laboratory of Organic Chemistry**

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**ACADEMIC YEAR: 2017-2018**

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**TYPE OF EDUCATIONAL ACTIVITY: Characterizing**

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**TEACHER: Patrizia Scafato**

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website:

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mobile (optional):

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Language: **Italian**

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ECTS: **6** (3 h lessons and  
3 h lab activities)n. of hours: **60** (24 h lessons  
and 36 h lab activities)Campus: **Potenza**  
**Department of Science**  
Program:Semester: 2nd  
**03/06/2018-**  
**06/15/2018**

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**EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES***Educational goals (knowledge):*

- *Safe Handling of organic reagents.*
- *Theoretical and experimental aspects of techniques used for the preparation, isolation and purification of organic compounds.*
- *Basic principles of the retrosynthetic analysis of multifunctional organic molecules.*
- *Laboratory activities: synthesis, isolation and purification of organic compounds, using reactions covered in the courses of Organic Chemistry I and II and the experimental techniques discussed in the lessons.*

*Main learning outcomes:*

- *Perform synthetic procedures described in the literature.*
  - *Propose an efficient method for the isolation and purification of a given organic compound.*
  - *Write a report on a scientific experiment.*
  - *Use the retrosynthetic analysis to design the synthesis of polyfunctional molecules*
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**PRE-REQUIREMENTS***Knowledge of topics of "General and Inorganic Chemistry" and "Organic Chemistry I" courses.*

- *Basic concepts on atomic structure*
  - *Basic concepts on acidity and basicity (Brønsted and Lewis)*
  - *Structure and hybridation of Carbon atom*
  - *Reactivity of main organic functional groups (alkanes, alkenes, alkynes, halides, alcohols, amines, acids and derivatives)*
  - *Mechanisms of main organic reactions (substitutions, additions, eliminations, radical reactions)*
  - *Skill in the project of simple organic syntheses.*
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**SYLLABUS***Lessons topics:*

*Safety (2h): main risk sources in a typical organic chemistry lab, Safe Handling of organic compounds, disposal of residues, protective equipment and safety devices. Glassware and assembly procedures of equipment (1h). Techniques for the isolation and the purification of organic compounds: solvent extraction, continuous and chemically active substances extraction; thin layer chromatography (TLC), column chromatography, HPLC and gas-chromatography; simple, fractional and azeotropic distillation; crystallization and determination of melting points; sublimation and lyophilization. Drying of solvents and common reagents (12h). Organic synthesis: theoretical aspects of the reactions involved in lab activities; multistep synthesis: retrosynthetic analysis, disconnection of multifunctional compounds, common synthons and synthetic equivalents, latent polarity and umpolung concept (9h).*

*Laboratory activities:*

*1) separation of mixtures by extraction with chemically active substances; 2) oxidation of a secondary alcohol, TLC and column chromatography; 3) preparation and distillation of isoamyl acetate; 4) addition of a prepared in situ Grignard reagent to a ketone and alcohol dehydration; 5) synthesis and crystallization of 2-phenylindole (Fisher reaction); 6) synthesis and crystallization of trans-cinnamic acid (Doebner reaction); 7) synthesis and crystallization of trans-stilbene (Horner-Wittig reaction); 8) acetylation of a sugar and optical rotation measurements.*

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**TEACHING METHODS***Theoretical lessons (24 hours) and Laboratory tutorials (36 hours)*

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**EVALUATION METHODS***Written and Oral examination together with course of Organic Chemistry II.*

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*23/01/2018; 20/02/2018; 13/03/2018; 19/06/2018; 17/07/2018; 18/09/2018; 10/10/2018 M; 03/12/2018*

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#### TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

*Suggested textbooks:*

- L.M. Harwood, C. J. Moody, J. M. Percy *Experimental Organic Chemistry*, Ed. Blackwell S.P.
- Vogel, *Practical Organic Chemistry*. Ed. Longmans
- R. M. Roberts, J. C. Gilbert, S. F. Martin *Experimental Organic Chemistry*, Ed. Saunders College Pub.
- S. Warren, P. Wyatt *Organic Synthesis-The Disconnection Approach*, Ed. Wiley.
- C. Willis, M. Willis *Organic Synthesis*, Oxford University Press.

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#### INTERACTION WITH STUDENTS

*At the beginning of the course, the teacher describes the educational goals, syllabus and evaluation method, provides students with the necessary educational materials for the laboratory activities and collects the list of students who want to attend the course.*

*Consulting hours: Monday from 9 to 11 am and Wednesdays from 2.30 to 4.30 pm at the study of the teacher (3A130, Department of Science). In addition, students can contact the teacher by e-mail at any time.*

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#### EXAMINATION SESSIONS (FORECAST)<sup>1</sup>

*Calls for examination are the same of the course of Organic Chemistry II*

*23/01/2018; 20/02/2018; 13/03/2018, 19/06/2018; 17/07/2018; 18/09/2018; 10/10/2018; 03/12/2018*

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SEMINARS BY EXTERNAL EXPERTS    YES     NO

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#### FURTHER INFORMATION

*It is strongly recommended the simultaneous frequency of both courses of Organic Chemistry II and Laboratory of Organic Chemistry*

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<sup>1</sup>Subject to possible changes: check the web site of the Teacher or the Department/School for updates.