

COURSE SYLLABUS

1. Identification

Code and title: QUP 017 – Organic Synthesis

Professor: Diogo Seibert Lüdtkke

Level: Master and Doctorate

Credit hours: 3

Revised: June_2020

2. Summary

The course aims to address advanced aspects of organic synthesis in a dynamic and attractive way. The main focus will be centered on recent results from the literature, on topics of current interest to the international scientific community. Special emphasis will be given to applications aimed at the synthesis of molecules with outstanding biological activity. Additionally, the objective is to discuss in detail fundamental aspects such as chemo-, regio- and stereochemistry.

3. Objective

Addressing advanced aspects in organic synthesis in a dynamic and attractive way, with special emphasis on applications aimed at the synthesis of molecules with outstanding biological activity. Additionally, the objective is to discuss in detail fundamental aspects such as chemo-, regio- and stereochemistry.

4. Contents

- Protecting Groups: Protecting groups of alcohols, amines, carbonyl compounds, etc.
- Oxidation reactions: Oxidations of alcohols, alkenes and carbonyl compounds.
- Reduction reactions: Reductions of carbonyl compounds, alkenes and alkynes.
- Olefination reactions: Wittig, Horner-Wadsworth-Emmons, Still-Gennari, Julia-Kocienski, Tebbe-Petasis, Peterson, etc.
- Olefin metathesis reactions: ring opening metathesis (RCM), ring closing metathesis (ROM), cross metathesis (CM) reactions.
- Palladium-catalyzed reactions: Heck reaction, Stille cross couplings, Suzuki, Negishi, Sonogashira, Buchwald-Hartwig.

5. Assessment

List of exercises, presentation and discussion of scientific articles, theoretical tests and/or directed works. The student, who obtains a final grade of A, B or C, awarded as per the list below, will be considered approved:

A: grade equal to or above 9.0

B: grade equal to or above 7.5 and below 9.0

C: grade equal to or above 5.0 and below 7.5

D: grade below 5

FF: lack of frequency

6. Methodology

Lectures, exercises lists, seminars and examinations.

7. Bibliography

- Smith, M. B. *Organic Synthesis*, McGraw-Hill 2nd. edition, 2002.
- March, J. *Advanced Organic Chemistry*, John Wiley & Sons, 4th ed. 1992.
- Greene, T. W.; Wuts, G. M. *Protective Groups in Organic Synthesis*. Wiley, 2nd Ed. 1999.
- Kürti, L.; Kzakó, B. *Strategic Applications of Named Reactions in Organic Synthesis* Elsevier, Academic Press, 2005.
- Clayden, J.; Greeves, N.; Warren, S. *Organic Chemistry* Oxford University Press, 2nd 2012.
- Nicolaou, K. C.; Sorensen, E. J. *Classics in Total Synthesis: Strategies, Tactics and Methods* Wiley-VCH: New York, 1996.
- Nicolaou, K. C.; Snider, S. A. *Classics in Total Synthesis II: More Strategies, Tactics and Methods* Wiley-VCH: New York, 2003.
- Hudlicky, T.; Reed, J. *The Way of Synthesis*, Wiley-VCH, Weinheim, 2007.
- De Meijere, A.; Diedrich, F. *Metal-Catalyzed Cross-Coupling Reactions*, 2nd Edition, Wiley-VCH, Weinheim, 2004.
- Gladysz, J., Ed. *Chem. Rev.* **2011**, *111*, 1167–2485. Special Issue: "2011 Frontiers in Transition Metal Catalyzed Reactions".

8. Prerequisite:

QUIP 302 – Advanced Organic Chemistry