

MASTER 2 R MOLECULAR CHEMISTRY

UE09 Reactivity and Synthetic Strategy (40h) 8 ECTS

Reactivity (10 h)

New Insights in Organic Chemistry: modern organic reactions

- Recent development for Reduction/Oxidation processes
- Protecting Groups: Utility in organic synthesis
- Pd-catalyzed cross coupling and introduction to C-H activation
- Asymmetric alkylation & allylation
- Epoxidation & 1,2-Dihydroxylation
- Organic Polymers: Synthesis and Reactivity

Retrosynthesis (10h)

Basics & Basis in retrosynthetic strategy

Green chemistry (20 h)

Sustainability, theoretical foundations (the 12 principles of green chemistry), metallic and organometallic catalysis, homogeneous and heterogeneous phase, biocatalysis, unusual reaction media, renewable raw materials and new concepts guiding the research and development in this field.

UE10 Analyses (30h) 7 ECTS

NMR (10h)

- NMR in structure elucidation:
 - Relative configuration (NOE and J coupling)
 - Absolute configuration by derivation
- II. Advanced NMR techniques
 - Suppression of the solvent signal
 - Diffusion and DOSY experiment
 - Solid state NMR
 - Dynamic NMR
- III. NMR of other nuclei than ^1H and ^{13}C
 - Principles
 - ^{19}F NMR
 - ^{31}P NMR

Thermal Analyses (10h)

Modern Mass Spectrometry (10h)

- Recent advances for the analysis of volatile compounds by MS (GC/GC, HRMS...)
- Recent advances for the analysis of biomolecules by MS (metabolomics...)
- Recent advances for the analysis of polymers by MS
- MS and Surface imaging: MALDI, DESI, DART

UE11 Applications (30h) 7 ECTS

Therapeutic Ch. (10 h)

I Introduction and Concepts

II Targets & Strategies

II-1 Proteins

Enzymes, Receptors, ionic channels

II-2 Nucleic acids

Alkylating agents, intercalating agents, gene therapy, gene silencing etc...

Organic polymers and materials (10 h)

Properties & Applications

Aroma Chemistry (10h)

General, History and Definitions

Routes Training (main families of odorant molecules)

Bioconversion of scent

Formulation & Perfumes

UE12 Project Management (13 h) 4 ECTS

Modern Techniques in Project Management

Project Management Processing Groups

How to Scope, Plan, Launch, Monitor & Control, Close a project

Earned Value Analyses

Tutorial Project

How to present results (written, oral presentation)

UE13 English 4 ECTS

Preparation for TOEIC (Test Of English for International Communication)

Scientific communication