



**PROGRAMS AND BIBLIOGRAPHY**

<b>Subject</b>	
<b>Code</b>	<b>Name</b>
QO852	Introduction to Asymmetric Catalysis

<b>Vector</b>
OF:S-5 T:002 P:000 L:000 O:000 D:000 HS:002 SL:002 C:002 AV:N EX:S FM:75%

<b>Pre requirement</b>	QO321 *QO521
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<b>Summary</b>
Asymmetric induction modes. Catalysis with Lewis acids and bases. Organocatalysis (aminocatalysis, H-Bonding, ion-pairing, and others). Other catalytic systems. Asymmetric induction in enantioselective catalysis. Non-classical interactions between substrates and catalysts. Kinetic resolution and dynamic kinetic resolution. Non-linear effects and autocatalysis. Bifunctional, dualistic and multifunctional catalytic systems. Desymmetrization reactions. Applications in the preparation of complex molecules.

<b>Program</b>
<ol style="list-style-type: none"><li>1. Introduction to catalysis: definitions, motivations and general considerations</li><li>2. Lewis acids and bases</li><li>3. Interactions between substrates and catalysts: electronic effects, steric effects, stereo-electronic effects, transition states, physical-chemistry considerations.</li><li>4. Resolution methods: definitions, principles, and case studies</li><li>5. Non-linear effects and autocatalysis: definitions and case studies</li><li>6. Catalysis with metal complexes: definitions, elemental steps and case studies</li><li>7. Organocatalysis: definitions, activation modes and case studies</li><li>8. Bi- and multifunctional catalytic systems: definitions, elements of design and case studies.</li><li>9. Examples of applications for the preparation of complex molecules</li></ol>

<b>Bibliography</b>
A) Fundamentals of Asymmetric Catalysis. Patrick J. Walsh, Marisa Kozlowski. University Science Books, 2009.
Additional Bibliography: 1) Fundamentals of Organometallic Catalysis. Dirk Steinborn, Wiley-VCH, 2011. 2) Asymmetric Organocatalysis: From Biomimetic Concepts to Applications in Asymmetric Synthesis. Albrecht Berkessel, Harald Groger, Wiley-VCH, 2005.

<b>Evaluation criteria</b>
For grading policy, see: Regimento Geral de Graduação, Seção I – Normas Gerais, Capítulo V – Da Avaliação do Aluno na Disciplina. Students are required to attend 75 % of the lectures. For further details, see: Regimento Geral de Graduação, capítulo VI, seção X, artigo 72.