

MU5CI360 Systems Chemistry of Living & Synthetic Matter									
Mots-clés : Chemical Dynamics, Kinetic/Thermodynamic Modelling, Self-assembly, Chemical Networks and Coupled Reactions, Emergence of Complexity, Evolution									
Responsables Jullien Ludovic, Professeur, UMR PASTEUR, CNRS-ENS-Sorbonne Université Mathieu Morel, MdC, UMR PASTEUR, CNRS-ENS-Sorbonne Université									
ECTS 6	Cours 26 h	TD 8 h	TP 8 h	Tutorat 8 h	Ecrit 40	CC 30	TP	Oral 30	Eval. répartition oui
<p>Descriptif de l'UE :</p> <p>This course has been conceived for students in chemistry with taste and curiosity for the chemistry/biology interface and who wish to enlarge their perspectives in biomimetic chemistry or synthetic biology.</p> <p>This course aims at providing a rigorous physico-chemical description of biological phenomena which are rather singular to the eyes of the chemist, as exemplified by:</p> <ul style="list-style-type: none"> - Out-of-equilibrium and sustained enzymatic networks, - Highly specific interactions and kinetic proof-reading, - Dynamic self-assembly and compartmentalization, - Fluctuations-regulated systems, - Emergence of spatial organization and dynamics... <p>It will also equip with a solid cultural and conceptual background the chemists, who wish to reproduce some complex behaviors encountered in biology.</p> <p>The module will alternate lectures and hands-on tutorials on image analysis and computational data analysis/modelling. With the help of tutors, students will propose both an "experimental" project based on available data (oral defense, 30%) and a "conceptual" project on their specific interest (written report, 40%).</p>									
<p>Learning Goals</p> <ul style="list-style-type: none"> - To reconstruct the behavior of living matter within an established physico-chemical framework; - To locate the concepts and tools (experimental and computational) in the whole of physical chemistry for the analysis of complex biological systems; - To formulate in precise scientific terms a scientific questioning and to evaluate its relevance according to the state of the art of knowledge and analysis tools. 									
<p>Prerequisite</p> <p><i>Essential:</i> Notions of reactivity, thermodynamics, statistical mechanics, chemical kinetics. <i>Recommended:</i> Basic notions of molecular and cellular biology</p>									
Langue ⁽¹⁾ English	Cours, TD, TP English							Documents English	Bibliographie English