Adam Mickiewicz University in Poznań

Doctoral School of Exact Sciences AMU

Bioorganic Chemistry. Kinetics in the Study of Reaction Mechanisms

Prof. dr hab. Jacek Stawiński

Scientific lectures

Field of science	Chemistry
Teaching method	Lecture
Language	English
Numbers of hours	15h
Aims of the course	This course is designed to provide Ph.D. students with: 1. Essential knowledge of the kinetics of simple and complex chemical reactions, with emphasis on their relevance to bioorganic chemistry. 2. A comprehensive overview of reaction energetics, including thermodynamic and kinetic principles, and the factors influencing kinetic versus thermodynamic control of chemical processes.
Course contents	This course focuses on the chemical and physicochemical foundations of reaction kinetics, related to the study of the mechanisms of chemical reactions. In addition to the theoretical principles of chemical kinetics, the course will address practical applications such as: (i) verifying proposed reaction mechanisms by deriving rate laws, (ii) deducing plausible mechanisms from kinetic data, (iii) distinguishing between specific and general acid-base catalysis, and (iv) applying the steady-state approximation to complex reaction pathways. This course is particularly valuable for students and researchers in organic chemistry, biochemistry, and molecular biology.
Prerequisites and co-requisites	University-level organic chemistry and working proficiency in English are required.

Learning outcomes	
On completion of the course PhD candidates will be able to:	**Assessment mode**
Upon completing the course, doctoral students should be able to: (i) analyze reaction mechanisms from a kinetic perspective and identify the most likely rate-determining steps, (ii) formulate rate laws corresponding to proposed reaction mechanisms,	Assessment includes a written exam followed by an individual discussion of the examination work.

(iii) propose reaction mechanisms that are consistent with given kinetic rate laws, and (iv) critically read and interpret scientific literature on the application of kinetics in organic and bioorganic reaction mechanisms.	
Literature	1. J. McMurry, Chemia Organiczna, PWN 2010. 2. Clayden, Greeves & Warren: Organic Chemistry; 2nd Edition, Oxford University Press 2012 ISBN 978-0-19-927029-3. 3. Materials from lectures.
Additional information	