



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2017/2018		
BACHELOR'S DEGREE (BSC)	CHEMISTRY		
SUBJECT	CHEMICAL KINETICS AND MOLECULAR DYNAMICS		
TYPE OF EDUCATIONAL ACTIVITY	D		
AMBIT	10527-A scelta dello studente		
CODE	02019		
SCIENTIFIC SECTOR(S)	CHIM/02		
HEAD PROFESSOR(S)	LAZZARA GIUSEPPE	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	102		
COURSE ACTIVITY (Hrs)	48		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	3		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	LAZZARA GIUSEPPE Monday 11:00 12:00 studio del prof. Giuseppe Lazzara (1/B16) viale delle scienze pad. 17 Wednesday 11:00 12:00 studio del prof. Giuseppe Lazzara (1/B16) viale delle scienze pad. 17		

PREREQUISITES	They are required basic knowledge of chemistry. Basic concepts for chemical equilibrium. Capacity of resolution of differential equations (first order).
LEARNING OUTCOMES	<p>Knowledge and understanding Critical acquisition of the fundamentals of chemical kinetics (kinetic laws and experimental methods). Ability to use the language and the specific terminology of the discipline.</p> <p>Applying knowledge and understanding Capacity to select and apply the mathematical tools to expose the basic principles and to solve problems of kinetics authorized to simple physical and / or chemical transformations.</p> <p>Making judgments To be able to extract and evaluate the information obtained from the experimental results, and evaluate the reliability of data.</p> <p>Communication skills Knowing how to explain in clear and strict terms, with the help of features and / or diagrams.</p> <p>Learning ability The student at the end of the course should have the tools to deal with and understand advanced topics in chemical kinetics and dynamics of molecules of considerable practical interest</p>
ASSESSMENT METHODS	<p>The final examination aims at assessing not only the candidate knowledge and his ability to apply it to real situations (not necessarily mentioned during the course) but also the possession of the properties of scientific language and exposure abilities . The commission invites the student to discuss a theme based on his/her choice and then continues with questions about other topics.</p> <p>Different classes of evaluation will be done based on the following considerations:</p> <p>1) Basic knowledge of topics and limited capacity of processing knowledge for application to new situations. Sufficient capacity analysis of the proposed phenomena and exposure of the pursued procedure (rating 18-21)</p> <p>2) Good knowledge of topics and good capacity of processing knowledge for application to new situations. Rather good capacity of analysis of the proposed phenomena and exposure of the pursued procedure (rating 22-24)</p> <p>3) Very good knowledge of topics and ability in processing knowledge for application to new situations. Good capacity of analysis of the proposed phenomena and exposure of the pursued procedure (rating 25-27)</p> <p>4) Excellent knowledge of the topics, excellent and prompt capacity of knowledge processing for application to new situations. Very good capacity of analysis of the proposed phenomena and and exposure of the pursued procedure (rating 28-30)</p> <p>5) Excellent knowledge of the topics, excellent and very smart capacity of processing in order to apply them to new situations. Excellent capacity of analysis of the presented phenomena and and exposure of the pursued procedure (rating 30 cum laude)</p>
EDUCATIONAL OBJECTIVES	The course aims to provide a thorough understanding of the principles of chemical kinetics of essential laws for a quantitative discussion of the evolution of processes over time. The teaching will help provide a solid basis for the graduate to the first level to interpret and predict the temporal evolution of physical and chemical changes. The use of new methodologies and complex equipment for the study of these processes will be discussed in-depth. Such knowledge will be useful in various business fields such as industry, environment and energy, Cultural Heritage, Material science.
TEACHING METHODS	The course will be given in the second semester of the academic year. It is based on lectures.
SUGGESTED BIBLIOGRAPHY	Chemical Kinetics: The Study of Reaction Rates in Solution, di Kenneth A. Connors. Edizione: Vch Pub, 1990 Peter W. Atkins, Julio De Palma, Chimica Fisica (5a Ed. It.), Zanichelli, 2012

SYLLABUS

Hrs	Frontal teaching
5	Presentation of the course; chemical kinetics: general and application fields, kinetic equations.
5	Experimental techniques for the study of the kinetics of chemical processes: spectroscopy

SYLLABUS

Hrs	Frontal teaching
8	Kinetics of physical processes: theory and applications.
6	Thermal degradation of polymers. Investigation techniques and methods for the identification of the reaction mechanism.
8	Isothermal and isoconversional methods for the determination of the activation energy of degradative processes.
4	Prediction of the life time by experiments in accelerated aging conditions.
4	Crystallization processes, mechanisms and their study.
4	Homogeneous and heterogeneous nucleation.
4	Processes of diffusion with 2 or 3 dimensions. Confinement effects