UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Fisica e Chimica - Emilio Segrè
ACADEMIC YEAR	2017/2018
MASTER'S DEGREE (MSC)	CHEMISTRY
SUBJECT	METALORGANIC CHEMISTRY AND CATALYSIS
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50483-Discipline chimiche inorganiche e chimico-fisiche
CODE	16491
SCIENTIFIC SECTOR(S)	CHIM/03
HEAD PROFESSOR(S)	DUCA DARIO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**DUCA DARIO** Monday 13:00 14:00 Studio del docente presso Ed.17. Tuesday 13:00 14:00 Studio del docente presso Ed.17. Wednesday 13:00 14:00 Studio del docente presso Ed.17. Thursday 13:00 14:00 Studio del docente presso Ed.17. Friday 13:00 14:00 Studio del docente presso Ed.17. Saturday 10:00 13:00 Studio del docente presso Ed.17.

DOCENTE: Prof. DARIO DUCA

PREREQUISITES	Inorganic-, organic- and physical-chemistry training of the first degree chemistry course
LEARNING OUTCOMES	- Knowledge and learning skills in studying catalysis. - Knowledge application ability on catalysis, using an unifying perspective able to reduce to one the different paradigms usually employed to study the distinct aspects of the apparently unrelated catalytic systems: heterogeneous, homogeneous, enzymatic etc. - Designing ability of alternative synthesis route, involving green-chemistry, catalysis and their models. - Learning ability, using technical books, on catalysis and its bases and models. - Communicative ability on catalysis and its bases and models.
ASSESSMENT METHODS	Two oral examinations, one intermediate and one final. Students, in order to show their learning level on the basic catalysis, have to take the first oral exam, discussing one literature case-history. Positive exam scores, in both the examinations, are framed into five sets, excellent exams are assessed cum laude, distinguished ones with a mark in the range 30-27, good 26-23, more than sufficient 22-19 and just sufficient 18.
EDUCATIONAL OBJECTIVES	The course is developed in a semester with classes. At first, in the course is deepened the Organometallic chemistry. This is presented as the basis for the development of the simplest mechanistic and synthetic schemas to be used later in the study of catalysis. The latter is presented by introducing its historical bases, its principles – in the various application areas – and its modern and advanced tools, especially useful: i) to design eco-friendly synthetic routes of industrial catalytic processes and ii) to identify models that can be used to study the same industrial processes.
TEACHING METHODS	Lessons.
SUGGESTED BIBLIOGRAPHY	Testi di Riferimento CHIMICA INORGANICA; Gary L. Miessler, Donald A. Tarr – Piccin 2011. CATALYSIS Concepts and Green Applications; Gadi Rothenberg – WILEY-VCH Verlag GmbH & Co. 2008. Testi di Approfondimento METAL-CATALYSED REACTIONS OF HYDROCARBONS Fundamental and Applied Catalysis; Geoffrey C. Bond – Springer Science + Business Media, Inc. 2005. MOLECULAR HETEROGENEOUS CATALYSIS A Conceptual and Computational Approach; Rutger A. van Santen, Matthew Neurock – WILEY-VCH Verlag GmbH & Co. 2006. MECHANICAL CATALYSIS Methods of Enzymatic, Homogeneous, and Heterogeneous Catalysis; Gerhard F. Swiegers – John Wiley & Sons, Inc. 2008.

SYLLABUS

Hrs	Frontal teaching
2	Organometallic Chemistry Ligands
2	Bonding of Metal-Atoms and Organic-Systems
3	Characterization of Organometallic Species and Fragments
3	Reactions Involving Gain or Loss of Ligands
2	Reactions Involving Modi cation of Ligands
3	Metal-Metal Bonding
6	Homo- and Hetero-Atomic Clusters
6	Basic Catalysis
4	Metallorganic Catalysis
4	Homogeneous Catalysis
4	Heterogeneous Catalysis
4	Bio-Catalysis
5	In-Silico Catalysis