

Química Avançada

2014/2015

Codi: 42429

Crèdits: 9

Titulació	Tipus	Curs	Semestre
4313385 Química Industrial i Introducció a la Recerca Química/Industrial Chemistry and Introduction to Chemical Research	OT	0	1

Professor de contacte

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Utilització de llengües

Llengua vehicular majoritària: anglès (eng)

Grup íntegre en anglès: No

Grup íntegre en català: Sí

Grup íntegre en espanyol: No

Equip docent

Teodor Parella Coll

Marta Figueredo Galimany

Rosa Maria Ortuño Mingarro

Juli Real Obradors

Mariona Sodupe Roure

José Peral Pérez

Maria Jose de Montserrat Esplandiú Egido

José Vidal Gancedo

Montserrat López Mesas

Maria del Mar Puyol Bosch

Gonzalo Guirado López

Prerequisites

- The student must possess Bachelors degree in Sciences or Biosciences, preferred Chemistry, Material Science, Nano-science, Biotechnology or Environmental Sciences

- Intermediate english level

Objectius

Advanced essential chemistry topics are studied for carrying out interdisciplinary chemical research.

Competències

- Correctly apply new information capture and organisation technologies to solve problems in professional activity.
- Define specialised concepts, principles, theories and facts in the different areas of Chemistry.

- Evaluate responsibility in the management of information and knowledge in the field of Industrial Chemistry and Chemical Research.
- Identify information in the scientific literature using the appropriate channels and integrating said information to approach and contextualise a research issue.
- Innovate in chemical synthesis and analysis methods related with different areas of Chemistry.
- Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
- Propose alternatives for the solving of complex chemical problems in different chemical specialities.
- Student should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent
- Students should know how to apply the knowledge acquired and the capacity to solve problems in new or little-known areas within broader (or multidisciplinary) contexts related to their area of study
- Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously
- Use scientific terminology in the English language to defend experimental results in the context of the chemistry profession.

Resultats d'aprenentatge

1. Correctly apply new information capture and organisation technologies to solve problems in professional activity.
2. Design chemical experiments.
3. Elucidate the structure of complex chemical compounds on the basis of the appropriate chemical analysis and structural determination techniques.
4. Evaluate responsibility in the management of information and knowledge in the field of Industrial Chemistry and Chemical Research.
5. Identify information in the scientific literature using the appropriate channels and integrating said information to approach and contextualise a research issue.
6. Identify technological applications based on biological systems and living organisms for the creation and modification of products or processes.
7. Innovate in the synthesis and analysis methods of specific materials.
8. Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
9. Student should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent
10. Students should know how to apply the knowledge acquired and the capacity to solve problems in new or little-known areas within broader (or multidisciplinary) contexts related to their area of study
11. Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously
12. Use numeric methods in the study of chemical reactions.
13. Use scientific terminology in the English language to defend experimental results in the context of the chemistry profession.

Continguts

- Chemical speciation, non destructive analysis, miniaturization
- Chemometrics
- Surface chemistry (heterogeneous catalysis, self-assembled monolayers)
- Conventional and non-conventional solvents
- Applications of computational techniques in chemistry.
- Structure determination in chemistry (NMR, EPR, Microscopy)

- Synthesis and catalysis (Basic principles and strategies in the design of organic synthesis, Stereoselective synthesis, Homogeneous catalysis, Non-aromatic and aromatic carbo- and heterocycles, Total synthesis)

Metodologia

Design and train of oral presentations

Theoretical and exercise lectures

Collaborative activities and seminars

Activitats formatives

Títol	Hores	ECTS	Resultats d'aprenentatge
Tipus: Dirigides			
Theoretical and exercise lectures	63	2,52	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Tipus: Supervisades			
Collaborative activities and seminars	6	0,24	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Tipus: Autònomes			
Design and train of oral presentations	130	5,2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Avaluació

Delivery of manuscript

Oral presentation

Quizzes and exam

Activitats d'avaluació

Títol	Pes	Hores	ECTS	Resultats d'aprenentatge
Delivery of manuscript	20 %	5	0,2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Oral presentation	20 %	5	0,2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Quizzes and exam	60%	16	0,64	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Bibliografia

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- Introduction to Surface Chemistry and Catalysis, 2nd Edition, G.A. Somorjai, Y. Li, Wiley, 2010, ISBN: 978-0-470-50823-7
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- Introduction to Computational Chemistry, F. Jensen, Wiley 2002
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