

CHEMICAL BASIS FOR CHEMICAL SENSING

1.1. Identification

University:	Universidad Politécnica de Valencia										
School:	Escuela Técnica Superior de Ingeniería del Diseño										
Course:	Chemical Basis for Chemical Sensing										
ECTS:	4										
Semester:	<i>Winter</i>					<i>Summer</i>				X	
Category	<i>Fundamental course</i>				X	<i>Specialisation course</i>					
Module	<i>MFI</i>		<i>MFII</i>		<i>MFIII</i>	X	<i>MSI</i>		<i>MSII</i>		<i>MSIII</i>
Teachers:	Fáliz Sancenón , Miguel Ángel González , Teresa Pardo										
Language:	<i>English</i>	X	<i>Italian</i>		<i>Swedish</i>		<i>Spanish</i>			X	

1.2. Learning-outcomes

- knowledge about the fundamentals of sensing for environmental and industrial processes
- knowledge about the fundamentals of control systems using chemical sensors

1.3. Competencies

▪ General

- to have critical understanding of technical and scientific tools
- to design and use any type of sensor system
- to work and manage teams
- communication skills (both written and oral)
- to work in an international context
- knowledge of different European languages

▪ Specific

- to design sensors systems
- to understand molecular recognition processes with abiotic systems
- to understand molecular recognition processes in biologic systems
- to determine the parameters that allow to design molecular receptors and their relation in sensing technology

1.4. Contents

1. Molecular recognition. 2. Self-assembly. 3. Non-covalent interactions. 4. Macrocycles. 5. Supramolecular reactivity. 6. Techniques for determination of stability constants. 7. Molecular recognition using biomolecules. 8. Biomolecules as sensing systems: carbohydrates, proteins, enzymes, lipids and nucleic acids. 9. Molecular interactions host-guest. 10. Immobilization modes of bioreceptors. 11. Markers and tracing properties. 12. Chemical modifications of bioreceptors for homogeneous and heterogeneous phase assay.

1.5. Teaching Methodology

- Lecture sessions
- Practical sessions: “cooperative work” for solving problems
- Laboratory sessions

1.6. Evaluation

- written exams
- oral evaluation of the problems solved by “cooperative work”
- oral evaluation of laboratory work

1.7. Bibliography

- J.W. Steed, J.L. Atwood. “Supramolecular Chemistry”. Wiley-VCH
- K. Ariga, T. Kunitaka. “Supramolecular Chemistry. Fundamentals and Applications”. Springer
- J.-M. Lehn. “Supramolecular Chemistry. Concepts and Perspectives”. Wiley-VCH

- E. Kress-Rogers (Ed.). “Handbook of Biosensors and Electronic Noses”. CRC Press, Boca Ratón, 1997.
- R.F., Taylor, J.N. *Schultz*. “Handbook of Chemical and Biological Sensors.” J. N. Ins. Phys.; Bristol, 1996.
- G. T. Hermanson. “Bioconjugate Techniques “. Academic Press, San Diego, 1996.