LIQUID CRYSTALS AND SUPREMOLECULAR CHEMISTRY

1.1. Identification

University:	Universidad Politécnica de Valencia											
School:	Escuela Técnica Superior de Ingeniería del Diseño											
Course:	Liquid crystals and supremolecular chemistry											
ECTS:	3											
Semester:	*Winter*						*Summer*					X
Category	*Fundamental course*						*Specialisation course*					X
Module	*MFI*		*MFII*		*MFIII*		*MSI*		*MSII*	x	*MSIII*	
Teachers:												
Language:	*English*	X	*Italian*				*Swedish*		*Spanish*			

1.2. Learning-outcomes

- knowledge in traditional and new materials, as well as in their properties and characterization.
- knowledge about sophisticated and intelligent control materials as well as about the fundamentals of their physical, chemical and technological parameters for their application knowledge.
- Knowledge about advanced organic synthesis.

1.3. Competencies

- **General**
  - to design, characterize and study materials and their properties
  - to design and use any type of sensor systems
  - to have critical understanding of technical and scientific tools
  - to work and manage teams
  - communication skills (both written and oral)
  - to work in an international context

- **Specific**
  - to understand the concept of thermotropic and liotropic liquid crystal, supramolecular chemistry and mesomorphism.
  - to study the energetic basis of mesomorphism appearance.
  - to study the different types of mesophases, and predict their appearance based on the molecular structure.
  - to know the applications of the different liquid crystals.
  - to study the different synthesis pathways to prepare new organic materials.

1.4. Contents

1. Introduction to liquid crystals and supramolecular chemistry. Structure and properties. Mesomorphism.

2. Thermodynamic insights for liquid crystals. Enthalpy and entropy features
3. Classification of the different liquid crystals. Thermotropic liquid crystals. Lyotropic liquid crystals. Chiral liquid crystals. Liquid crystal polymers. Supramolecular liquid crystals.
4. Applications. Liquid crystal displays. Other applications.
5. Techniques in liquid crystal characterisation. Thermal analysis. Spectroscopy. Polarized microscopy.
6. Last advances in liquid crystals synthesis.

1.5. Teaching Methodology

- Lecture sessions
- laboratory sessions: “synthesis of liquid crystal polymers”
- laboratory sessions: “characterisation of liquid crystal materials by thermal analysis”
- Practical sessions: computer analysis.

1.6. Evaluation

- written exams
- oral evaluation of laboratory work and characterisation of liquid crystals.

1.7. Bibliography

- Introduction to liquid crystals. Chemistry and physics” Peter J. Collings and Michael Hird. Ed. Taylor & Francis, 1997.
- Handbook of Liquid Crystals. Fundamentals” D. Demus, J. Goodby, G.W. Gray , H.W. Spiess, V. Vill. Ed. Wiley-VCH, 1998
- Liquid Crystals in Complex Geometries: Formed by Polymer And Porous Networks. Ed. by: G P Crawford, S Zumer, Taylor and Francis, 1996