1. **Title of the module**

CHEM5300 (CH530) - Polymeric and Organic Materials

1. **School or partner institution which will be responsible for management of the module**

Physical Sciences

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 5

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn and Spring

1. **Prerequisite and co-requisite modules**

Prerequisites:

CHEM3090 Fundamental Organic Chemistry for Physical Scientists

CHEM3820 Chemical Skills / PSCI3810 Chemical Skills for Forensic Scientists

CHEM3140 Introduction to Biochemistry and Drug Chemistry

Co-requisite:

CHEM5060 Chemical Identification Techniques

1. **The programmes of study to which the module contributes**

New module for the MChem/BSc Chemistry, BSc Chemistry with Year in Industry programmes.

This is not available as a wild module.

1. **The intended subject specific learning outcomes.
On successfully completing the module students will be able to:**

Have a knowledge and understanding of:

1. Fundamental concepts relating to polymer chemistry.
2. Operating instrument and interpreting spectra from spectroscopic data.
3. Structure-property relationships liquid-crystal (LC) materials.
4. Synthetic approaches to polymers, LCs, and light emitting organics.
5. Concepts relating to spectroscopy and organic light emitting devices.

**Intellectual skills:**

1. An ability to interpret spectroscopic data.
2. An ability to link chemical structure to experimental observables.
3. The skills to perform practical experiments to gain spectroscopic information.
4. The skills to operate standard chemical instrumentation, record data, evaluate observations and errors.

**Subject-specific skills**:

1. A knowledge of basic spectroscopy; infra-red, UV-VIS, fluorescence.
2. An understanding of how polymers are synthesised and analysed.
3. More detailed understanding of small molecule synthesis approaches.
4. A knowledge of LC behaviour and how it relates to observable properties.
5. A basic understanding of OLED device compositions.
6. An ability to make use of appropriate texts, or other learning resources as part of managing their own learning.
7. **The intended generic learning outcomes.
On successfully completing the module students will be able to:**

Have a knowledge and understanding of:

1. Problem-solving skills, an ability to formulate problems in precise terms and to identify key issues, and the confidence to try different approaches in order to make progress on challenging problems.
2. Analytical skills – associated with the need to pay attention to detail and to develop an ability to manipulate precise and intricate ideas, to construct logical arguments and to use technical language correctly.
3. Personal skills – the ability to work independently, to use initiative, to organise oneself to meet deadlines and to interact constructively with other people.
4. **A synopsis of the curriculum**

Chemistry in context

Plastics, Liquid Crystals and Organic LEDs are ubiquitous in everyday life; your smartphone, tablet or television screen is likely an Organic LED. Here, the chemistry of these common materials is explored. Specifically, the structure and nomenclature of organic and inorganic macromolecules are covered, as well as polymer syntheses. The physical, chemical and mechanical properties of polymers, liquid crystals and light emitting materials are dissected and device structure of organic LEDs is deconvoluted.

(Lab component)

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**
* G. Solomons, Organic Chemistry 11th ed.
* J. M. G. Cowie, Polymers: Chemistry and Physics of Modern Materials 3rd ed.
* Y. Jean, F. Volatron and J. Burdett, An Introduction to Molecular Orbitals
* S.-S. Sun, L. R. Dalton, Introduction to Organic Electronic and Optoelectronic Materials and Devices
* P. J. Collins, M. Hird, Introduction to Liquid Crystals: Chemistry and Physics
1. **Learning and teaching methods**

Total contact hours: 45

Private study hours: 105

Total study hours: 150

1. **Assessment methods**
	1. Main assessment methods

Assignment 1 (6%)

Assignment 2 (8%)

Assignment 3 (8%)

Laboratory Practical 1, 7 hours (6%)

Laboratory Practical 2, 7 hours (6%)

Laboratory Practical 3, 7 hours (6%)

Examination, 2 hours (60%)

13.2 Reassessment methods

Like-for-like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *8.1* | *8.2* | *8.3* | *8.4* | *8.5* | *8.6* | *8.7* | *8.8* | *8.9* | *8.10* | *8.11* | *8.12* | *8.13* | *8.14* | *8.15* | *9.1* | *9.2* | *9.3* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| *Workshops* | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |
| *Laboratory Practicals* | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  |  | **X** | **X** | **X** |
| *Lectures* | **X** | **X** | **X** | **X** | **X** | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Assignments* | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |
| *Laboratory Practicals*  | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  | **X** | **X** | **X** | **X** |
| *Examination* | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Chemical findings contained within this module have been discovered by residents of many diverse countries and recognised as internationally important by awards such as the Nobel Prize (Heck, Suzuki, Negishi etc). All the students will be well versed in internationally recognised ‘language’ of chemical structure and mechanism in organic chemistry.

**FACULTIES SUPPORT OFFICE USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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Revised FSO Jan 2018