1. **Title of the module**

CHEM6240 (CH624) - Transformations and Chirality in Organic Chemistry

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 6

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**

MChem/BSc Chemistry

BSc Chemistry with Year in Industry

MSci/BSc Forensic Chemistry

BSc Forensic Chemistry with Year in Industry

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

Have a knowledge and understanding of:

8.1 Core and foundation scientific chemical, concepts, terminology, theory, and methods in relation to the chemical sciences.

8.2 Areas of chemistry including properties of chemical elements, organic functional groups, physiochemical principles, organic reactivity, organic materials, and synthetic pathways.

8.3 Appreciate developments at the forefront of some areas of chemical sciences relating to organic chemistry.

Intellectual skills:

8.4 Ability to demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to the subject and to apply such knowledge and understanding to the solution of qualitative and quantitative problems.

8.5 Ability to recognise and analyse problems and plan strategies for their solution by the evaluation, interpretation and synthesis of scientific information and data.

Subject-specific skills:

8.6 The ability to collate, interpret and explain the significance and underlying theory of experimental data pertaining to: classes of chirality and chirality resolution; chiral synthesis: carbonyls, auxiliaries, protecting groups, oxidation, enolate and aldol reactions; chemistry of double bonds: pericyclic reactions, frontier orbital theory, Woodward Hoffman rules; classical heterocyclic syntheses; targeted synthesis of topical organic molecules

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

Have a knowledge and understanding of:

9.1 Written skills in communication of chemical information.

9.2 Generic skills needed for students to undertake further training of a professional nature.

9.3 Problem-solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.

9.4 Time-management and organisational skills, as evidenced by the ability to plan and implement efficient and effective modes of working. Self-management and organisational skills with the capacity to support life-long learning.

1. **A synopsis of the curriculum**

A key component to chemical education is the exposure to more advanced aspects of chirality, and chemical transformations towards the synthesis of organic targets. Concepts relating to the synthesis of natural and unnatural target molecules through organic chemical transformations are essential to the students’ chemical repertoire. In-depth exposure to chirality, exposure to asymmetric chemical transformations, carbon-carbon bond-forming reactions, and their application in targeted small molecule synthesis will be covered.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**
* Primary: G. Solomons, Organic Chemistry 11th Ed.
* Clayden, Greeves, Organic Chemistry 2nd Ed.
* Secondary: Principles of Asymmetric Synthesis by Gawley, and Aube

Selections of primary journal literature will be provided.

1. **Learning and teaching methods**

Total contact hours: 33

Private study hours: 117

Total study hours: 150

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

Assignment 1 (4 pages, 10%)

Assignment 2 (4 pages, 15%)

Assignment 3 (4 pages, 15%)

Examination (60%)

13.2 Reassessment methods

Reassessment Instrument -100% exam

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* | *9.1* | *9.2* | *9.3* | *9.4* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| *Lectures*  | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| *Workshops* | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |
| *Assignments (x3)* | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| *Examination (3 hr)* | **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. All the students will be well versed in internationally recognised ‘language’ of 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.**

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| --- | --- | --- | --- | --- |
| 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