**SECTION 1: MODULE SPECIFICATIONS**

1. Title of the module

CH624 Transformations and Chirality in Organic Chemistry.

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

School of Physical Sciences.

1. Start date of the module

Academic year 2015-16

1. The number of students expected to take the module

25 (AY 2015-2016), 50 (AY 2016-2017), 70 (AY2017-2018)

1. Modules to be withdrawn on the introduction of this proposed module and consultation with other relevant Schools and Faculties regarding the withdrawal

None, this module is a new module introduced as part of the new Chemistry Programme launched in 2013-2014 academic year.

1. The level of the module (e.g. Certificate [C], Intermediate [I], Honours [H] or Postgraduate [M])

-Honours [H]

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

*15 (ECTS 7.5)*

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

Autumn Term and/or Spring Term

1. Prerequisite and co-requisite modules

CH309 CH382/PS381, and CH314 as prerequisite; CH506 as co-requisite

1. The programmes of study to which the module contributes

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

1. The intended subject specific learning outcomes

Knowledge and understanding of:

11.A1 Core and foundation scientific chemical, concepts, terminology, theory, and methods in relation to the chemical sciences.

11.A3 Areas of chemistry including properties of chemical elements, organic functional groups, physiochemical principles, organic and inorganic materials, and synthetic pathways.

11.A4 Appreciate developments at the forefront of some areas of chemical sciences.

Intellectual skills:

11.B1 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.

11.B2 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:

11.C3 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: Diels Alder, frontier orbital theory, Woodward Hoffman rules; classical heterocyclic synthesis: Fischer Indole, cytosine and pyridine; targeted synthesis of topical organic molecules: squalene and Cholesterol.

1. The intended generic learning outcomes:

12.D1 Communication skills, covering both written and oral communication.

12.D2 Generic skills needed for students to undertake further training of a professional nature.

12.D3 Problem-solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.

12.D8 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:

**Module Aim:** A key component to chemical education is the exposure to more advanced aspects of chirality, and chemical transformations towards the synthesis of simple 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. Comprehensive literature searching as a means to problem solving will be emphasised. These are topics relevant to the cohorts completing UoK’s Chemistry programmes. The aim of this module is to deliver advanced concepts of synthetic organic chemistry and the introduction of these concepts in the synthesis of complex organic molecules.

1. Indicative Reading List

Indicative Reading List:

(i) Primary: G. Solomons, Organic Chemistry 11th Ed.

(ii) Principles of Asymmetric Synthesis by Gawley, and Aube

(iii) Secondary: Clayden, Geeves, Organic Chemistry 2nd Ed.

(iv) selections of primary journal literature will be provided

1. Learning and Teaching Methods, including the nature and number of contact hours and the total study hours which will be expected of students, and how these relate to achievement of the intended module learning outcomes

*Learning and Teaching Methods:*

●24 lectures (24 hrs), 3 individual assignments in 3 workshop sessions (3 hrs each); total study hours: 150

●Lectures supported by assignments, personal study using textbooks, and primary literature (outcomes 11.A1, 11.A3, 11.A4, 12.D3)

●Lectures (gathering and ordering information), assignments and working-group sessions (problem solving and applying theory to complex series of transformations) (outcomes: 11.A1, 11.A3, 11.A4; 11.B1, 11.B2, 11.C3, 12.D1, 12.D2, 12.D3, 12.D8)

●working-group sessions, personal study using textbooks, web-based material and primary journal literature (outcomes: 11.A1, 11.A3, 11.A4; 11.B1, 11.B2, 11.C3, 12.D1, 12.D2, 12.D3, 12.D8)

1. Assessment methods.

Three Assignments (10%, 15%, 15%). Each assignment will comprise of two parts. Workshops will address particular problem solving approaches with a mandatory submission (part A), followed by a separate submission following the workshop (part B). Multiple assignments needed to ensure students can assimilate the feedback and adapt their assignments accordingly. Workshops and assignments address outcomes:11.A1, 11.A3, 11.A4; 11.B1, 11.B2, 11.C3, 12.D1, 12.D2, 12.D3, 12.D8.

Final examination (60%). Outcomes: 11.A1, 11.A3, 11.A4; 11.B1, 11.B2, 11.C3, 12.D3, 12.D8.

1. Implications for learning resources, including staff, library, IT and space

New module for the BSc Chemistry and BSc Forensic Chemistry programmes. However, due to the rather large new content some new Library, and IT will be required; budget is available. Staff time for delivering this module will be allocated in SPS workload allocation model, and covered by new staff appointments.

1. The School/Collaborative Partner (delete as applicable) recognises and has embedded the expectations of current disability equality legislation, and supports students with a declared disability or special educational need in its teaching. Within this module we will make reasonable adjustments wherever necessary, including additional or substitute materials, teaching modes or assessment methods for students who have declared and discussed their learning support needs. Arrangements for students with declared disabilities will be made on an individual basis, in consultation with the University’s/Collaborative Partner’s (delete as applicable) disability/dyslexia support service, and specialist support will be provided where needed.

All these modules require students to draw and recognise organic molecules. These tasks will prove very challenging if not impossible to visually impaired students - depending on the severity of their impairment. Appropriate resources may be required if this encountered.

1. Campus(es) where module will be delivered:

Canterbury

**SECTION 2: MODULE IS PART OF A PROGRAMME OF STUDY IN A UNIVERSITY SCHOOL**

**Statement by the School Director of Learning and Teaching/School Director of Graduate Studies (as appropriate):** "I confirm I have been consulted on the above module proposal and have given advice on the correct procedures and required content of module proposals"

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| ................................................................  Director of Learning and Teaching/Director of Graduate Studies (delete as applicable)  …………………………………………………  Print Name | ..............................................  Date |

**Statement by the Head of School:** "I confirm that the School has approved the introduction of the module and, where the module is proposed by School staff, will be responsible for its resourcing"

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| .................................................................  Head of School  …………………………………………………….  Print Name | ..............................................  Date |

**SECTION 3: MODULE IS PART OF A PROGRAMME IN A PARTNER COLLEGE OR VALIDATED INSTITUTION**

(Where the module is proposed by a Partner College/Validated Institution)

**Statement by the Nominated Officer of the College/Validated Institution** *(delete as applicable)***:** "I confirm that the College/Validated Institution*(delete as applicable)* has approved the introduction of the module and will be responsible for its resourcing"

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| .................................................................  Nominated Responsible Officer of Partner College/Validated Institution  ………………………………………………….  Print Name  …………………………………………………..  Post | ..............................................  Date |

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Partner College/Validated Institution

Module Specification Template  
Last updated February 2013