Confirmation that this version of the module specification has been approved by the School Learning and Teaching Committee:

……19th June 2015…………………………………………….

**MODULE SPECIFICATION**

1. **Title of the module**

CH309 Fundamental Organic Chemistry for Physical Scientists

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

School of Physical Sciences

1. **Start date of the module**

Existing module, next running in 2015-16.

1. **The number of students** expected to take the module

≈ 150

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 **Modules to be withdrawn** on the introduction of this proposed module and consultation with other relevant Schools and Faculties regarding the withdrawal

None. Existing module.

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

C

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

15 (7.5 ECTS)

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

Term 1

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

CH308 Molecules Matter & Energy, CH314 Introduction to Biochemistry and Drug Chemistry, PS381 Chemical Skills for Forensic Scientists OR CH382 Chemical Skills

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

Chemistry, Forensic Science, Forensic Chemistry (BSc, BSc with Foundation Year, BSc with Year in Industry, MSci., MChem.).

This is not available as a wild module

1. **The intended subject specific learning outcomes**

Where FS/FC corresponds to Forensic Science and Forensic Chemistry programme specifications and Chem corresponds to Chemistry programme specifications.

* 1. Knowledge and understanding of core and foundation scientific physical and chemical concepts, terminology, theory, units and conventions to chemistry and forensic science. FS/FC A1. Chem A1.
  2. Knowledge and understanding of areas of organic chemistry (organic functional groups, organic materials and compounds, synthetic pathways) as applied to chemistry and forensic science. FS/FC A3. Chem A3.
  3. An ability to demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to Chemistry and to apply such knowledge and understanding to the solution of qualitative and quantitative problems. FS/FC B1. Chem B5.
  4. An ability to recognise and analyse novel problems and plan strategies for their solution by the evaluation, interpretation and synthesis of scientific information and data. FS/FC B2. Chem B6.

1. **The intended generic learning outcomes**

Where FS/FC corrsponds to Forensic Science and Forensic Chemistry programme specifications and Chem corresponds to Chemistry programme specifications.

12.1 Problem-solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information. FS/FC D2. Chem D15.

12.2 Numeracy skills, including such aspects as correct use of units, significant figures, decimal places etc. FS/FC D3. Chem D16.

* 1. Information-retrieval skills, in relation to primary and secondary information sources, including information retrieval through on-line computer searches. FS/FC D4. Chem D17.
  2. 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. FS/FC D7. Chem D20.
  3. Study skills needed for continuing professional development and professional employment. FS/FC D9. Chem D21.

1. **A synopsis of the curriculum**

**Carbon:** the carbon atom, atomic and molecular orbitals, sp3 hybridisation, bonding, drawing/representation of organic compounds.

**Functional Groups:** overview of functional groups and names.

**Alkanes;** structure, nomenclature, physical properties, conformations, isomers, cyclic alkanes.

**Alkenes:** structure, nomenclature, physical properties, sp2 hybridisation, -bonding, E/Z-isomers, electrophilic addition reactions of alkenes.

**Alkynes:** structure, sp hybridisation, nomenclature, representative reactions.

**Organic reactions:** homolytic and heterolytic bond scission and bond formation, curly arrows, polar reactions, electrophilic addition to alkenes.

**Alkyl halides:** structure, nomenclature, physical properties, synthesis of alkyl halides, reactions of alkyl halides.

**Nucleophilic substitution reactions:** introduction to bimolecular nucleophilic substitution (SN2), unimolecular nucleophilic substitution (SN1) and elimination reactions (E1 and E2).

**Chirality:** stereoisomers, enantiomers, diastereoisomers, (R) and (S) notation and definition, properties of enantiomers.

**Aromatic compounds:** definition of aromatic, Huckel rule, delocalisation, aromatic vs non-aromatic rings, nomenclature, simple reactions.

**Aldehydes and ketones:** structure, nomenclature, representative reactions (oxidation, reduction reactions).

**Carboxylic Acids and Derivatives:** structure, nomenclature, representative reactions (oxidation, reduction reactions).

1. **Indicative Reading List**

**Compulsory text:**

*Fundamentals of organic chemistry* -7th edition. McMurry, John 2011

Book: Core text It is expected and necessary that you read this textbook as an accompaniment to all lecture notes and coursework for CH309.

*Fundamentals of organic chemistry* – 5th edition. McMurry, John 2003

Book: Core text SUITABLE. An older version of the above. Still valid and as useful.

**Recommended additional text for Chemistry and Forensic Chemistry students:**

*Organic chemistry* - Solomons, T. W. Graham, Fryhle, Craig B., Snyder, S. A. 2013

Book: Recommended Past editions (since 2000) of this text entirely SUITABLE. CH309 requires an accompanying textbook and the McMurry Funadmentals text (above) is entirely suitable. However Chemists and Forensic Chemists will be studying more advanced organic chemistry in 2nd, 3rd and 4th years and as a consequence it is advised that they use this textbook instead of or as well as the McMurry. It is a compulsory text for further studies.

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

24 hours of Lectures

10 hours of drop-in sessions/workshops

2 hours revision session

Total study hours 150

Achievement of learning outcomes:

* Lectures (11.1, 11.2, 11.3, 11.4, 12.1, 12.2)
* Workshops (11.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.5)
* Revision session (11.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.4, 12.5)
* Independent study (11.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.3, 12.4, 12.5)

1. **Assessment methods** and how these relate to testing achievement of the intended module learning outcomes

Coursework: 40%. 5 Assignments

Examination (Length 2 hours): 60%

The above assessments test students’ knowledge and understanding of concepts and theory (11.1, 11.2, 11.3) and application of techniques to analyse and solve problems (11.3, 11.4, 12.1, 12.2). In preparing for the assessments, students will need to manage their own time and revision using reference materials. (12.3, 12.4, 12.5)

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

None, existing module

1. The School 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 disability/dyslexia support service, and specialist support will be provided where needed.
2. **Campus** where module will be delivered:

Canterbury