1. **Title of the module**

LABS513 Introduction to Drug Synthesis

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

Centre for Higher and Degree Apprenticeships (CHDA)

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)**

Flexible delivery model

Autumn and/or Spring and/or Summer

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

N/A

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

FdSc and BSc (Hons) in Applied Chemical Sciences

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

8.1 Demonstrate a clear understanding of the reactions of key organic functional groups.

8.2 Appreciate the applications of common functional group transformations in the synthesis of complex molecules.

8.3 Appreciate the importance of selectivity (chemo-, regio- and stereo-) in the synthesis of complex molecules.

8.4 Design a synthetic route to a simple drug target.

8.5 Appreciate the similarities and differences in small scale (laboratory) and large scale (plant) reactions for drug synthesis.

8.6 Discuss the importance of ‘green chemistry’ considerations during drug manufacture.

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

9.1 Demonstrate the development of practical/technical skills

9.2 Analyse, evaluate and correctly interpret data

9.3 Communicate and present data effectively

9.4 Obtain and use information from a variety of sources as part of self-directed learning.

9.5 Manage their time and use their organisation skills within the context of self-directed learning.

1. **A synopsis of the curriculum**

Introduction to key organic functional groups; revision of previous modules.

Concepts of chemo-, regio-, and stereoselectivity in synthesis.

Introduction to protecting groups

Survey of key functional group transformations, illustrated with examples from the pharmaceutical industry.

Focus on carbonyl chemistry, enolate chemistry and aromatic & heteroaromatic chemistry.

From the laboratory to the factory; green chemisty.

Examples of drug synthesis in action: case studies of drug discovery from discovery to manufacture.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Clayden, J., Greeves, N., and Warren, S. (2012) Organic Chemistry. Oxford University Press: New York.

Stoker, H.S. (2015) General, Organic, and Biological Chemistry (7th ed.). Cengage: Boston.

Neal, M.J. (2012) Medical Pharmacology at a Glance (6th ed.). Wiley-Blackwell: Hoboken New Jersey.

Li, J.J., Johnson, D.S., Sliskovic, D.R., et al. (2004) Contemporary Drug Synthesis. Wiley: Hoboken, New Jersey.

Li, J.J. (2013) Heterocyclic Chemistry in Drug Discovery. Wiley-Blackwell: Hoboken, New Jersey.

1. **Learning and teaching methods**

Blended Distance learning:

Contact Hours: 120

Private Study Hours: 30

Total Study Hours: 150

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

2 assignments 20% (10% each)

Portfolio 30% - composed of individual assignments where topics are applied to the workplace

2 hr Exam 50% - composed of MCQs (20%) and standard-length questions (30%)

The pass mark for each individual assessment is 40%.  All assessments must be passed in order to pass the module.

13.2 Reassessment methods

Like for Like

1. ***Module learning outcomes (sections 8 & 9) to learning and teaching methods (sectin2) and methods of assessment (section 13)***

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 8.6 | 8.7 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Teaching** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Work-based experience |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |  |
| Portfolio |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** |
| Assignments | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| MCQ | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |  | **x** |
| Examination | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |  | **x** |

1. **Inclusive module design**

The School/Collaborative Partner *(delete as applicable)* 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**

Blended distance learning – delivered from Medway and Canterbury campus

1. **Internationalisation**

International vocation is an important part of Applied Chemical Science. With regards to the intended learning outcomes, in particular 8.4, 8.5 and 8.6, the target learning outcomes within this module are applicable worldwide as part of the universal principles and techniques used in the Pharmaceutics R&D Industry. With regard to subject content, the material within the syllabus is applied to a range of international contexts.

**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 delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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