

# CH3H5-15 Designing and Making Functional Organic Molecules

**26/27**

**Department**

Chemistry

**Level**

Undergraduate Level 3

**Module leader**

Paul Wilson

**Credit value**

15

**Module duration**

5 weeks

**Assessment**

20% coursework, 80% exam

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

This module builds on core concepts covered in Year 1 and Year 2 to understand more advanced organic reactions, expanding the synthetic chemistry toolbox and enabling complex design principles, with reference to retrosynthetic analysis, for the synthesis of functional organic molecules to be understood.

### Module aims

By the end of the module, students should be able to use their knowledge to devise syntheses of complex organic molecules.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module is split into 4 coherent topics (A-D) that will be delivered via traditional lecture delivery.  
Topic A: Pericyclic and cyclisation reactions

Topic B. Reactive intermediates

Topic C. Diastereoselective synthesis

Topic D. Asymmetric reactions and atropisomerism

This content will be consolidated by supporting workshops in which a retrosynthetic approach (Topic E) to the chemistry covered will be taken.

## Learning outcomes

By the end of the module, students should be able to:

- Predict and explain the outcomes of a range of pericyclic, radical and polar cyclisation reactions.
- Understand and apply reactive intermediates in synthesis.
- Understand, explain and predict the stereochemical outcome of diastereoselective reactions of chiral molecules including the synthesis, use and removal of chiral auxiliaries
- Understand and apply a range of catalytic asymmetric reactions to complex targets.
- Critically analyse the synthesis of complex known molecules understanding and understand why commercial routes are chosen.

## Indicative reading list

[Reading lists can be found in Talis](#)

## Subject specific skills

Ability to develop strategies, via retrosynthetic analysis, for the synthesis of functional organic molecules.

## Transferable skills

Communication

Critical Thinking

Digital Literacy

Information Literacy

Problem Solving

Professionalism

Sustainability

Teamwork

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## Study

## Study time

| Type              | Required                    |
|-------------------|-----------------------------|
| Lectures          | 21 sessions of 1 hour (14%) |
| Practical classes | 4 sessions of 1 hour (3%)   |
| Private study     | 125 hours (83%)             |
| Total             | 150 hours                   |

## Private study description

N/A

## Costs

No further costs have been identified for this module.

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## Assessment

You do not need to pass all assessment components to pass the module.

### Assessment group D

| Assessment component   | Weighting | Study time | Eligible for self-certification |
|--|-----------|------------|---------------------------------|
| Individual Poster  | 20%       | 30 hours   | Yes (extension)                 |
| <p>Students to engage with the scientific databases in open ended research. Students will produce a poster presenting a detailed and quantitative case study of a functional organic molecule in the market / clinic (e.g. drug or other speciality chemical). The synthesis and/or scale up of the molecule(s) presented in the case study should include chemistry covered in this module. This can/will also be able to reference chemistry from Year 1 and Year 2 content. The poster will be submitted online and marked (10 mins per poster, see duration below) by the academics delivering the module.</p> |           |            |                                 |
| <p>Reassessment component is the same</p>  |           |            |                                 |
| Centrally-timetabled examination (On-campus)   | 80%       |            | No                              |

|                     | <b>Weighting</b> | <b>Study time</b> | <b>Eligible for self-certification</b> |
|---------------------|------------------|-------------------|--|
| Written examination |                  |                   |  |

- Answerbook Pink (12 page)
- Students may use a calculator
- Periodic Tables

Reassessment component is the same

### Feedback on assessment

Cohort-level examination feedback and individual written feedback provided to students via Moodle.

[Past exam papers for CH3H5](#)

## Availability

### Courses

This module is Option list C for:

- UCHA-4 Undergraduate Chemistry (with Intercalated Year) Variants
  - Year 4 of F101 Chemistry (with Intercalated Year)
  - Year 4 of F122 Chemistry with Medicinal Chemistry (with Intercalated Year)
- UCHA-3 Undergraduate Chemistry 3 Year Variants
  - Year 3 of F100 Chemistry
  - Year 3 of F121 Chemistry with Medicinal Chemistry
- Year 3 of UCHA-F110 Undergraduate Master of Chemistry (with Industrial Placement)
- Year 4 of UCHA-F107 Undergraduate Master of Chemistry (with Intercalated Year)
- UCHA-F109 Undergraduate Master of Chemistry (with International Placement)
  - Year 3 of F109 MChem Chemistry (with International Placement)
  - Year 3 of F111 MChem Chemistry with Medicinal Chemistry (with International Placement)
- UCHA-4M Undergraduate Master of Chemistry Variants
  - Year 3 of F100 Chemistry
  - Year 3 of F105 Chemistry
  - Year 3 of F109 MChem Chemistry (with International Placement)
  - Year 3 of F125 MChem Chemistry with Medicinal Chemistry
- Year 4 of UCHA-F127 Undergraduate Master of Chemistry with Medicinal Chemistry (with Intercalated Year)