

# CH404-15 Synthetic Chemistry III (Macromolecular Chemistry)

**23/24**

**Department**

Chemistry

**Level**

Undergraduate Level 4

**Module leader**

Sebastien Perrier

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

20% coursework, 80% exam

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

N/A

[Module web page](#)

### Module aims

This module is designed to develop student awareness of current problems and directions in the forefront of Macromolecular chemistry and aspects of how Macromolecules are involved in Supramolecular assembly and aggregation. Participants will have the opportunity to evaluate critically selected current research in this area. The course is designed to allow students to be original in the application of their knowledge to the solution of, research-based problems

This will be achieved by a range of teaching methods including directed reading and set exercises. Students will be expected to undertake a significant amount of student-centred learning around the subject which will be directed appropriately during the 10 academic contact hours with the whole class.

An additional contact hour a week will be set aside (as bookable) so that students who have

concerns with directed reading and student centred learning can discuss their problems with an academic on a one to one or group basis.

Depending on the level and importance of contemporary research evident at the time, and also on the particular research interests of staff members, two or more of the following areas will be addressed; new controlled polymer synthetic methods, heterogeneous polymerisation chemistry and supramolecular assembly of polymers.

Students will be expected to demonstrate their abilities by critical evaluation of recent published material in one of the areas of study. This will be achieved the submission of a written report. Students will also undertake a written examination, which will test both their critical thinking around the subject as well as their ability to apply their knowledge to original problems.

## **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.

By definition this module will focus on very recent research in the areas of study. The specific examples used may differ on a year to year basis.

### **Syllabus**

A compulsory set of 10 classes will be used to discuss material in two of the following areas.

New controlled polymer synthetic methods (5 contact hours)

- a) Adaptation of living polymerisation for advanced applications
- b) Responsive polymers (thermal, pH, etc)
- c) Post-polymerisation modification
- d) Polymers in therapeutics
- e) Classic case studies

Degradable and Sustainable Polymers (5 contact hours)

- a) Polymers from renewable resources
- b) Functional degradable polymers by ring-opening polymerization
- c) Degradable polymers in tissue engineering
- d) Classic case studies

Polymer Architectures (5 contact hours)

- a) Star-shaped and hyperbranched polymers
- b) Graft or comb-shaped polymers
- c) Dendrimers
- d) Classic case studies

Supramolecular Assembly of Polymers (5 Contact hours)

- a) Methods for poly(peptide) synthesis
- b) Secondary and tertiary structure of poly(peptide)s
- c) Biologically-inspired self-assembly of macromolecules
- d) Classic case studies

These classes will involve introductory 'lecture'/seminars, and problem classes

An additional contact hour a week will be set aside (as bookable) so that students who have

concerns with directed reading and student-centred learning can discuss their problems with an academic on a one to one or group basis.

## **Learning outcomes**

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

- Understand and be aware of current research and problems in the areas of polymer synthetic methods and supramolecular assembly of polymers.
- Use their knowledge to critically evaluate recent research work in any of the areas of study To be able to disseminate that knowledge by the preparation of a CONCISE written report. (A concise report will test the student's ability for communicating/abstracting only the MOST relevant material).
- Show originality in application of their knowledge to solving problems in the three areas of study.
- Use IT to prepare a written report .

## **Indicative reading list**

As this is a research module, much of the recommended and essential reading will be recently published research articles and thus may change over the years.

However, essential texts and primary material that will be required for directed reading:

Macromolecular

Chemical Reviews December 2001, 101(issue 12)

Polymer Synthesis P Rempp and E W Merrill, Huthig & Wepf

Polymer Chemistry G Odian

Polymer Chemistry Himenz

## **Research element**

e.g. essay, dissertation, individual or group research, research skills activity, etc.

## **Subject specific skills**

Critical thinking

Written communication

Independence and initiative

## **Transferable skills**

Critical thinking

Written communication

Independence and initiative

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## **Study**

## Study time

Type	Required
Lectures	10 sessions of 1 hour (7%)
Private study	140 hours (93%)
Total	150 hours

## Private study description

Self study

## Other activity description

Bookable contact hours

## 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.

Students can register for this module without taking any assessment.

## Assessment group D4

	Weighting	Study time
A short review of three papers from an author in the area of this module published in the last 6 years.	20%	
In-person Examination	80%	
<ul style="list-style-type: none"><li>• Answerbook Pink (12 page)</li><li>• Graph paper</li><li>• Periodic Tables</li><li>• Students may use a calculator</li></ul>		

## Feedback on assessment

Assessed work feedback (summative and formative) provided on marksheets returned to the students. Cohort level examination feedback provided via Moodle.

## Availability

### Pre-requisites

To take this module, you must have passed:

- All of
  - [CH272-15 Materials and Polymers](#)
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  - [CH272-15 Materials and Polymers](#)

### Courses

This module is Optional for:

- Year 1 of TCHA-F1PB MSc in Chemistry with Scientific Writing
- TCHA-F1PE Postgraduate Taught Scientific Research and Communication
  - Year 1 of F1PE Scientific Research and Communication
  - Year 2 of F1PE Scientific Research and Communication
- UCHA-F110 Undergraduate Master of Chemistry (with Industrial Placement)
  - Year 4 of F110 MChem Chemistry (with Industrial Placement)
  - Year 4 of F112 MChem Chemistry with Medicinal Chemistry with Industrial Placement
- Year 5 of UCHA-F107 Undergraduate Master of Chemistry (with Intercalated Year)
- UCHA-F109 Undergraduate Master of Chemistry (with International Placement)
  - Year 4 of F109 MChem Chemistry (with International Placement)
  - Year 4 of F111 MChem Chemistry with Medicinal Chemistry (with International Placement)
- UCHA-4M Undergraduate Master of Chemistry Variants
  - Year 4 of F105 Chemistry
  - Year 4 of F110 MChem Chemistry (with Industrial Placement)
  - Year 4 of F109 MChem Chemistry (with International Placement)
  - Year 4 of F126 MChem Chemistry with Med Chem (with Prof Exp)
  - Year 4 of F125 MChem Chemistry with Medicinal Chemistry
  - Year 4 of F106 MChem Chemistry with Professional Experience
- Year 5 of UCHA-F127 Undergraduate Master of Chemistry with Medicinal Chemistry (with Intercalated Year)