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UNIVERSITY of York

Bioinspired Chemistry - CHE00033M

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- **Department:** Chemistry
- **Module co-ordinator:** Prof. Paul Walton
- **Credit value:** 10 credits
- **Credit level:** M
- **Academic year of delivery:** 2020-21
 - See module specification for other years: [2019-20](#)

Module will run

Occurrence

A

Teaching cycle

Spring Term 2020-21 to Summer Term 2020-21

Module aims

This module explores the way in which biology is increasingly inspiring the design of new chemical systems and materials. Apart from the inherent fascination of discovering how biological systems work, we can also learn about the circumstances under which things can go wrong, and—in the longer term—hope to improve on nature. This module provides an overview of how chemists attempt to model the high efficiency of nature's catalysts (enzymes) – in particular focussing on 'difficult' reactions. The course also indicates how biology can be used as a source of inspiration in materials science, and how using biology as inspiration may also lead to 'greener' chemical products based on renewable, biologically compatible resources.

Module learning outcomes

- to have an appreciation of the synthesis and characterisation of models of enzyme active sites
- to gain an insight into applications of biomimetic systems in green chemical technology and materials science
- to understand the basis of biomimicry

Module content

Bioinorganic Model Complexes I, 6 lectures, PHW

Principles of inorganic models; reasons for models. Models of haemoglobin and myoglobin. Other O₂-transport proteins: haemocyanin, haemerthyrin. Copper oxidases for cellulose degradation.

Bioinorganic Model Complexes II, 6 lectures, AKDK

Bioinorganic Organometallic Chemistry. Artificial metalloenzymes.

Molybdenum and Iron enzymes, 6 lectures, AP

Examples of mononuclear Mo/W enzymes, incl nitrate reductase, aldehyde oxidase, xanthine oxidase. Hydrogenases (how biology handles hydrogen). Models of nitrogenase.

Enzyme Kinetics of Metalloenzymes, 1 x 2h unassessed workshop, AP

Assessment

Task	Length	% of module mark
24 hour open exam Bioinspired Chemistry	N/A	70
Practical Assessed Workshop: Bioinorganic model complexes	2 hours	30

Special assessment rules

None

Additional assessment information

Comprehension questions on scientific paper (unseen in advance of the workshop). Topic of assessment, material from the PHW course.

Closed examination. Answer two compulsory 20-mark questions. Topics of exam questions, material from AKDK and AP courses.

Reassessment

Task	Length	% of module mark
24 hour open exam Bioinspired Chemistry	N/A	70
Practical Assessed Workshop: Bioinorganic model complexes	2 hours	30

Module feedback

Written and/or oral feedback for workshops will be given either during the sessions or within a week.

Closed exam results with per-question breakdown are returned to the students via supervisors within 5 weeks (as per special approval by the University Teaching Committee). Outline answers are made available via the Chemistry web pages when the students receive their marks, so that they can assess their own detailed progress/achievement. The examiners' reports for each question are made available to the students via the Chemistry web pages.

Indicative reading

This is a research-led course so up-to-date scientific publications will form the majority of the reading

The information on this page is indicative of the module that is currently on offer. The University is constantly exploring ways to enhance and improve its degree programmes and therefore reserves the right to make variations to the content and method of delivery of modules, and to discontinue modules, if such action is reasonably considered to be necessary by the University. Where appropriate, the University will notify and consult with affected students in advance about any changes that are required in line with the University's policy on the [Approval of Modifications to Existing Taught Programmes of Study](#).

Coronavirus (COVID-19): changes to courses

10/9/2020

The 2020/21 academic year will start in September. We aim to deliver as much face-to-face teaching as we can, supported by high quality online alternatives where we must.

Find details of the measures we're planning to protect our community.

[Course changes for new students](#)