

# HR308-15 Extreme Environmental Biology

**21/22**

**Department**

Life Sciences

**Level**

Undergraduate Level 3

**Module leader**

Jose Gutierrez-Marcos

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

The aim of this module is to enable students to make the transition from textbook driven learning to cutting edge science represented in primary literature. This will be achieved in a fast evolving, highly topical subject, which is extreme biology. The subject is notable for integrating all levels of biological organisation.

### Module aims

More specifically the module aims to impart knowledge in two key areas. The first is knowledge of the way organisms have adapted to rapidly changing environments. This rapidly growing area of understanding is shedding light into many areas of biology, such as cell biology, disease, biotechnology and synthetic biology. Within this context, we consider how organisms have taken advantage of genetic and epigenetic variation to rapidly adapt to extreme environments. Secondly, the student will consider several examples of very complex biological processes, whose molecular basis may be currently unknown, and discover how experimental analysis can provide insight into these complex processes. By analysing experimental data, the student will be able to obtain and expand cutting edge information in a highly topical and fast evolving subject such as extreme environment biology.

## 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.

1. Adaptation to extreme environments- basic concepts (Dr. J. F. Gutierrez-Marcos).
- 2-4. How extreme environment drives evolution (Dr. R. G. Allaby).
- 5-7. How to survive in extreme temperatures (Dr. J. F. Gutierrez-Marcos).
- 8-9. How to live in a water-limited environment (Dr. J. F. Gutierrez-Marcos).
- 10-11. Living under extreme atmospheric conditions (Dr. J. F. Gutierrez-Marcos).
- 12-13. Extreme viruses and parasites (Dr. J. F. Gutierrez-Marcos).
- 14-16. Pollutants- how to survive in a toxic environment (Dr. J. F. Gutierrez-Marcos).
- 17-18. Searching for life in outer space (Dr. J. F. Gutierrez-Marcos).
- 19-20. From extreme biology to synthetic biology (Dr. J. F. Gutierrez-Marcos).

## Learning outcomes

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

- The module progresses from a series of lectures covering topical areas of extreme environmental biology. Students should be able to have developed skills in rapidly acquiring knowledge from complex areas of primary research literature and assembling it into reviews or seminar presentations.

## Subject specific skills

- a. Demonstrate clear understanding of the scientific topic
- b. Contain evidence of extended reading and lateral integration of material not covered in the lectures
- c. Demonstrate independent thought and deep understanding
- d. Specifically answer the set question using information from multiple lectures and sources
- e. Be structured and formatted in a way that demonstrates understanding and logical flow
- f. Use multiple sources to construct complex scientific arguments and integrating these to build and develop the student's own scientific conclusions.

## Transferable skills

1. Critical appraisal of source material
  2. Self directed learning
  3. Adult learning
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# Study

## Study time

| Type          | Required                    |
|---------------|-----------------------------|
| Lectures      | 20 sessions of 1 hour (12%) |
| Private study | 130 hours (76%)             |
| Assessment    | 20 hours (12%)              |
| Total         | 170 hours                   |

## Private study description

130 hrs of self-study and directed reading to prepare for the open book assessment

## Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

## Assessment group A

|  | Weighting | Study time | Eligible for self-certification |
|--|-----------|------------|---------------------------------|
|--|-----------|------------|---------------------------------|

### Assessment component

|                      |      |          |    |
|----------------------|------|----------|----|
| Open Book Assessment | 100% | 20 hours | No |
|----------------------|------|----------|----|

Final assessment for the module will be on open book assessment. This is an essay based assessment consisting of 4 questions- students need to answer 2. The essays cannot be answered using lecture notes alone- students will need to perform background research and essays will need to be fully referenced.

Reassessment component is the same

## Feedback on assessment

## Availability

### Courses

This module is Core optional for:

- Year 3 of UIPA-C1L8 Undergraduate Life Sciences and Global Sustainable Development

This module is Optional for:

- Year 3 of UBSA-C700 Undergraduate Biochemistry
- ULFA-C1A2 Undergraduate Biochemistry (MBio)
  - Year 3 of C1A2 Biochemistry
  - Year 3 of C700 Biochemistry
- Year 4 of ULFA-C702 Undergraduate Biochemistry (with Placement Year)
- Year 3 of ULFA-C1A6 Undergraduate Biochemistry with Industrial Placement (MBio)
- Year 3 of UBSA-3 Undergraduate Biological Sciences
- Year 3 of ULFA-C1A1 Undergraduate Biological Sciences (MBio)
- Year 4 of ULFA-C113 Undergraduate Biological Sciences (with Placement Year)
- Year 3 of ULFA-C1A5 Undergraduate Biological Sciences with Industrial Placement (MBio)
- Year 3 of UBSA-C1B9 Undergraduate Biomedical Science
- ULFA-C1A3 Undergraduate Biomedical Science (MBio)
  - Year 3 of C1A3 Biomedical Science
  - Year 3 of C1B9 Biomedical Science
- Year 3 of ULFA-C1A7 Undergraduate Biomedical Science with Industrial Placement (MBio)
- Year 4 of ULFA-CB18 Undergraduate Biomedical Science with Placement Year
- Year 3 of ULFA-B140 Undergraduate Neuroscience (BSc)
- Year 3 of ULFA-B142 Undergraduate Neuroscience (MBio)
- Year 3 of ULFA-B143 Undergraduate Neuroscience (with Industrial Placement) (MBio)