

Module Specification

Module Title Module Code
Credit Value Level Mode of Delivery Semester B

| Pre-requisite modules | Co-requisite modules | Overlapping modules |
|-----------------------|----------------------|---------------------|
| | | |

1) Content Description

Provide a description of the module, as it will appear in the Module Directory and on the Student Information System (approx. 70-80 words).

The diversity of microbial metabolisms. Bacterial growth and replication, including organization and division of the chromosome, growth yield and response to temperature and nutrient availability. Photolithotrophy, photoorganotrophy, chemolithotrophy and chemoorganotrophy. Fermentation and anaerobic respiration. Nitrogen transformations by microorganisms in free-living and mutualistic settings. Microbiological standards in clean water processing and waste water treatment. Lectures will be supplemented by a practical course to be held in Semester B, weeks 9 and 11. Themes for the practical course will be the creation of laboratory microcosms, microbial photosynthesis and nitrogen and sulphur transformations in sediments.

2) Module Aims

Specify the aims of the module, i.e. the broad educational purposes for offering this module.

To review and clarify the diverse and connected transformations of C, S and N by microorganisms and to understand their significance in the contexts of growth, energy acquisition, redox balance, biogeochemical cycles and the human economy. The character and measurement of bacterial growth and replication will be described, with an emphasis on the variety of metabolic pathways available to bacteria, and consideration of their importance in industry and agriculture.

3) Learning Outcomes

Identify the learning outcomes for this module, i.e. knowledge, skills and attributes to be developed through completion of this module. Outcomes should be referenced to the relevant [QAA benchmark statements](#) and the [Framework for Higher Education Qualifications in England, Wales and Northern Ireland \(2008\)](#). The [SEEC Credit Level Descriptors for Further and Higher Education 2003](#) and [Queen Mary Statement of Graduate Attributes](#) should also be used as a guiding framework for curriculum design.

| Academic Content: | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A 1 | Understanding of the roles of C and N, and other major and minor nutrients, in the growth of archaea, bacteria and fungi, and how they are supplied, sequestered and stored |
| A 2 | Understanding of the sources and methods of utilisation of energy by archaea and bacteria, distinguishing between the major modes of phototrophic and chemotrophic life-styles, and to be able to write appropriate summary equations |
| A 3 | To be able to distinguish between electron transport and substrate-level phosphorylation as mechanisms of energy conservation, and to present examples of each |
| A 4 | To be able to describe and interpret the bacterial cell cycle and its responses to temperature and nutrient availability |

Disciplinary skills - able to:

| | |
|----|------------------------------------------------------------------------------------------------------------------|
| B1 | To discuss in essays the modes of growth of microorganisms |
| B2 | To define by equation, and give descriptive examples of specific N and S transformations by named microorganisms |
| B3 | To be able to demonstrate basic practical skills in characterising microbially-mediated reactions. |

Attributes:

| | |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C1 | To understand and practice the principles of safety in laboratories handling microorganisms |
| C2 | To gain confidence in the manipulation of microorganisms, and the use of equipment for monitoring microbial metabolism and to design and create laboratory microcosms. |

4) Reading List

Provide an indicative reading list for the module. This should include key texts and/or journals but **should not** be an exhaustive list of materials.

Madigan, Martinko, Parker 2005 Brock: Biology of Microorganisms (11th edn) Prentice-Hall.

5) Teaching and Learning Profile

Provide details of the method of delivery (lectures, seminars, fieldwork, practical classes, etc.) used to enable the achievement of learning outcomes and an indicative number of hours for each activity to give an overall picture of the workload a student taking the module would be expected to undertake. This information will form the Key Information Set for each undergraduate programme and will be used to populate the KIS widget found on the QMUL programme information pages. More information can be found [online](#) about KIS. You may also wish to refer to the [QAA guidance on contact hours](#) when completing this section.

| Activity Type | KIS Category | Time Spent (in hours) |
|---------------|--------------|-----------------------|
| Lectures | Scheduled | 22 |
| Workshops | Scheduled | 12 |
| Total | | 34 |

Specify the total module notional study hours. This should be a total of the hours given for each activity. The notional study hours for each academic credit point is 10. A 15 credit point module therefore represents 150 notional study hours.

| Activity Type | Total Time Spent (in hours) | Percentage of Time Spent |
|---------------------------------|-----------------------------|--------------------------|
| Scheduled learning and teaching | 34 | 22.7 |
| Placement | 0 | 0 |
| Independent Study | 116 | 77.3 |
| Total | 150 | 100 |

Use the information provided in the box above to specify the total time spent and the percentage time spent in each category of teaching and learning activity.

6) Assessment Profile

Provide details of the assessment methods used to assess the achievement of learning outcomes.

| Description of Assessment | Assessment Type | KIS Category | Duration/Length | Percentage Weighting | Final element of assessment | Qualifying Mark |
|---------------------------|--------------------|--------------|------------------------|----------------------|-----------------------------|-----------------|
| Examination | Exam | Exam | 2 Hours and 30 Minutes | 75% | Yes | |
| Coursework | Written assignment | Coursework | | 25% | No | |

Final element of assessment: The assessment that takes place last. **There should normally be only one element of assessment marked as final unless two assessment or submission dates occur on the same day.**

Qualifying mark: A specified minimum mark that must be obtained in one or more elements of assessment in order to pass a module. **This is in addition to, and distinct from, the requirement to achieve a pass in the module mark to pass the module.**

Reassessment

Provide details of the reassessment methods used, specifying whether reassessment is either standard reassessment or synoptic reassessment.

- Standard Reassessment
 Synoptic Reassessment

| Synoptic reassessment details (if you have indicated synoptic reassessment above, please give details) | | |
|--------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------|
| Brief Description of Assessment | Assessment Type | Duration/Length of Examination/ Coursework |
| Resit Examination | Examination | 2 Hours and 30 Minutes |