mar500 - Physiology and diversity of microorganisms

Module label: Physiology and diversity of microorganisms
Module code: mar500
Credit points: 12.0 KP
Workload: 360 h
Used in course of study: Master's Programme Microbiology > Mastermodule

Module responsibility
- Heribert Cypionka

Authorized examiners
- Alle hier genannten

Module counseling
- Lehrende der Mikrobiologie

Entry requirements
none

Skills to be acquired in this module
The students know the cells of pro- and eukaryotes. They understand the basic mechanisms of microbial metabolism. They know the physiological and phylogenetic groups of prokaryotes, eukaryotic microorganisms and viruses. They have an overview over applied aspects of microbiology.

Module contents
Lecture + Exercises: Physiology and Life modes of Prokaryotes: Cellular and subcellular organization, assimilation and dissimilation, energy metabolism, transport, microbial growth, respiration, chemiosmotic theory, fermentation, anaerobic respiration, lithotrophy, photosynthesis, prokaryotic diversity, systematics and taxonomy, Archaea, Bacteria, Eukarya, pathogenic prokaryotes, evolution, microbiological techniques

Lecture + Exercises: Microbial Diversity The eukaryotic cell, diversity, systematics and taxonomy of prokaryotes and eukaryotic microorganisms, algae, protozoa, fungi, slime molds, phagocytosis, symbioses, pathogenic eukaryotes, diversity of eukaryotic microbes, components of viruses, virus reproduction, bacteriophages, diversity of viruses, virus diseases

Broadening lectures, one out of the following lectures:
- Biological significance of suspended matter
- Sediment Microbiology

This lecture presents state of the art knowledge about occurrence, life and activities of microorganisms in these environments. Physiological issues are addressed as well as evolutionary and applied aspects. Topics are:

- Formation, diagenesis and special features of sediments
- physico-chemical conditions and geological records
- interpretation of gradients
- microbes and biological processes in sediments
- methods for cultivation of sediment organisms
- molecular methods
- biogeochemical methods
- quantification of prokaryotes and viruses

(Teacher: Cypionka, Engelen, Vandieken; Form of study/semester periods per week: 4 week block, 2 lectures per week, Presence: 16 hours, private study: 74 hours; Credits: 3; 2nd Semester, Learning target/competences: Physico-chemical conditions, microbial processes and methods of studying these processes in sediments)

Broadening Seminar: Scientific writing and presentation
The students know the importance and structure of scientific publications. They have learned to critically read those, and know the requirements of different parts. They are trained to to give oral presentations and know how to produce scientific reports and posters. They know how to use the library and how to find relevant literature on the internet, and how to use data banks like Endnote.
They have learned how to present themselves for an application.

Seminar Scientific writing and presentation:
- Types and relevance of scientific publications
- Parts of scientific publications step by step:
  - Abstract, Introduction, Results, Discussion
  - University facilities for literature search
- Oral presentation
- How to prepare posters
- Tips for using PowerPoint, Word and Endnote
- Job application
  (Courses: Seminar (2 SPPW, 3 CP); Teachers: Cypionka, Engelen, Vandieken; Work load:
  Presence: 30 hours, private study: 60 hours; Passing criteria: Oral presentation or discussion of
  parts of scientific papers )
- alternative lectures of the MSc MUWi or Biology program (see current online schedule)
  Excursions to companies and scientific institutions

Reader’s advisory
Brock. Microbiology

Links

Language of instruction
English

Duration (semesters)
2 Semester

Module frequency
jährlich

Module capacity
unlimited

Modullevel
MM (Mastermodul)

Modulart
Pflicht

Lern-/Lehrform / Type of program
Lecture + Exercises: Physiology and life modes of prokaryotes (2 + 1 semester periods per week [SPPW], 3 CP)
Lecture + Exercises : Microbial Diversity (2 +1 SPPW, 3 CP)
1 broadening lecture or seminar (Biological significance of suspended matter / Sediment microbiology / Broadening Seminar: Scientific writing and presentation) (2 SPPW, 3 CP)
Microbiological + ICBM Colloquium (2 CP)
Excursions (1 CP)

Vorkenntnisse / Previous knowledge

Examination
Time of examination
Type of examination
Final exam of module
Two written tests about the contents of the lectures ‘Physiology and life modes of prokaryotes’ and Microbial Diversity.
At least 50 % of the reachable points in written tests about the two lectures mentioned above.

Course type
Comment
SWS
Frequency
Workload attendance
Lecture
6.00
84 h
Exercises
2.00
28 h
Study trip
1.00
14 h
Total time of attendance for the module
126 h