mar580 - Profile Module Microbial ecology of marine sediments

<table>
<thead>
<tr>
<th>Module label</th>
<th>Profile Module Microbial ecology of marine sediments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>mar580</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master's Programme Microbiology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Bert Engelen</td>
</tr>
</tbody>
</table>

Entry requirements
Lecture: Microbial ecology
The students know how to
- sample marine sediments
- characterize the cores sedimentologically and biogeochemically
- collect and analyze porewater
- determine total cell counts
- quantify groups of organisms molecular biologically
- cultivate different physiological groups of bacteria
- present and discuss scientific results
- write a scientific protocol

Skills to be acquired in this module

**Module contents**
Microbial ecology of marine sediments: The physiological diversity of microorganisms and their spatial distribution within marine sediments are demonstrated according to chemical and physical parameters. Different physiological groups are analysed along the sediment column of intertidal sandflat or beach. Sediment sampling is performed at the back barrier area of the island 'Spiekeroog' at the beginning of the course.

Oxygen penetration, porewater sulfate and methane concentrations are measured down to a depth of app. 5 meters. As microbiological parameters, total cell numbers are counted and the numbers of archaea and bacteria are calculated after quantitative PCR (qPCR). More specifically, the relative amounts of sulfate reducers and methanogens are also determined by qPCR targeting key-genes for sulfate reduction and methanogenesis. Furthermore, every single group of students will specifically enrich one physiological type of microorganisms from distinctive sediment layers. Microbial growth and activity are monitored over the whole period of the course.

Accompanying the course, all participants will give a talk to introduce 'their' physiological group concerning its ecology, physiology, and strategies for a specific enrichment. All the data and observations of the single groups will be combined at the end of the course to draw an overall picture of microbial diversity and the occurrence of the different physiological groups corresponding to relevant geochemical gradients.

**Reader's advisory**

**Links**
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Reference text: 6 CP | SE; PR | 2. FS | Engelen
- Modullevel: MM (Mastermodul)
- Modulart: Wahlpflicht
- Lern-/Lehrform / Type of program: Seminar (2 CP, 1SPPW ), practical course (4 CP, 4 SPPW)

**Vorkenntnisse / Previous knowledge**
Block course, 2 weeks, seminar and laboratory work

**Examination**
- Final exam of module: One assessment of examination: Portfolio (seminar presentation, written protocol)
- Protocol (100 %), seminar presentation (no mark). Active participation (Active and documented participation in practical courses (labs, exercises, seminars, field trips) and
courses. These include e.g. the delivery of exercises, writing a lab report or seminar presentations according to the advice of the course supervisor.)

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>1.00</td>
<td></td>
<td>14 h</td>
</tr>
<tr>
<td>Practical</td>
<td></td>
<td>4.00</td>
<td></td>
<td>56 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module**: 70 h