

MSc MODULE

Metal Contaminants – Metals in the Ocean

INTERDISCIPLINARY COURSE ON HEAVY METAL CONTAMINANTS IN THE MARINE ENVIRONMENT.

LEARN ABOUT

- Biogeochemical cycling of metals.
- Environment management strategies, and policy.
- Effects of climate change on heavy metals.
- Effects of both current and future ocean activities, interventions, and solutions.
- Analytical techniques.
- Risk assessment, management strategies, and policy.



DELIVERY:

a blend of online lectures by international experts and hybrid applied learning seminars.

DATES: 15 October- 17 December, 2024.

Registration



CAU



SeaEU



Kiel University
Christian-Albrechts-Universität zu Kiel



GEOMAR

Module Name	Metal Contaminants – Metals in the Ocean	
Module Number	bioc385-01a	
Person in Charge	Prof. Dr. Sylvia Sander Phone: +49-(0)431-600-1420, E-mail: ssander@geomar.de	
Semester / Duration	One semester	Status Optional
Regular Cycle	Annual in winter semester	
Study Programme	Master of Science in Biological Oceanography	
Classes	Class Title (Teaching Form) Lecturers	Contact Time / Group Size
	<u>Metal Contaminants - Metals in the Ocean</u> (Lecture hybrid) Prof. Dr. Sylvia Sander and invited international guest lecturers providing best expertise on the topics	2 hr per week / 20 students
	<u>Case studies of marine metal contaminants</u> (Seminar hybrid) Prof. Dr. Sylvia Sander and invited international scientists providing best expertise on the topics	1 hr per week / 20 students
Credit Points / Workload	5 ECTS / 150 hours	
Prerequisites	None.	
Completion Module	None.	
Following Module	None.	

<p>Educational Objectives</p>	<p>This course provides a comprehensive insight to the topic of marine metal contaminants, encompassing their chemistry, environmental toxicology, risk assessments, management, and analytical skills. Students will study the transport, fate, and speciation of metals, alongside bioavailability, bioaccumulation, and detoxification mechanisms. The curriculum emphasises evaluating biotic responses to metal exposure, utilising biomarkers, and conducting risk assessments through environmental toxicology principles. A key focus is on the impact of current and future ocean activities, such as deep-sea mining and ocean alkalinity enhancement, on metal contamination. Students will analyse these activities' environmental implications and explore potential solutions. The course also covers the scientific, technological, societal, and economic aspects of ocean interventions, integrating natural sciences with economics, biotechnology, ethics, policy, and ocean governance. Case studies will provide practical insights into contemporary marine ecotoxicology applications. By the end of the course, students will have developed an interdisciplinary understanding and practical expertise on metals in the ocean and the skills to assess and evaluate potential impacts of metal contaminants in marine environments</p>
<p>Content Of Teaching</p>	<p>This blended course format will consist of self-study online lectures, in-person/hybrid Q&A sessions and applied learning seminars. While the online lectures will be accompanied by online self-tests, the seminars will deepen the theoretical knowledge by examples of practical application. Students will read and discuss selected papers, and engage in group discussions. Each student will also identify a topic of interest and present it to the group. The topic of the presentation may be any area of metal contaminants, a case study, or a question (e.g., impact of climate change, efficacy of ocean solutions/interventions) with an explicit link to marine metal contaminants.</p>
<p>Examination</p>	<p>Individual oral presentation (100%)</p>
<p>Literature</p>	<p>Relevant literature will be distributed within the respective courses.</p>
<p>Additional Information</p>	<p>In the framework of the interdisciplinary Master School of Marine Sciences (iMSMS), this elective module is open to Master students of all CAU programmes. They are obliged to verify the ECTS recognition with their examination office or study program responsible. The module is also internationally offered in the framework of the SEA-EU alliance.</p>