

Environmental and Recycling Technology (M. Eng.)

Module – Number	735	Obligatory in specialization Environmental Technology (ET)		
Module name	Environmental Pollutants and Chemistry Aspects			
Module coordinator	Dr. Christian Kaßner/ Dipl.-Ing.(FH) Petra Hauschild			
Title	Environmental Pollutants and Chemistry Aspects			
Title of examination	Environmental Pollutants and Chemistry Aspects			
Semester	2 nd			
Course type	Language	Lecture	English	
Credit hours/ ECTS/ Workload	4	5	150	
Formal Conditions	Bachelor of Engineering or Bachelor of Science degree			

1. Content and objectives

Content:

- environmental chemistry / environmental toxicology – overview
 - toxicological assessment
 - transport of pollutants
 - air pollution and atmospheric chemistry
 - water / groundwater, contamination and remediation
 - soil and sediments, contamination and remediation
 - pollutants in buildings and remediation
- pollutants and their effects, including persistent and water pollutant substances, cycle and lifetime of substances ecologic systems
 - inorganic pollutants
 - organic pollutants
- special toxicological effects and analysis
- diversity of environmental chemicals in ground- and surface waters, sediments and soils – especially in industrial regions
- important environmental pollutants in soil, water and air and their effects
- production residues and undesired byproducts in conversion- and degradation products
- properties, effects and detection of environmentally relevant pollutants like ozone, nitrogen and sulfur compounds, organic substances and heavy metals in the environment (air, water and earth)
- toxicological aspects
- detection reactions for selected pollutants

Learning objectives:

Students acquire in-depth knowledge in Environmental chemistry. In addition to scientific and engineering knowledges which reflect the toxicological aspects, historical up-to-date engineering processes. In this way students are enabled, to recognize and evaluate application possibilities.

Literature:

1. Reh, F.: Environmental Chemistry, Chemistry of Major Environmental Cycles, 2005
2. Paasivirta, Handbook of Environmental Chemistry, 3rd Edition
3. Ortega-Calvo, Parsons: Bioavailability of Organic Chemicals in Soil and Sediment, Springer, 2018
4. Jolliet, Saade-Sbeih et a.: Environmental Life Cycle Assessment, CRC Press 2016
5. ASCE, Water Treatment Plant Design, 5 th Ed.
6. Handbook Environmental Analysis, Patnaik, ISBN 978-1315151946, CRC press
7. Neumaier, Weber: Altlasten: Erkennen, Bewerten, Sanieren, Springer Verlag; ISBN-13: 978-3642648311
8. Paasivirta: New Types of Persistent Halogenated Compounds (The Handbook of Environmental Chemistry), Springer Verlag, ISBN-13: 978-3642085123,
9. Fent: Ökotoxikologie (Umweltchemie-Toxikologie-Ökologie), Thieme-Verlag, ISBN -9783131099945

2. Method(s) of instruction

Lecture

3. Requirements for attendance

Principles of chemistry and process engineering.

4. Usability of this module

This module is obligatory in the specialization Environmental Technology and a compulsory module in the other specialization Recycling Technology.

5. Requirements for assessment

The module examination encompasses all contents of the lecture.

Exam: Written exam with a duration of 120 min. Alternative forms of exams are possible.

6. ECTS Credits

Modules are assessed by a module examination which is credited by 5 credit points according to the ECTS (European Credit Transfer and Accumulation System).

7. Frequency of offer

The module is offered in the first academic year.

8. Workload

- course participation	= 50 h
- preparing and following-up of the lecture contents	= 45 h
- exam preparation	= 40h
- preparation for practical training	=15 h
Total workload	150 h = 5 ECTS

9. Duration of module

The module is held within one semester.