| Module Name | Module Code |
|---|---|
| Identification & Modelling of Chemical Key Processes | AEF-EM008 |
| **Module Coordinator** | |
| Dr. agr. Claus-Georg Schimming | |
| **Organizer** | |
| Institut für Natur- und Ressourcenschutz - Hydrologie und Wasserwirtschaft | |
| **Faculty** | |
| Faculty of Agricultural and Nutritional Sciences | |
| **Examination Office** | |
| Prüfungsamt Agrar- und Ernährungswissenschaftliche Fakultät | |

| | |
|---|---|
| **ECTS Credits** | 6 |
| **Evaluation** | Graded |
| **Duration** | one semester |
| **Frequency** | Only takes place during winter semesters |
| **Workload per ECTS Credit** | 30 hours |
| **Total Workload** | 180 hours |
| **Contact Time** | 60 hours |
| **Independent Study** | 120 hours |
| **Teaching Language** | English |

| **Module Courses** | | | |
|---|---|---|---|
| **Course Type** | **Course Name** | **Compul-sory/Optional** | **SWS** |
| Lecture | Identification & Modelling of Chemical Key Processes -lecture | Compulsory | 2 |
| Exercise | Identification & Modelling of Chemical Key Processes - exercise | Compulsory | 2 |
| **Prerequisits for Admission to the Examination(s)** | | | |
| | | | |

| Examination(s) | | | | |
|---|---|---|---|---|
| **Examination Name** | **Type of Examination** | **Evaluation** | **Compulsory / Optional** | **Weighting** |
| Written Examination: Identification & Modelling of Chemical Key Processes | Written Examination | Graded | Compulsory | 100 |

**Further Information on the Examination(s)**

1.+2. period in wintersemester
1. period in summersemester

examiner: Dr. Schimming
QIS: 72300 with number of Examination 72310

**Course Content**

Chemical processes in the ecosystem context and transport in open systems, types of chemical reactions, reaction and equilibria constants in the ligth of termodynamics, produtivity in ecosystems, element cycling (biogeochemitry) and ecostochiometry, emergence of chemistry in formal processes (Biol. Production, eutrophivcatioon, acidification etc.)

**Learning Outcome**

Deeper understanding of chemistry in ecosystems; the students will be able to analyse bio-geochmical models critically regarding the parameters, the students will be also able to extrapolate principals of equilibra and kinetics to the ecosystem scale which are open and normally away from equilibrium i.e. they are metastable, the terms of Thermodynamics Heat (Entalphy) and Entropy can be used in the context of Ecosystem Theories particularily covered in the relevant 2nd and 3rd semester courses.

**Reading List**

Fränzle O. (1993): Contaminants in Terrestrial Environment. Springer, Berlin. R
Joergensen S.E. (2012): Introduction to Systems Ecology. CRC Press, Boca Raton
Lindsay W.L. (1979): Chemical Equilibria in Soils. Wiley New York
Reible D.D. (1999): Fundamentals of environmental engineering. Springer, Boca Raton.
Schlesinger, W.H. (1997): Biogeochemistry. An Analysis of Global Change. Academic Press, San Diego.
Schnoor, J.L. (1984): Modelling of total acid deposition impacts. Butterworth, Boston
Schnoor, J.L. (1996): Environmental Modelling – Fate and transport of pollutants in water, air and soil. John
Sterner,, R.W., Elsner J.J. ((2002): Ecological Stoichiometry- The Biology of Elements from Mollecules to the Biosphere. Princton Universty Press, Princton
Wiley &Sons, New York equilibria and rates in natural waters. Wiley, New York.

**Additional Information**

Dr. agr. Claus Schimming
Fon:+49 431 880-4034
Fax:+49 431 880-4083
E-Mail: cschimming@ecology.uni-kiel.de

| Use | Compulsory / Optional | Semester |
|---|---|---|
| Master, 1-subject, Agricultural Sciences, Agricultural Economics, (Version 2013) | Optional | - |
| Master, 1-subject, Agricultural Sciences, Agribusiness, (Version 2013) | Optional | - |
| Master, 1-subject, Agricultural Sciences, Crop Sciences, (Version 2013) | Optional | - |
| Master, 1-subject, Agricultural Sciences, Animal Sciences, (Version 2013) | Optional | - |
| Master, 1-subject, Agricultural Sciences, Environmental Sciences, (Version 2013) | Optional | - |
| Master, 1-subject, Applied Ecology, (Version 2016) | Optional | - |
| Master, 1-subject, Applied Ecology, (Version 2015) | Optional | - |
| Master, 1-subject, Applied Ecology, (Version 2010) | Optional | - |
| Master, 1-subject, Environmental Management, (Version 2013) | Optional | - |
| Master, 1-subject, Environmental Management - Management of Natural Resources, (Version 2010) | Optional | - |
| Master, 1-subject, Nutritional and Food Science, (Version 2013) | Optional | - |
| Master, 1-subject, Nutritional and Consumer Economics, (Version 2013) | Optional | - |
| Master, 1-subject, Sustainability, Society and the Environment, (Version 2013) | Optional | - |