Module name: Methods and Techniques in Chemical Ecology

Identification number	Workload	Credits	Term of studying*	Frequency of occurrence	Duration**
MN-B-E 6	360 h	12	1st or 2nd term of studying	Summer term, 2nd half	7 weeks

1	Type of lessons	Contact times***	Self-study times	Intended group size
	a) **Lectures** (L) b) **Practical/Lab** (P) c) **Seminar** (S)	a) 23 h b) 152 h c) 5 h	180 h (Preparing and reworking matters of L and P; Writing of a protocol)	a) 8 students b) 8 students / supervising tutor c) 8 students / supervising tutor

2 Learning outcomes / Skills

Students who have successfully completed this module will have acquired an advanced understanding of chemical ecology in aquatic systems. Emphasis will be laid on the role of infochemicals, toxins and essential nutrients. Furthermore, the students will be familiar with the design of biotests to assess the biological activity and with techniques of isolating and quantifying such substances from biological organisms. To achieve these aims the students will be using state-of-the-art analytical equipment of the research labs. Optional short field excursions will be performed. Students will be trained to evaluate and understand the scientific literature in specific fields of contemporary ecological research.

3 Contents

Main topics:

• knowledge about major current topics in Aquatic Chemical Ecology, in particular chemical communication, toxins and essential nutrients

• methods for the analysis of biologically active compounds: Extraction of volatile and more polar compounds from water, chromatography (HPLC, GC), chromatography coupled to mass spectrometry (LC-MS, GC-MS). Molecular techniques: quantitative gene expression analysis (qPCR). Accomplishment and analysis of bioassays.

• soft skills: experimental design with emphasis on analytical techniques, literature search, oral presentations

4 Teaching methods

Lectures; Seminar; Guidance to independent scientific research; Excursions; Training on presentation techniques in oral and written form

5 Requirements for participation

Bachelor; enrollment in the Master´s degree course “Biological Sciences” (see examination regulations for details)

Additionally: Knowledge of fundamental ecological principles is indispensable to participate in this module.

6 Type of examinations

Exam prerequisites: Regular and active participation, passed written protocol

Exams: Two hour written examination about topics of the lectures and practical part (accounts for 70 % of the total module mark) and an oral presentation of a selected paper in the field of aquatic chemical ecology (accounts for 30 % of the total module)

See also remark under Additional information (11) for students beginning the degree course before winter term 2013/2014.

Methods and Techniques in Chemical Ecology (MN-B-E 6) continued

7	**Requisites for the allocation of credits** Total module mark at least “adequate” (see § 10 of the examination regulations for details)
8	**Compatibility with other Curricula** None
9	**Significance of the mark for the overall grade** In the Master´s degree course “Biological Sciences”: 15 % of the overall grade (see appendix 2 of the examination regulations)
10	**Module coordinator and Participating faculty** **Module coordinator:** Prof. Dr. E. von Elert, phone 470-6084, e-mail: evelert@uni-koeln.de **Participating faculty:** Dr. P. Fink, Prof. Dr. E. von Elert
11	**Additional information** **- Subject module** of the Master´s degree course “Biological Sciences” - **Focus of research:** (E) Ecology and Evolution - **Literature:** (i) Brönmark, C., Hansson, L.A. (2012) Chemical Ecology in Aquatic Systems. Oxford University Press - Additional reviews and original papers will be handed out during the module. - **General time schedule:** Week 1-6 (Mon.-Fri.): Lectures, seminar and practical work; Week 7 (Mon.-Fri.): Preparation for the written examination - **Attention: Students who have enrolled in the MSc Biological Sciences before winter term 2013/2014** and who want to continue in the old frame of the degree course scheme (*i.e.* 15 CP per subject module) have to write an additional essay of 8-12 pages. This essay is assessed as “passed” or “failed” and does not account to the total module mark. - **Introduction to the module:** May 26, 2014 at 9 a.m., Cologne Biocenter, room -1.005 (first basement floor) - **Written examination:** July 18, 2014; more details will be given at the beginning of the module

[*] According to the course schedule (see appendix 2 of the examination regulations)

[**] Preparation times before the official start of the module are not included here.

[***] All decimal numbers were rounded. The values correspond to the effective contact times over the total duration of the module (including examination times).