V e r k ü n d u n g s b l a t t

der Universität Duisburg-Essen - Amtliche Mitteilungen

Jahrgang 12 Duisburg/Essen, den 01. April 2014 Seite 237 Nr. 24

Erste Ordnung zur Änderung der Prüfungsordnung für den Master-Studiengang Water Science an der Universität Duisburg-Essen

Vom 11. März 2014

Aufgrund des § 2 Abs. 4 und des § 64 Abs. 1 des Gesetzes über die Hochschulen des Landes Nordrhein-Westfalen (Hochschulgesetz - HG) vom 31.10.2006 (GV. NRW. S. 474), zuletzt geändert durch Gesetz vom 03.12.2013 (GV. NRW. S. 723), hat die Universität Duisburg-Essen folgende Ordnung erlassen:

Artikel I

Die Prüfungsordnung für den Master-Studiengang Water Science an der Universität Duisburg-Essen vom 01.06.2012 (Verkündungsblatt Jg. 10, 2012 S. 377 / Nr. 55) wird wie folgt geändert:

1. Die Anlage 1 - Studienplan - erhält die Fassung der dieser Ordnung anhängenden Anlage 1.

2. Die Anlage 2 - Inhalte und Kompetenzziele der Module - wird um die Angaben ergänzt, die dieser Ordnung als Anlage 2 anhängen.

Artikel II

Diese Ordnung tritt am Tage nach ihrer Veröffentlichung im Verkündungsblatt der Universität Duisburg-Essen - Amtliche Mitteilungen in Kraft.

Ausgefertigt aufgrund des Beschlusses des Fakultätsrates der Fakultät für Chemie vom 30.01.2014.

Duisburg und Essen, den 11. März 2014

Für den Rektor
der Universität Duisburg-Essen
Der Kanzler
In Vertretung
Eva Lindenberg-Wendler

Anlage 1

Anlage 1: Studienplan

Das Lehrangebot im Master-Studiengang Water Science erstreckt sich über zwei Jahre. Das Studium umfasst Lehrveranstaltungen aus dem Pflicht-, Wahlpflicht- und Wahlbereich, wie im nachfolgenden Regelstudienplan erklärt:

A) Required Modules:

Term	Module	Total Number of Credits for Modules	Course					Cr. per Course	Requirements	Exam
			Requirements	Course	HPW					
					L	S	P			
2	Applied Analytical Chemistry (ApplAnaC)	5	none	Applied Analytical Chemistry	2	1		5	none	Written Exam
2	Applied Microbiology (ApplMiBi)	6	none	Geomicrobiology Hygiene	2 2			3 3	none none	Written Exam for Module
3	Biofouling, Biocorrosion (Biof)	5	none	Biofouling, Biocorrosion	2	1		5	none	Written Exam
1	Chemometrics and Statistics (Chemo)	5	none	Chemometrics and Statistics	2	1		5	none	Written Exam
1 2	Environmental Microbiology (EnviMiBi)	12	none	Environmental Microbiology Practical Course Environmental Microbiology	2	1 1	 8	5 7	none	Written Exam for Module
3	Practical Analytical Chemistry (AnaC-P)	10	none	Practical Course Analytical Chemistry		1	14	10	none	
3	Research Practical (Res Pract)	10	AnaC-P, P EnviMiBi	Research Practical Course		1	14	10	none	Written Report
1	Water Chemistry (WatChem)	5	none	Water Chemistry	2	1		5	none	Written exam/ Presentation
4	Master Thesis	30	80 Cr. from the Master degree Programm	Master Thesis			0	30		Master Thesis

B) Optional Modules*:

Term	Module	Total Number of Credits for Modules	Course					Cr. per Course	Requirements	Exam
			Requirements	Course	HPW					
					L	S	P			
2	Advanced Mass Spectrometry (Adv MS)	3	none	Advanced Mass Spectrometry	1	1		3	none	Written or oral Exam
1 or 3	Electrochemistry and Electro-chemical Analysis (Electro)	5	none	Electrochemistry and Electrochemi-cal Analysis	2	1		5	none	Written Exam
1 or 3	Environmental Chemistry: Pollutants (EnviPoll)	5	none	Environmental Chemistry: Pollutants	2	1		5	none	Written or oral Exam
1 or 3	Environmental Chemistry: Soil/Waste (EnviSoil)	5	none	Environmental Chemistry: Soil/Waste	2	1		5	none	Written or oral Exam
1, 2 or 3	Excursions	1-5	none	Excursions	1-5			1-5	none	Written re-port (no grades)
2	Management (Manage)	6	none	Quality Manage-ment	1	1		3	none	Written Exam for Module
3				Project Manage-ment	2			3	none	
1 or 3	Membrane Tech-nologies (MemTech)	3	none	Membrane Tech-nologies	1	1		3	none	Written Exam
2	Metrology in Chemistry (Metrol)	2	none	Metrology in Chemistry	1			2	none	Written or oral Exam
2	Microbial Physiology (MicrobPhys)	3	none	Microbial Physio-logy	2			3	none	Written Exam
2	Oxidative Pro-cesses in Water Technology (OxProcess)	5	none	Oxidative Pro-cesses	2	1		5	none	Written or oral Exam and Presen-tation
2	Stable Isotope Analysis (SIA)	9	none	Stable Isotope Analysis	2	1		5	none	Written exam/ Presentation
				Practical Course			3	4	none	Written re-ports

2 3	Technical Engineering Water (TechEngWater)	9	none L Technical Engineering Water	Technical Engineering Water Practical Course	2	1	 3	5 4	none none	Written or oral Exam Written exam
1 or 3	Wastewater Treatment (WWT)	5	none	Wastewater Treatment	2	1		5	none	Written exam
1, 2 or 3	WaterPollution / Water Treatment (WatPoll)	5	none	Water Pollution / Water Treatment	2		1	5	none	Written or oral exam
1 oder 3	Nanopartikel und Kolloide (Nano)	5	none	Nanopartikel und Kolloide	2	1		5	none	Written or oral exam
1, 2 or 3	Polymers as Biomaterials (Biopolymer)	5	none	Polymers as Biomaterials	2	1		5	none	Written or oral exam
1, 2 or 3	Nano-Biophotonik (NABIP)	5	none	Nano-Biophotonik-Lecture Nano-Biophotonics - block internship and methods course	2		1	5	none	Written exam
2	Advanced Gas Chromatography (Adv GC)	2	none	Advanced Gas Chromatography	1			2	none	Written or oral exam
*		Additional to the list of optional courses students may choose any offered module from the M.Sc. Chemistry that is not already part of the Water Science curriculum. In the case of doubt the examination committee decides on the acceptance.								
Optional Courses MTW3		Out of the Master's Programme Management and Technology of Water and Wastewater (MTW3) students may choose any offered module that is not already part of the Water Science curriculum (Admission to modules needs to be arranged with the individual lecturers and may be limited to a certain number of students.)								
Optional Courses EnviTox		Out of the Master's Programme Environmental Toxicology (EnviTox) students may choose any offered module that is not already part of the Water Science curriculum (Admission to modules needs to be arranged with the individual lecturers and may be limited to a certain number of students.)								

Compulsory Courses	Applied Analytical Chemistry	25 Credits
	Biosciences	23 Credits
	Research Practical	10 Credits
Optional Modules		32 Credits
Master Thesis		30 Credits
Total		120 Credits

First Term	HPW	Cr	Exam
Chemometrics and Statistics	3	5	1
Environmental Microbiology	3	5	1
Water Chemistry	3	5	1
Optional Courses		**15**	**2-3**
Electrochemistry and Electrochemical Analysis	3	5	1
Environmental Chemistry: Soil/Waste	3	5	1
Environmental Chemistry: Poll			
Membrane Technologies	2	3	1
Wastewater Treatment	3	5	1
Water Pollution/ Water Pollution Monitoring	3	5	1
Nanopartikel und Kolloide	3	5	1
Polymers as Biomaterials	3	5	1
Nano-Biophotonik	3	5	1
Excursions	1-5	1-5	
Sum		30	5-6

Second Term	HPW	Cr	Exam
Applied AnaC	3	5	1
Env-MiBi-P	9	7	
Applied Microbiology	4	6	1
Optional Courses		**12**	**2-3**
Advanced Mass Spectrometry	2	3	1
Quality Management	2	3	
Metrology in Chemistry	1	2	1
Microbial Physiology	2	3	1
Oxidative Processes	3	5	1
Stable Isotope Analysis	6	9	1
Technical Engineering Water	3	5	1
Water Pollution/ Water Pollution Monitoring	3	5	1
Polymers as Biomaterials	3	5	1
Nano-Biophotonik	3	5	1
Advanced Gas Chromatography	1	2	1
Excursions	1-5	1-5	
Sum		30	4-5

Third Term	**HPW**	**Cr**	**Exam**
Biofouling, Biocorrosion	3	5	1
AnaC-P	15	10	
Research-P	15	10	
Optional Courses		**5**	**1**
Electrochemistry and Electrochemical Analysis	3	5	1
Environmental Chemistry: Pollutants	3	5	1
Environmental Chemistry: Soil/Waste	3	5	1
Project Management	2	3	1
Membrane Technologies	2	3	1
Technical Engineering Water-Practical Course	3	4	
Wastewater Treatment	3	5	1
Water Pollution/ Water Pollution Monitoring	3	5	1
Excursions	1-5	1-5	
Nanopartikel und Kolloide	3	5	1
Polymers as Biomaterials	3	5	1
Nano-Biophotonik	3	5	1
Sum		30	2
Fourth Term	**HPW**	**Cr**	**Exam**
Master-Arbeit	0	30	1
Sum		30	1
Total Sum		120	11-12

Anlage 2

Polymere as Biomaterials	Reactions at interfaces between polymers and an aquatic-biological environment, foreign-body reaction (tissue-implant-interaction); Biocompatibility, hemocompatibility (in vitro/in vivo characterization methods); Biocompatible polymers (permanent, biodegradable, resorbable); Bulkmodifications of polymers (immobilization n, polymerblends, chemical modifications); Surface engineering (coatings, structuring, plasma- and wet-chemical treatments), characterization methods (e.g. microscopy, contact angle, ATR-FTIR); Biofunctionalization (adsorption, layer-by-layer deposition, covalentimmobilization), characterization methods (e.g. SPR, quartz crystal microbalance); Drug delivery systems (diffusion-, degradation- and swelling-controlled systems, polymer-drug-conjugates), models and methods to examine drug release (HPLC, ELISA, proteinassays); Medical/Biological application of surface engineered polymers (e.g. vascular prostheses, suture materials, tissue engineering, etc.	will gain detailed insights into the fundamentals of reactions at interfaces between polymers and the aquatic-biological environment, polymer surface engineering processes to control such reactions and analytical methods for surface characterization and determination of biocompatibility. At the end of the course, students will be able to evaluate the applicability of polymers as biomaterial as well as to name suitable modification methods.
Nano-Biophotonik	Introduction to the exciting novel concepts of NanoBiophotonics, Nanobiomaterials, Characterization and Functionalization of nanobiomaterials, Biophotonic methods, strategies and case studies, Diagnostic methods of NanoBiophotonics, Therapeutic approaches of NanoBiophotonics. Methods to design and apply nanomaterials in life science using light. Practical couses include the following three branches: NANO: synthesis, (bio) functionalization, characterization, stabilization BIO: imaging, biomolecules, nanobiomaterials, assays PHOTO: spectroscopy, laser / optics, plasmonics	gain basic knowledge at the topical intersections of nanomaterials, biology and photonics. They will know modern methods of Nanobiophotonics, how biological and optical functions can be designed using nanomaterials and photonic tools useful in biology and medical diagnosis and therapy. In the case studies, students should be able to find a suitable nanomaterial as solution for a biological or biomedical exercise with the tool "Light". They are able to select synthesis routes, biofunctionalization and appropriate characterization methods for specific problems, these apply and estimate. The theoretical knowledge of these three areas "nano", "bio" and "photonics" will be experimentally proved in the small groups during the internship
Advanced Gas Chromatography	Hyphenation chromatographic techniques, interface techniques, large volume injections in GC, solvent effects, basics in capillary column technology, presentation and discussion of examples from various application fields.	understanding pros and cons of advanced chromatographic techniques and their technical implementation with a particular respect to hyphenated techniques and large volume injection methods in gas chromatography. Another key aspect will be the understanding of fundamental issues for the enantiodifferentiation of volatile chiral compounds, learning to optimize a separation and being able to choose appropriate conditions in enantioselective GC separations.