

Module Description

MSc Environmental Protection

Contents

Environmental Management (UW 3-5)

Sewage and Waste Engineering (UW 2-2)

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Communal Environmental Protection (UW 2-5)

Module:	WP-Module Environmental Management
Abbreviation:	UW 3-5
Course Description:	Environmental Management (UM) and QSHE-Systems (Quality, Safety, Health, Environment), Project UM/QSHE-Systems
Semesters:	2 + 3 (winter semester)
Module Responsibility:	Hohnecker
Lecturer:	Hohnecker
Course Language:	German
Curriculum Classification:	Elective Subject for MSc Environmental Protection
Form of Teaching:	Lectures, 4 SWS + 2 SWS (min. 5 students)
Attendance:	90 hours classroom attendance, 210 hours independent studies
Credits:	10
Special Requirements:	none
Learning Objectives:	<ul style="list-style-type: none"> • Students will be qualified to apply cyclic thought models (holistic thinking) and learn the requirements for personal leadership. • Knowledge of the fundamental strategies, terms and contexts of integrated Quality Management (QM) and Environmental Management (UM) as well as the quality assurance through certifying and auditing procedures. • Students will have studied and gained understanding of strategic considerations as well as methods of integrated environmental and quality management, quality assurance, auditing, certification and their implementation on national and international levels. • Students will be enabled to prepare and organise an audit as well as actively accompany critical reviews.
Contents:	<ul style="list-style-type: none"> • Essentials of Integrated Environmental Management according to DIN EN ISO 9000 ff. (2000), ISO 14000 ff., EMAS; IVU-RL... • Implementation of audits • Environmental key figures, bench marks • Practical realisation of Quality and Environmental Management systems • Practical examples s.a. Rainwater-Management, Flood-Management, Commissioning of sewage water treatment...
Credits/Evaluation:	Written test (60min.), seminar paper and presentation
Media:	PowerPoint, Overhead and board presentations, excursions
Literature:	<ul style="list-style-type: none"> • DIN EN ISO 9000ff, 2005, Qualitätsmanagementsysteme Grundlagen und Begriffe, Normenausschuss Qualitätsmanagement, Statistik und Zertifizierungsgrundlagen (NQSZ) according to DIN e.V. • DIN ISO 14001, 2009, Umweltmanagementsysteme according to DIN e.V. • BINNER, H.F. (2002): Prozessorientierte TQM-Umsetzung, 2. Edition, Carl Hanser Publishing House, Munich, Vienna • KOSTKA, C. & S. (2002): Der Kontinuierliche Verbesserungprozess, 2. Edition, Carl Hanser Publishing House • KRAMER, M.; BRAUWEILER, J.; HELLING, K. (Publ.) (2003): Internationales Umweltmanagement. Volume 2: Umweltmanagementinstrumente und -systeme. Gabler Publishing House, Wiesbaden

Module:	Sewage and Waste Engineering
Abbreviation:	UW 2-2
Course Description:	Chemophysical Wastewater Treatment, Waste Engineering, Community Water Management I
Semesters:	2 + 3 (summer semester)
Module Responsibility:	Gräf
Lecturer:	Gräf
Course Language:	German
Curriculum Classification:	Elective Subject for MSc Environmental Protection
Form of Teaching:	Lectures, 2 SWS + 2 SWS
Attendance:	90 hours classroom attendance, 135 hours independent studies
Credits:	7.5
Special Requirements:	None
Learning Objectives:	<ul style="list-style-type: none"> • Students will have studied the effects of sewage inlets on the water management as well as gained understanding of procedures for wastewater treatment and waste engineering. • Comprehensive knowledge of respective legislation regulating water and waste management. • Students have familiarised themselves with interdisciplinary tasks and procedures of sustainable community water management (settlement sewerage, rain water management, waste water purification, including treatment and utilisation of sewage sludge). • Students will be capable to apply the basic strategic approaches for the regulation of waster conditions and contaminated areas.
Contents:	<ul style="list-style-type: none"> • Thermodynamic views to production and waste generation • Direct and indirect discharge of waste water • Waste water treatment and resulting waste accumulation • Structure and regulations of the circular economy and waste law • Water-legal regulations for sewage disposal • Cyanide oxidation, nitrite treatment, chromate reduction, neutralisation, heavy metal precipitation, flocculation, sedimentation, sludge dewatering • Thermal elimination procedures, waste disposal • Application of wastewater/waste regulations of the German Association for Water, Wastewater and Waste (DWA) • Environmental Law (passages for water and land use) • Immissions on water and soil, assessment and solutions
Credits/Evaluation:	Written test (120min.)
Media:	PowerPoint, Overhead and board presentations, group work
Literature:	<ul style="list-style-type: none"> • WAGNER, K., (2005): Deponieverordnung und Deponieverwertungsverordnung, Erich Schmidt Publishing House, Berlin • BILITEWSKI, B., WELTIN, D. & WERNER, P., (Publ.), WINKLER, J. (Author) (2004): Comparative Evaluation of Life Cycle Assessment Models for Solid Waste Management, Beiträge zur Abfallwirtschaft/Altlasten, TU Dresden, Vol. 36, Verlag des Forums für Abfallwirtschaft und Altlasten (Publ. House) • Praxis der industriellen Abwasserbehandlung, HIRTHAMMER, F. (2006) • GRÄF, R. (1999): Taschenbuch der Abwasserbehandlung, Hanser Publishing House, Munich • ATV-Handbuch (1997) Biologische und weitergehende Abwasserreinigung, 4. Edition, Ernst & Sohn, Berlin • GUJER, W. (1999): Siedlungswasserwirtschaft, Springer, Berlin • DWA-Regelwerk Abwasser/Abfall (2005)

Module:	Waste Management
Abbreviation:	UW 3-2
Course Description:	Waste Management, Recycling Techniques
Semesters:	2 + 3 (winter semester)
Module Responsibility:	Hohnecker
Lecturer:	Gräf/Marbach, Puscher
Course Language:	German
Curriculum Classification:	Elective Subject for MSc Environmental Protection
Form of Teaching:	Lectures, 2 SWS + 2 SWS
Attendance:	60 hours classroom attendance, 90 hours independent studies
Credits:	5
Special Requirements:	none
Learning Objectives:	<ul style="list-style-type: none"> • Students will have gained understanding of technically available procedures for waste separation. • Detailed knowledge of material-related processing and recycling of waste • Students will have familiarised themselves with major methods of thermal waste treatment. • Development of strategies for the solution of complex waste management problems
Contents:	<ul style="list-style-type: none"> • Waste separation techniques in the overall context of waste management • Waste utilisation for plastic waste • Utilisation of recycled glass and paper • Thermal waste treatment: incineration, pyrolysis, gasification • Specific procedure combinations
Credits/Evaluation:	Written test (90min.)
Media:	PowerPoint, Overhead and board presentations, group work
Literature:	<ul style="list-style-type: none"> • BILITEWSKI, B. & JANZ, A. (2004): Trockene Tonne – Neue Wege und Chancen einer gezielten stofflichen Verwertung, presentation for conference „Trockene Tonne“ 17.06.2004 at TU-Dresden, published in conference reader • HEERING, B. (2001): Untersuchungen zur Herstellung von verwertbaren Stoffströmen aus Restabfall nach mechanisch-biologischer Vorbehandlung, Shaker-Verlag (Publisher)

Appendix A: Module Handbook

Module:	Ecological Context
Abbreviation:	UW 1-1
Course Description:	Ecology, Water Pollution Control, Bio-Monitoring Internship I
Semesters:	1
Module Responsibility:	Nobel
Lecturer:	Hohnecker, Nobel
Course Language:	German
Curriculum Classification:	Elective Subject for MSc Environmental Protection
Form of Teaching:	Lectures, 2 SWS + 2 SWS, Internship 1 SWS
Attendance:	75 hours classroom attendance, 120 hours independent studies
Credits:	6.5
Special Requirements:	none
Learning Objectives:	<ul style="list-style-type: none"> • Students will have understood the basic principles and functions of ecological systems (constituents, functional groups, energy flow, material cycles). • Students know the fundamental strategies and environmental principles of water protection and water development. • Students will have studied the most important scientific, technical and legal foundations as well as appropriate measures of natural water development. • Students will have gained knowledge of selected biological measuring procedures for the determination and evaluation of the effect of air pollutions on plants (bio indication) and are able to use these practically.
Contents:	<ul style="list-style-type: none"> • Clarification of basic ecological facts and terms • Review of individual organisms in their habitat (auto-ecology), coexistence of the individuals of a species (population ecology), reciprocal effects between organisms and environment (synecology) and their interdependent structures (ecological systems) • Environmental Law (compartment water), environmental action and environmental quality targets, European Union Water Framework Guidelines • Foundations of water development, measures for bio-engineering and water renaturation • Bio-indication experiments: standardized tobacco exposition (summer) and/or lichen mapping (winter)
Credits/Evaluation:	Written test (90min.), seminar paper, lecture-accompanying project work
Media:	PowerPoint, Overhead and board presentations, excursions
Literature:	<ul style="list-style-type: none"> • HEINRICH, D. & HERGT, M. (2002): dtv-Atlas zur Ökologie, 5th edition, München: Deutscher Taschenbuch Verlag • Patt, H. et. alt. (2011) Naturnaher Wasserbau, Springer Verlag • VEREINIGUNG DEUTSCHER GEWÄSSERSCHUTZ e.V. (2001): Ökologische Bewertung von Fließgewässern, VDG. Bd.64 • VDI-RICHTLINIE 3957: Biologische Messverfahren zur Ermittlung und Beurteilung von Luftverunreinigungen auf Pflanzen (Bioindikation) • WITTIG, R. & B. STREIT (2004): Ökologie. – Stuttgart Ulmer (UTB basics; UTB 2542) • LU-BW Schriftenreihen 2011_2012

Module:	WP-Module Municipal Environmental Protection
Abbreviation:	UW 2-5
Course Description:	Municipal Water Management II, Decontamination of Land, Local Environmental Protection Project
Semesters:	2 + 3 (summer semester)
Module Responsibility:	Hohnecker
Lecturer:	Hohnecker, Schneller
Course Language:	German
Curriculum Classification:	Elective Subject for MSc Environmental Protection
Form of Teaching:	Lectures, 2 SWS + 2 SWS (minimum 5 students)
Attendance:	90 hours classroom attendance, 210 hours independent studies
Credits:	10
Special Requirements:	none
Learning Objectives:	<ul style="list-style-type: none"> • Students will know the interdisciplinary tasks of sustainable community water management (inclusion of inherited waste problems). • Students will have understood the scientific as well as engineering methods for the calculation of wastewater purification and rehabilitation of inherited waste (including cost-benefit analysis). • Students will be able to plan and assess plants for wastewater and sewage sludge treatment as well as procedures for the rehabilitation of inherited waste under defined conditions (national and international). • Students will have worked to a large extent independently in a methodically-structured way with a practical problem situation (environmental project).
Contents:	<ul style="list-style-type: none"> • Procedures of wastewater and sludge treatment as well as treatment and utilization of contaminated materials under consideration of defined requirements (national and international). • Application of wastewater/waste regulations of the German Association for Water, Wastewater and Waste (DWA). • Task outlines for wastewater, refuse dump and sludge treatment. • Water laws (WHG, WG, WRRL), soil conservation, contamination ordinance
Credits/Evaluation:	Written test (90min.), seminar paper, presentation
Media:	PowerPoint, Overhead and board presentations, excursions
Literature:	<ul style="list-style-type: none"> • DWA-Regelwerk Abwasser/Abfall (2005) • GUJER, W. (2007) Siedlungswasserwirtschaft, Springer Verlag Berlin, Heidelberg, New York • DWA-Regelwerk (2011), Hennef, DWA e.V. • ATV-Handbuch (1997) Biologische und weitergehende Abwasserreinigung, 4th edition, Ernst & Sohn, Berlin • MELIN, T. Et. Al. (2003): Membranverfahren – Grundlagen der Modul- und Anlagenauslegung, 2nd edition, Springer Heidelberg • Imhoff, K. et alt. (2009) Taschenbuch der Stadtentwässerung, Oldenbourg Industrieverlag