

**BULLETIN**

**UNIVERSITY OF DEBRECEN**

**ACADEMIC YEAR 2015/2016**

**Faculty of Agricultural and Food Sciences and  
Environmental Management**

**AGRICULTURAL ENVIRONMENTAL MANAGEMENT  
ENGINEERING MSc**

Coordinating Center for International Education



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## CHAPTER 1

### UNIVERSITY OF DEBRECEN

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**Date of Foundation:** 1912 Hungarian Royal University of Sciences 2000 University of Debrecen

**Legal predecessors:** Debrecen University of Agricultural Sciences Debrecen Medical University Wargha István College of Education, Hajdúböszörmény Kossuth Lajos University of Arts and Sciences

**Legal status of the University of Debrecen:** state university

**Founder of the University of Debrecen:** Hungarian State Parliament

**Supervisory body of the University of Debrecen:** Ministry of Education

**Accreditation dates and statute numbers:** Debrecen University of Agricultural Sciences: 17 December 1996, MAB/1996/10/II/1. Debrecen Medical University: 5 July 1996, OAB/1996/6/II/6 Wargha István College of Education, Hajdúböszörmény: 5 July 1996, OAB/1996/6/II/2 Kossuth Lajos University of Arts and Sciences: 5 July 1996, OAB/1996/6/II.5. University of Debrecen: 3 October 2012, MAB/2012/8/VI/2.

**Number of Faculties at the University of Debrecen:** 14

- Faculty of Law
- Faculty of Medicine
- Faculty of Humanities
- Faculty of Health
- Faculty of Dentistry
- Faculty of Economics and Business (before 1 August 2014 the predecessors of the Faculty were the Faculty of Applied Economics and Rural Development and the Faculty of Economics and Business Administration)
- Faculty of Child and Adult Education
- Faculty of Pharmacy
- Faculty of Informatics
- Faculty of Agricultural and Food Sciences and Environmental Management (before 1 March 2010 the name of the Faculty was the Faculty of Agriculture)
- Faculty of Engineering
- Faculty of Public Health
- Faculty of Sciences and Technology
- Faculty of Music

*Number of accredited programmes at the University of Debrecen:* 73 degree programmes with the pre-Bologna 5-year-system university education, 41 supplementary degree programmes offering transfer-degree continuation of studies towards the university degree (MSc), 50 degree programmes with the pre-Bologna 3-year-system college education, 67 BSc and 78 MSc programmes according to the Bologna system, 5 unified one-cycle linear training programmes, 35 specializations offering post-secondary vocational certificates and 159 vocational programmes.

**Number of students at the University of Debrecen:** 28812

according to time of studies: 22888 full-time students, 5899 part-time students having corresponding classes and 25 part-time students having evening classes or distance education according to education level: 944 students at post-secondary vocational level, 17406 students at BSc, 3112 students at MSc, 21 students at college level, 190 students at university level (MSc), 5320 students at one-cycle linear training, 954 students at vocational programmes, 865 students at PhD, 3741 foreign students.

*Full time teachers of the University of Debrecen:* 1421

194 full college/university professors and 1055 lecturers with a PhD.

## CHAPTER 2

### DEAN'S WELCOME

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Thank you for your interest in our university with a great past and in our agricultural higher education with approximately 150 year old traditions.

The University of Debrecen is one of the institutions offering a wide range of courses and research activities in Hungary. As one of the most significant think tanks in the country and the knowledge centre of the region, we seek to provide unprecedented opportunities for our students to gain state-of-the-art knowledge and to carry out significant activities.

With excellent infrastructure and high level education, the Faculty of Agricultural and Food Sciences and Environmental Management ensures excellent facilities for its students. In addition to gaining in-depth modern experience, a wide range of opportunities are available to perform professional and scientific activities beyond the scope of academic studies. After obtaining their certificates in higher education vocational training and BSc diploma courses, our students acquire a thorough practical knowledge, they can continue their studies in MSc training and then the best ones in Ph.D. training.

We firmly believe that the variety of trainings and courses we offer are attractive to many students who choose the Faculty of Agricultural and Food Sciences and Environmental Management for academic education.

I wish you every success in your studies and hope to meet you personally in the near future.

*Prof. Dr. István Komlósi*  
Dean

## CHAPTER 3 HISTORY OF THE FACULTY

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### **History of the Faculty**

Agricultural higher education in Debrecen started in 1868 with the foundation of the National Higher Economic School of Debrecen. This date marks the beginning of agricultural higher education in Debrecen and East Hungary. Between 1876 and 1906 the institute's official name was Secondary Economic School. Then it was run under the name Hungarian Royal Academy of Economy until 1944. Between 1944 and 1949 our institute went on with its work as the Debrecen Department of the Agricultural Sciences at the Hungarian Agricultural University. In 1953 tuition began again at the Agricultural Academy. Training of professionals reached University level between 1962 and 1970 at the Agricultural College. Between 1970 and 1999 the institute got its university title and as the Agricultural University of Debrecen it operated with two branch faculties (Szarvas, earlier Hódmezővásárhely, later Mezőtúr).

The University of Debrecen was established with 5 university-, three college faculties and three research institutes on 1<sup>st</sup> January, 2000. In 2002 the Faculty of Agriculture and Rural Development was established, and by 2006, the university had comprised 15 faculties.

## **CHAPTER 4**

### **MISSION OF THE FACULTY**

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#### Mission of the Faculty

The mission of the Faculty of Agricultural and Food Sciences and Environmental Management is the multifunctional development of agriculture and rural development in the North Great Plain Region. Accordingly, the institution deals with regional, national and international research and consultancy, as well as the primary goal of training professionals within the Center for Agricultural and Applied Economic Sciences. Our spectrum of educational, training and research areas have broadened, in compliance with the demands of sustainable agricultural and rural development. The interconnection between the branches of science is strengthening, which is desirable both in the long and the short terms. Our aspiration can be used as a motto, as well: "diverse training and mobility".

Our Faculty provides all the personal and infrastructural conditions of linear training. The structure of our educational programs is flexible and provides students with diverse course contents.

Our accredited laboratories provide us with the opportunity to impact sectors of the economy in such a way that these can meet the ever-changing demands on markets. Our purpose is to create high-standard student and research laboratories and to provide the conditions for special high-value machines and measurement processes.

The doctoral schools and doctoral programs operating at the Faculty have an ever-widening base - providing talented young people with a suitable environment for scientific development.

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## CHAPTER 5

### THE ORGANIZATIONAL STRUCTURE OF THE UNIVERSITY

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#### RECTOR OF THE UNIVERSITY OF DEBRECEN

Rector: Zoltán Szilvássy M.D., Ph.D, D.Sc.  
Address: 4032 Debrecen, Egyetem tér 1.  
Phone: +36-52-412-060  
Phone/Fax: +36-52-416-490  
E-mail: rector@unideb.hu

#### FACULTY OF AGRICULTURAL AND FOOD SCIENCES AND ENVIRONMENTAL MANAGEMENT

Dean: Prof. Dr. habil. István Komlósi  
Address: 4032 Debrecen, Böszörményi út 138.  
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Fax: +36-52/486-292  
E-mail: komlosi@agr.unideb.hu

Vice Dean for Educational Affairs: Dr. habil. Csaba Juhász  
Address: 4032 Debrecen, Böszörményi út 138.  
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Vice Dean of Scientific Affairs: Dr. László Stündl  
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E-mail: stundl@agr.unideb.hu

#### DEAN'S OFFICE

Head of Dean's Office: Dr. Mrs. Julianna Fricz Mocsári  
Address: 4032 Debrecen, Böszörményi út 138.  
Phone/Fax: +36-52/508-412, +36-52/508-489  
E-mail: friczj@agr.unideb.hu

#### REGISTRAR'S OFFICE

Registrar: Dr. Mrs. István Kovács  
Address: 4032 Debrecen, Böszörményi út 138.  
Phone/Fax: +36-52/508-409, +36-52/508-317  
E-mail: ktunde@agr.unideb.hu

Officers  
Mrs. Gizella Kerekes Guthy  
Mrs. Mónika Bátori Pintye  
Ms. Zsuzsanna Házi  
László Lévai



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**CHAPTER 6**  
**THE DEPARTMENTS OF THE FACULTY**

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**INSTITUTE OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE**

Böszörményi út 138., Debrecen, 4032

Full Professor, Head of Institute	János Kátai C.Sc.
Associate Professor	Ms. Andrea Balláné Kovács Ph.D. Ms. Mária Micskeiné Csubák C.Sc. Imre Vágó C.Sc.
Assistant Professor	Ms. Rita Erdei Kremper Ph.D. Ms. Sándorné Kincses Ph.D. Zsolt Sándor Ph.D.
Secretary	Ms. Gizella Szász
Research Assistant	Ms. Magdolna Tállai Ph.D.

**INSTITUTE OF ANIMAL SCIENCE, BIOTECHNOLOGY AND NATURE  
CONSERVATION**

Böszörményi út 138., Debrecen, 4032

Full Professor, Head of Institute	István Komlósi D.Sc.
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**Department of Animal Husbandry**

Böszörményi út 138., Debrecen, 4032

Full Professor, Dean, Head of Department	István Komlósi D.Sc.
Professor Emeritus	Imre Bodó D.Sc. Sándor Mihók C.Sc.
Professor	János Gundel C.Sc.
Technical Assistant	Ms. Beáta Babka Ms. Gabriella Gulyás Attila Sztrik
Associate Professor	Béla Béri C.Sc. Károly Magyar C.Sc. Ms. Gabriella Novotniné Dankó Ph.D. József Prokisch Ph.D. László Stündl Ph.D.

## CHAPTER 6

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Assistant Lecturer	Ms. Nóra Pálfyné Vass Ph.D.
Assistant Professor	Péter Bársony Ph.D. Levente Czeglédi Ph.D.
	Ms. Anna Pécsi Ph.D. János Posta Ph.D.
Secretary	Sándor Boros Ms. Ágnes Gere Ms. Károlyné Kiss Ms. Marianna Korcsmárosné Varga Ms. Anikó Nagy

### **Department of Nature Conservation, Zoology and Game Management** Böszörményi út 138., Debrecen, 4032

Head of Department	Lajos Juhász Ph.D.
Assistant Research Fellow	László Kövér Ph.D.
Professor	Károly Rédei D.Sc.
Technical Assistant	Norbert Tóth
Assistant Professor	Péter Gyüre Ph.D. Lajos Kozák Ph.D. László Szendrei Ph.D.

### **Department of Animal Nutrition and Food Biotechnology** Böszörményi út 138., Debrecen, 4032

Head of Department	László Babinszky Ph.D.
Associate Professor	Csaba Szabó Ph.D.
Senior Lecturer	Ms. Judit Gálné Remenyik Ph.D.

### **Animal Genetics Laboratory** Böszörményi út 138., Debrecen, 4032

Head of Department	András Jávora C.Sc.
Professor	András Kovács D.Sc.
Assistant Lecturer	Ms. Zsófia Rózsáné Várszegi Ph.D.
Senior Research Fellow	Ms. Szilvia Kusza Ph.D.

**INSTITUTE OF FOOD SCIENCE**

Böszörményi út 138., Debrecen, 4032

Full Professor, Head of Institute	Béla Kovács Ph.D.
Professor	János Csapó D.Sc.
Technical Assistant	Ms. Éva Bacskainé Bódi
	Ms. Andrea Tóthné Bogárdi
Associate Professor	Ms. Erzsébet Karaffa Ph.D.
	Péter Sipos Ph.D.
Assistant Lecturer	Ms. Diána Ungai Ph.D.
Assistant Professor	Ms. Nikolett Czipa Ph.D.
	Ferenc Peles Ph.D.
Secretary	Ms. Tünde Simon

**INSTITUTE FOR LAND UTILISATION, TECHNOLOGY AND REGIONAL DEVELOPMENT**

Böszörményi út 138., Debrecen, 4032

Head of Institute	János Nagy D.Sc.
Professor	Béla Baranyi D.Sc.
	Gyula Horváth D.Sc.
Associate Professor	Zoltán Hagymássy Ph.D.
	Endre Harsányi Ph.D.
	Tamás Rátonyi Ph.D.
Assistant Professor	Imre Andorkó Ph.D.
	Ms. Adrienn Széles Ph.D.
	András Vántus Ph.D.
Senior Research Fellow	Attila Csaba Dobos Ph.D.
Secretary	Ms. Zsuzsanna Dorogi
	Ms. Sándorné Széles

**INSTITUTE OF HORTICULTURE**

Böszörményi út 138., Debrecen, 4032

Head of Institute	Imre Holb D.Sc.
Assistant Research Fellow	Ferenc Abonyi
Associate Professor	Ms. Mária Takácsné Hájos C.Sc.

## CHAPTER 6

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Assistant Lecturer	Ádám Csihon
	Péter Dremák Ph.D.
Assistant Professor	Nándor Rakonczás Ph.D.
Secretary	Ms. Andrea Gátiné Laskai

### **INSTITUTE OF CROP SCIENCES** Böszörményi út 138., Debrecen, 4032

Head of the Institute	Péter Pepó D.Sc.
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### **Department of Landscape Ecology** Böszörményi út 138., Debrecen, 4032

Head of Institute	Péter Pepó D.Sc.
Professor	Mihály Sárvári D.Sc.
Associate Professor	József Csajbók Ph.D.
Assistant Lecturer	Ms. Adrienn Novák Ph.D.
	Ms. Enikő Vári Ph.D.
Assistant Professor	Lajos Fülöp Dóka Ph.D.
	Ms. Erika Kutasy Ph.D.
	András Szabó Ph.D.
Secretary	Ms. Gyöngyi Kovács
	Ms. Endréné Szendrei

### **Department of Plant Biotechnology** Böszörményi út 138., Debrecen, 4032

Professor	Miklós Gábor Fári D.Sc.
Associate Professor	Ms. Szilvia Veres Ph.D.
Assistant Lecturer	Ms. Szilvia Kovács
	Ms. Brigitta Tóth Ph.D.
Assistant Professor	Ms. Éva Domokosné Szabolcsy Ph.D.
	Ms. Zsuzsanna Lisztes-Szabó Ph.D.
	Péter Makleit Ph.D.

**Genetics Group**

Böszörményi út 138., Debrecen, 4032

Head Pál Pepó C.Sc.

**INSTITUTE OF PLANT PROTECTION**

Böszörményi út 138., Debrecen, 4032

Head of Institute György János Kövics C.Sc.

Associate Professor András Bozsik C.Sc.

László Radócz C.Sc.

Assistant Professor Antal Nagy Ph.D.

Senior Research Fellow Gábor Tarcali Ph.D.

Secretary Ms. Tünde Szabóné Asbolt

**AGRICULTURAL LABORATORY CENTRE**

Böszörményi út 138., Debrecen, 4032

Assistant Research Fellow Ms. Nóra Óri

Technical Assistant Ms. Nóra Bessenyei Tarpay  
Csaba Kiss

Ms. Hajnalka Pákozdy

Ms. Istvánné Sörös

Gábor Tóth M.D.

Associate Professor Ms. Tünde Pusztahelyi Ph.D.

**INSTITUTE OF WATER AND ENVIRONMENTAL MANAGEMENT**

Böszörményi út 138., Debrecen, 4032

Deputy Head Csaba Juhász Ph.D.

Head of Institute János Tamás D.Sc.

Assistant Research Fellow Péter Riczu

Ms. Nikolett Szöllősi

Professor Lajos Blaskó D.Sc.

Technical Assistant Ms. Kamilla Berényi-Katona

Ms. Katalin Bökfí

Associate Professor Ms. Elza Kovács Ph.D.

Assistant Lecturer Ms. Tünde Fórián Ph.D.

	Ms. Ildikó Gombosné Nagy Ph.D.
	Ms. Lili Mézes Ph.D.
Assistant Professor	Attila Nagy Ph.D.
	Csaba Pregun Ph.D.
Secretary	Ms. Imre Lászlóné Huszka
	Ms. Zsuzsanna Szathmáriné Pongor

**FACULTY OF ECONOMICS AND BUSINESS**

Böszörményi út 138., Debrecen, 4032

Assistant Research Fellow	Zoltán Győri Ph.D.
Professor	Csaba Berde C.Sc.
	Miklós Herdon Ph.D.
	András Nábrádi MBA, C.Sc.
	Géza Nagy C.Sc.
	József Popp D.Sc.
	Zoltán Szakály C.Sc.
College Professor	Ferenc Kalmár Ph.D.
	Ms. Edit Gizella Szűcs Ph.D.
Associate Professor	Péter Balogh Ph.D.
	Zsolt Csapó Ph.D.
	Wiwczaroski Dr. Troy B. Ph.D.
	János Felföldi Ph.D.
	István Grigorszky Ph.D.
	Ms. Csilla Juhász Ph.D.
	Levente Karaffa Ph.D.
	István Kuti C.Sc.
	László Lakatos Ph.D.
	Ms. Ilona Nagyné Polyák Ph.D.
	Miklós Pakurár Ph.D.
	Károly Pető C.Sc.
	László Posta C.Sc.
	Sándor Szűcs C.Sc.
	István Szűcs Ph.D.
Assistant Lecturer	Ms. Mónika Harangi-Rákos
Assistant Professor	Ms. Andrea Bauerné Gáthy Ph.D.

THE DEPARTMENTS OF THE FACULTY

Zoltán Csiki M.D., Ph.D.

Ms. Zita Hajdu Ph.D.

Ms. Judit Katonáné Kovács Ph.D.

Sándor Kovács Ph.D.

Ms. Ildikó Tar Ph.D.

Ferenc Buzás Ph.D.

Research Fellow

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## CHAPTER 7

### UNIVERSITY CALENDAR

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Academic calendar

2015/2016

Events	Dates
Opening Ceremony	September 6 (Sunday)
Enrolment week	September 7 - 11
Study period for not final year students	September 14 - December 18 (14 weeks)
Study period for final year students	September 14 - November 13 (9 weeks)
Deadline for thesis submission	October 30
Examination period for final year students	November 16 - December 4 (3 weeks)
Examination period for not final year students	December 21 – February 5 (7 weeks)
Defending of the thesis	November 30 – December 1
Final exam	December 10 - 11
Graduation ceremony	December 19
Enrolment week	February 8 - 12
Study period for not final year students	February 15 – May 20 (14 weeks)
Study period for final year students	February 15 - April 22 (10 weeks)
Deadline of the thesis	April 22
Examination period for final year students	April 25 – May 20 (4 weeks)
Examination period for not final year students	May 23 - July 8 (7 weeks)
Defending of the thesis	May 26 - 27
Final exam	June 6 - 7
Graduation ceremony	June 18



## CHAPTER 8

# AGRICULTURAL ENVIRONMENTAL MANAGEMENT ENGINEERING MSc PROGRAMME

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### AGRICULTURAL ENVIRONMENTAL MANAGEMENT ENGINEERING MSc PROGRAMME

About the course:

The MSc in Agricultural Environmental Management Engineering is designed to develop your undergraduate knowledge and improve it through application and research. The field of Agricultural Environmental Management Engineering is broad and the programme reflects this diversity, with emphasis on Natural Resource Management, Environmental Impact Assessment, Environmental Technologies, Environmental Informatics, which are the key research areas of the Department of Water and Environmental management responsible for the course.

Requirements:

Application requirements: BSc degree or higher in Environmental Science. BSc degree or higher in an environmental-related degree. Other approved accreditation or professional qualification. upper-intermediate English language certificate.

Length of the Study programme: Two year full-time taught programme plus dissertation. Presently no part-time options available.

Number of ECTS credits: 120

The course consists of lectures and seminars. Attendance at lectures is recommended, but not compulsory. Participation at practice classes is compulsory. A student must attend the practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. A student can't make up a practice class with another group. The attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certificate needs to be presented. Missed practices should be made up for at a later date, being discussed with the tutor. Active participation is evaluated by the teacher in every class. If a student's behavior or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as an absence because of the lack of active participation in class.

The knowledge of the students will be tested several times depending on the class types during the entire course. The training ends in a Final Exam (FE) of the whole semester material and a minimum of four FE dates will be set during the examination period. Unsuccessful students may repeat

During the semester there are two tests: the mid-term test in the 8th week and the end-term test in the 15th week. Students have to sit for the tests.

Tests are evaluated according to the followings:

Score Grade

0-59 fail (1)

60-69 pass (2)

70-79 satisfactory (3)

80-89 good (4)

90-100 excellent (5)

absence for any reason counts as 0%.

If the score of any test is below 60, the student can take a retake test in conformity with the EDUCATION AND EXAMINATION RULES AND REGULATIONS.

An offered grade: It may be offered for the students if the average of the mid-term and end-term tests is at least good (4). The offered grade is the average of them.

Careers:

Postgraduates may progress to a PhD or find employment in environmental management, lecturing,

## CHAPTER 8

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consultancy or other sectors where environmental management is involved.

## CHAPTER 9

## CURRICULUM OF THE FULL TIME PROGRAMME

Compulsory courses															Prerequisites of taking the subject
1. year															
Subjects	Neptun code	1 <sup>st</sup> semester						2 <sup>nd</sup> semester							
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.				
Academic language skill I.	MTMKGE035										2		AW5	0	None
Agri-environmental protection	MTMKGE006	2		1	ESE	4									None
Agro- and soil ecology	MTMKGE002	3		1	ESE	5									None
Environmental chemistry- environmental physics	MTMKGE001	3		1	ESE	5									None
Environmental impact assessment and landscape management	MTMKGE009									3		2	ESE	5	None
Environmental laboratory measurement techniques, ecotoxicology	MTMKGE010									2		1	ESE	3	None
Environmental Technology II.	MTMKGE011									2		1	ESE	3	None

Compulsory courses														Prerequisites of taking the subject
1. year (continued)														
Subjects	Neptun code	1 <sup>st</sup> semester						2 <sup>nd</sup> semester						
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.			
Land use and regional planning II.	MTMKGE005	2			ESE	3								None
Management and environmental sociology	MTMKGE018						2				ESE	3		None
Natural Resource Management	MTMKGE004	2		2	ESE	5								None
Research methodology- scientific discussion	MTMKGE003	3		2	ESE	5								None
Rural Development	MTMKGE007	2			ESE	3								None
Sustainable agricultural systems and technologies in crop management	MTMKGE008						2		1		ESE	3		None
Technical infrastructure systems	MTMKGE013						2		2		ESE	3		None
Thesis preparation I.	MTMKGE027						1		1		AW5	5		None

<b>Compulsory courses</b>													<b>Prerequisites of taking the subject</b>
<b>1. year (continued)</b>													
<b>Subjects</b>	<b>Neptun code</b>	<b>1<sup>st</sup> semester</b>					<b>2<sup>nd</sup> semester</b>						
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.		
<b>Water Resource Management and Water Quality Protection</b>	<b>MTMKGE012</b>						2		1	ESE	3	None	

Compulsory courses														Prerequisites of taking the subject	
2. year															
Subjects	Neptun code	1 <sup>st</sup> semester						2 <sup>nd</sup> semester							
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.				
Academic language skill II.	MTMKGE036			2	AW5	0									None
Agri-environmental politics	MTMKGE021						2				ESE	3			None
Agrohydrology and irrigation techniques	MTMKGE023	2		1	ESE	3									None
Environmental and quality management	MTMKGE020						2				ESE	4			None
Environmental economy II.	MTMKGE022						2			1	ESE	2			None
Environmental Health	MTMKGE026						2				ESE	2			None
Environmental informatics and remote sensing	MTMKGE017	2		2	ESE	3									None
Environmental Technology III.	MTMKGE016	2		1	ESE	3									None
Nature protection II.	MTMKGE014	2			ESE	2									None

Compulsory courses														Prerequisites of taking the subject	
2. year (continued)															
Subjects	Neptun code	1 <sup>st</sup> semester					2 <sup>nd</sup> semester					Crd.			
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.				
Precision agriculture II.	MTMKGE024	2		1	ESE	2									None
Public administration organization - Environmental law	MTMKGE019					2					ESE			2	None
Sustainable agricultural systems and technologies in animal breeding	MTMKGE015	2		1	ESE	3									None
Thesis preparation II.	MTMKGE028	1		1	AW5	10									None
Thesis preparation III.	MTMKGE029						1				ESE		15		None
Waste management II.	MTMKGE025	1		1	ESE	2									None

<b>Required elective courses</b>													<b>Prerequisites of taking the subject</b>				
<b>1. year</b>																	
<b>Subjects</b>	<b>Neptun code</b>	<b>1<sup>st</sup> semester</b>					<b>2<sup>nd</sup> semester</b>										
		<b>L</b>	<b>S</b>	<b>P</b>	<b>Exam</b>	<b>Crd.</b>	<b>L</b>	<b>S</b>	<b>P</b>	<b>Exam</b>	<b>Crd.</b>						
<b>Hydrology</b>	<b>MTMKGE030</b>										2				ESE	2	None
<b>Water management</b>	<b>MTMKGE031</b>										1		1	ESE	3	None	



Required elective courses													Prerequisites of taking the subject		
2. year															
Subjects	Neptun code	1 <sup>st</sup> semester				2 <sup>nd</sup> semester				L	S	P		Exam	Crd.
		L	S	P	Exam	Crd.	L	S	P				Exam		
Advanced environmental technologies	MTMKGE033	2			ESE	2									None
Geoinformatics	MTMKGE034						1			1	1	AW5	3		None
Soil Science	MTMKGE032	2			ESE	2									None

## CHAPTER 10 COURSE DESCRIPTIONS

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### Institute for Land Utilisation, Technology and Regional Development

Subject: **LAND USE AND REGIONAL PLANNING II.**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **2**

#### **Requirements**

Course content:

Due to the complicated character of environmental problems and the interdisciplinarity of the course, it aims to develop complex and systematic approach, which is crucial in protection the balance of natural environments and efficient utilisation of the natural, artificial and social resources available for crop production by means of planning land use. As a result of completion of the course, students will be able to apply principles of advanced regional planning and land use, as potential managers or professional experts.

#### **Required reading materials**

*Braimoh, A. K., Vlek, P. L. G. (Eds.): Land Use and Soil Resources*  
2008. ISBN: 978-1402067778

*American Farmland Trust: Saving the Farm: A Handbook for Conserving Agricultural Land*  
American Farmland trust western Office, Davis CA., 1990.

*Ellis, S. Mellor, A.: Soils and Environment*

London-New York, Routledge, 1995. ISBN: 978-0415068888

*Carr, M. H., Zwick, P. D.: Smart Land-Use Analysis*

The LUCIS Model. ESRI Press: Redlands, CA., 2007. ISBN: 978-1589481749

*Pretty, J.: The living land: Agriculture, food and community regeneration in rural Europe*  
London; Sterling, VA: Earthscan, 2001. ISBN: 9781853835179

Subject: **RURAL DEVELOPMENT**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **2**

#### **Requirements**

Course content: The aim of this course is to present the relationships and the features of the regional and settlement development in accordance with the regional politics of the European Union as well as to evaluate and interpret the European regional development policies. A further aim is to outline the historical dimensions, to make concepts clear, to examine the range of tools of development the European observations of regional development and the European practice of regional politics, with special regard to the EU's regional (structural) development and cohesion funding policy. The course covers the different regional policies, the European conditions of their range of tools and institutions and the theoretical and practical connections between the regional processes, the small regional and municipality development programs, as well as the methods and techniques of their management, conduction and implementation. As a result of completion of the course, students will be able to apply principles of advanced rural development, as potential managers or

professional experts.

### Required reading materials

*Edward J. Blakely, nancey Green Leigh: Planning Local Economic Development: Theory and practice*

Sage Publications Inc., 2009. ISBN: 9781412960939

*Andy Pike, andres Rodriguez-Pose, John Tomaney: Handbook of Local and Regional Development*  
Taylor & Francis Ltd., 2010. ISBN: 9780415548311

*Anne C. Steinemann, H. James Brown, William C. Apgar: Microeconomics for Public Decisions*  
Mason, OH: Thomson/South Western Press. (SAB), 2005. ISBN: 9780030264719

## Institute of Agricultural Chemistry and Soil Science

Subject: **AGRO- AND SOIL ECOLOGY**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **3**

Practical: **1**

### Requirements

Course content:

The goal of the course: understanding and application of the principles of agroecosystems in soil, in R&D. Main chapters: Crucial factors in the sustainable development of the agroecological sub-systems and natural resources DSPIR method and the results of the VAHAVA. Scientific background of the climatic change scenarios and adaptation strategies in the agriculture. Role of atmospheric parameters in soil-plant-air system. Role of plant in soil-plant-air system. Role of soil parameters in soil-plant-air system. Soil ecology. Soil and its environment: soil texture, soil components. Heat and water management of soil. The role of the soil inhomogeneity and micro relief in the soil formation and maintenance. Organic and inorganic materials and their cycles. Relationship between soil and atmosphere, the role of the microclimate. Pedoclimax concept and its limitations – pedogenetical processes. Taxonomy: viruses, bacteria, fungi and algae. Formation, development and maintenance of microbiological associations. Invertebrate associations: microfauna, mezofauna and macrofauna. Soil biodiversity and its role in the soil. The role and processes of rhizosphere in the soil ecology. Relationship between soil functions and production technology. Natural scientific background of the relationship between soil and plants. The function of soil in the formation of growing area. Protection management of protected and useful species and their living area in the production practice. Developmental directions of resistance biology, Advantages and risks of GMO. As a result of completion of the course, students will be able to apply principles of advanced ecological relations in soil, at R&D level.

### Required reading materials

*Gliessman, S. R.: Agroecology: Ecological Processes in Sustainable Agriculture*  
CRC Press., 2007. ISBN: 978-157504431

*Vandermeer, J. H.: The Ecology of Agroecosystems*

Jones and Bartlett Publishers, Sudbury, MA, 2010. ISBN: 978-0763771539

*Abbott, L. K., Murphy, D. V.: Soil Biological Fertility. A key to sustainable land use in agriculture*  
Springer, 2007. ISBN: 9781402017568

*Bardgett, R. D., Usher, M. B., Hopkins, D. W.: Biological biodiversity and function in soils*  
Cambridge University Press, 2005. ISBN: 9780521609876

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*Killham, K.: Soil Ecology*

1994.

*Lavelle P.-Spain, V.A.: Soil Ecology*

Subject: **ENVIRONMENTAL CHEMISTRY-ENVIRONMENTAL PHYSICS**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **3**

Practical: **1**

### **Requirements**

Course content: The goal of the course: understanding and application of the principles of environmental chemistry and environmental physics in R&D, obtaining theoretical knowledge of chemistry and physics to solve environmental problems caused by either natural or anthropological processes and to eliminate the threatening new potential hazards. Main chapters: Geochemical development of the Earth. Chemical evolution, formation of biopolymers. Conformation and structure of lithosphere. Weathering and other transformation processes in the lithosphere. Environmental chemistry of pedo- hydro- and atmosphere. Biogeochemical cycles of carbon, oxygen, nitrogen, phosphorus, sulphur and some essential and toxic heavy metals. Transport of pollutants. Physical laws govern transports and wave-motion. Ionising radiations in the environment. Radioactive isotopes of natural and anthropogenic origin. Energy and environment, renewable energy sources. As a result of completion of the course, students will be able to apply principles of advanced environmental chemistry and environmental physics at R&D level.

### **Required reading materials**

*Baird, C., Cann, M.: Environmental chemistry*

4th. Freeman Publishers, 2008. ISBN: 978-142920146

*Srivastava, M., Sanghi R.: Chemistry for Green Environment*

Narosa Publ. House, 2008. ISBN: 978-81-7319-620-1

*Montehith, J. L., Unsworth, N.H.: Principles of environmental physics*

Acad. Press Elsevier, 2008. ISBN: 071312931 X

*Manahan, S. E.: Environmental chemistry*

8th. CRC Press., 2005. ISBN: 9781566706339

*Andrews, J. E., Brimblecombe, P., Jickells, T. D., Liss, P. S., Reid, B. J. : An introduction to environmental chemistry*

2nd. Blackwell Publishing Ltd., 2004. ISBN: 978-0632059058

## **Institute of Water and Environmental Management**

Subject: **AGRI-ENVIRONMENTAL PROTECTION**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **1**

### **Requirements**

Course content: The aim of the subject is to improve knowledge on theoretic background and practical applications of the agri-environmental protection. The students recognize the evolution of the environmental protection, the relationship of the environmental management and agriculture,

the international and Hungarian environmental projects, and practical methods. The course shows the environmental regulation of the agriculture, the practice of the maintenanceable agriculture. The subject-matter of instruction contains the NATURA-2000, and the presentation of agricultural practices on protected areas, with practical examples. As a result of completion of the course, students will be able to apply principles of advanced agri-environmental protection, at R&D level and as potential managers or professional experts.

### Required reading materials

*Biol, E., Koundouri, P.: Choice Experiments Inferring Environmental Policy*

Edward Publishing, 2008. ISBN: 978 1 84542 725 2

*Jack, B.: Agriculture and EU Environmental Law*

Ashgate Publication, 2009. ISBN: 978-0754645405

*Merrington, G., Winder, L., Redman, M.: Agricultural Pollution. Environmental Problems and Practical Solutions*

Spon. Press, 2005. ISBN: 9780419213901

*Ritter, W. F., Shirmohammadi, A.: Agricultural nonpoint source pollution*

CRC Press. LLC, 2001. ISBN: 978-1566702225

*Warren, J., Lawson, C., Belcher, K.: The Agri-Environment*

Cambridge University Press, 2008. ISBN: 978-0521849654

Subject: **NATURAL RESOURCE MANAGEMENT**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **2**

### Requirements

Course content:

The goal of the course is discussing renewable and non-renewable natural resources (mining, production of annual and perennial energy crops etc.) in detail. As part of the course, the following will be covered: sustainability of the utilisation of resources, calculation of energy balance, environmental effects, major elements of life-cycle analysis; recultivation possibilities of areas injured by mining activity, possibilities to increase the efficiency of energy production from biomass. As a result of completion of the course, students will be able to apply principles of advanced natural resource management, at R&D level and as potential managers or professional experts.

### Required reading materials

*Pearce, R. K., Turner, D. W.: Economics of Natural Resources and the Environment*

Harvester Wheatsheaf, 1990. ISBN: 978-0801839870

*David A. A.: Environmental Economics and Natural Resource Management*

3rd. Taylor Francis Ltd., United Kingdom, 2010. ISBN: 978-0415779050

*Lund, C., Sikor, T.: The Politics of Possession: Property, Authority, and Access to Natural Resources*

Wiley-Blackwell, New York, 2010. ISBN: 978-1405196567

*Nagle, J.: Making Good Choices About Renewable Resources*

Rosen Publishing Group, 2009. ISBN: 978-1435856035

## CHAPTER 10

Subject: **RESEARCH METHODOLOGY-SCIENTIFIC DISCUSSION**

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Lecture: **3**

Practical: **2**

### **Requirements**

Course content: After fulfilling the course, students will be capable to make a graduation paper that suits to the expectation level of the specialization. Graduated students starting career in the sciences and professional practise would do well to have had courses in technical and scientific writing, public speaking, group communications, scientific presentations, journalism, leadership and interpersonal skills, professional ethics, audiovisual principles, rhetoric, and other subjects that develop the practical skills of communications. The course gives the ability to choose a topic effectively and to analyze the critical points of the objectives of the research. Fulfilling the course the student will be able to determine limits of time and contents of his own work-plan, to systematize and analyze the primary and secondary references, to work out the optimal research methodology according to the objectives, to estimate the reliability and adaptability of the results by his own, and will have knowledge in project-writing and management and some ideas relative to preparing for, organizing, and producing a rough draft of any scientific paper or presentation. Obtained knowledge prepares well the students for a professional or scientific career.

### **Required reading materials**

*Macrina, F. L.: Scientific Integrity: An Introductory Text with Cases*

2nd. ASM Press, Washington, DC, 2000. ISBN: 9781555811525

*Lowell, K., Jaton, A.: Spatial Accuracy Assessment*

*Montgomery, S. L.: The Chicago Guide to Communicating Science.*

University of Chicago Press, Chicago, 2003. ISBN: 978-0226534855

*J. L. Lebrun: Scientific writing. A readers and writer's guide*

Word Scientific Publishing. Singapore, 2008. ISBN: 978-9814350600

*M. J. Katz: From research to Manuscript. A guide to scientific writing.*

Springer Publish., 2009. ISBN: 978-1402094668

## Agricultural Laboratory Centre

Subject: **ACADEMIC LANGUAGE SKILL I.**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Practical: **2**

### **Requirements**

Course content: The pedagogical goals of the subject are to equip students with the essential receptive skills of reading and understanding high standard technical texts and to prepare them to be able to acquire subject knowledge and read scientific literature in English.

### **Required reading materials**

*Glendening, E.: Study Reading. A course in reading skills for academic purposes.*

Cambridge University Press, 2006.

*Wallace, M.: Study skills in English*

Cambridge University Press, 2006.

*Jandt, F. E. : An Introduction to intercultural Communication. Identities in a Global Community*  
Sage, 2010. ISBN: 978-1-4129-7010-5

Subject: **MANAGEMENT AND ENVIRONMENTAL SOCIOLOGY**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **2**

### Requirements

Course content: The goal of the course: introduction to the history, development, most important schools, trends and theories of management science, and understanding and ability of practical application of the principles of the most important relations, managerial methods and procedures. Main topics: development of management, managerial schools, trends, group management, organizational development, organizational culture, change management, motivation, conflict management, managerial method, managerial style, innovation management. As a result of completion of the course, students will be able to apply principles of advanced management as potential managers or professional experts.

### Required reading materials

*Paccos, A. M.: The Law and Economics of Corporate Governance: Changing Perspectives*  
Edward Elgar Publishing Ltd., 2010. ISBN: 978-1848448971

*Bernitz, U., Ringe, W-G.: Company Law and Economics protectionism: New Challenges to European Integration*

Oxford University Press, 2006. ISBN: 978-0199288090

*Coffee, J.: The Professions and Corporate Governance*

Oxford University Press, 2006. ISBN: 978-0199288090

*Renneboog, L.: Advances in Corporate Finance and Asset Pricing*

Elsevier Science and Technology, 2006. ISBN: 978-0444527233

*Harper, C.,: Environment and Society: Human Perspectives on Environmental Issues*

Upper Saddle River, New Jersey: Pearson education, Inc, 2004. ISBN: 978-0130165558

## Department of Landscape Ecology

Subject: **SUSTAINABLE AGRICULTURAL SYSTEMS AND TECHNOLOGIES IN CROP MANAGEMENT**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: In the context of the this course, students will adapt the scientific aspects of the interactive relationship between plant production and environment. The aim is to show the complex system of biological, agro-ecological and production technological factors; to describe material and energy process applied in the system and to model their environment impacts. Definition, component and types of alternative crop production systems. Conventional, sustainable, organic and other crop production systems. Ex situ and in situ environmental protection in crop production. Sustainable crop production technological models for crops, oil, leguminous, root, tuber, and fodders. As a result of completion of the course, students will be able to apply principles of advanced sustainable crop management, at R&D level and as potential managers or professional experts.

### Required reading materials

- Marin, F. R.: Crop management-Cases and Tools for Higher Yield and Sustainability*  
InTech Published, 2012. ISBN: 978-953-51-0068-3
- Lichtfouse, E., Navarette, M., debaeke, P., Véronique, S., Alberola, C. (Eds.): Sustainable Agriculture*  
Springer, 2009. ISBN: 978-90-481-2666-8
- Martin, J. H., Waldren, R. P., Stamp, D. L.: Principles of Field Crop Production*  
Upper Saddle River, New Jersey, Columbus, Ohio, 2006. ISBN: 978-0130259677
- Acquaah, G.: Principles of Crop Production. Theory, Techniques and Technology.*  
Upper Saddle River, New Jersey, Columbus, Ohio, 2005. ISBN: 978-0131145566
- Havlin, J. L., Beaton, J. D., Tisdale, S. L., Nelson, W. L.: Soil Fertility and Fertilizers*  
Upper Saddle River, New Jersey, 2005. ISBN: 978-0130278241

## Institute for Land Utilisation, Technology and Regional Development

Subject: **TECHNICAL INFRASTRUCTURE SYSTEMS**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **2**

Practical: **2**

### Requirements

Course content: The infrastructure supporting human activities includes complex and interrelated physical, social, ecological, economic, and technological systems such as transportation, energy production and distribution; water resources management; waste management; facilities supporting urban and rural communities; sustainable resources development; and environmental protection. Increasingly, inter- and multidisciplinary expertise is needed not only to design and build these systems, but to manage and sustain them as well. In the frame of the subject the basic elements, procedures and systems of technical infrastructure will be presented. Through the examination of these the students will get familiar with system-and methodological connections of realizing the technical infrastructure in the field of environment management. The adapted application of the technical infrastructure in the field of environment management will be presented in a different but still connected environment. As a result of completion of the course, students will be able to apply principles of advanced technical infrastructures, as potential managers or professional experts or professional experts.

### Required reading materials

- Goodman, A. S., Hastak, M.: Infrastructure planning handbook: planning, engineering, and economics*  
New York, ASCE Press, 2006. ISBN: 978-0071474948
- Nemerow, N. L., Agardy, F. J., Salvato, J. A.: Environmental Engineering: Environmental Health and Safety for Municipal infrastructure, Land Use and Planning, and Industry*  
Hoboken, N. J.: Wiley, 2009. ISBN: 978-0470083055
- Maione, U., Lehto, B. M., Monti, R.: New trends in water and environmental engineering for safety and life*  
Netherlands, 2000. ISBN: 9058095738
- Cheremisionoff, N. P.: Handbook of solid waste management and waste minimization technologies.*



Amsterdam, Butterworth-Heinemann, 2003. ISBN: 978-0750675079  
*Kreith, F., Tchobanoglous, G.: Handbook of solid waste management*  
New York, McGraw-Hill, 2002. ISBN: 978-0071356237

## Institute of Food Science

Subject: **ENVIRONMENTAL LABORATORY MEASUREMENT TECHNIQUES, ECOTOXICOLGY**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: The purpose of the environmental impact assessment is to ensure that students as decision makers in the future will be able to consider the environmental impacts and can decide whether to proceed with a project. In the course, the relevant European Union Directive and regulations in other regions on Environmental Impact Assessment will be detailed through case studies. Conditions and the way of completion of a preliminary environmental study, an impact assessment and an Integrated Pollution Prevention and Control procedure will be discussed as well as key areas for assessment, such as description of the environment and significant effects on the environment, project description techniques from environmental point of view, and methods for comparison of alternatives. As a result of completion of the course, students will be able to apply principles of advanced environmental impact assessment, at R&D level and as professional experts or potential managers or professional experts.

### Required reading materials

*Belitz, H. D., Grosch, Werner, Schieberle, Peter: Food Chemistry*

ISBN: 978-3-540-69934-7

*Cresser, M. S.: Flame spectrometry in environmental chemical analysis*

The Royal Society of Chemistry. Cambridge, 1994.

*Montaser, A.: Inductively coupled plasmas mass spectrometry*

VCH Publishers. New York., 1998.

*Skoog D. A., D. M. West, F. J. Holler: Fundamentals of analytical Chemistry*

1992.

## Institute of Water and Environmental Management

Subject: **ENVIRONMENTAL TECHNOLOGY II.**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: The goal of the course: understanding of R&D aspects in environmental technologies, including drinking water purification technologies with respect to general and special contaminants, such as arsenic; membrane technologies – micro, ultra and nanofiltration, reverse

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osmosis; waste water treatment technologies; membrane bioreactors and their applications; alternative bioenergy resources, such as bioethanol, biodiesel and their production technologies; biogas production; solar energy, photovoltaic systems; geothermal energy and use in urban and agricultural applications. As a result of completion of the course, students will be able to apply principles of selected environmental technologies, at R&D level and as potential managers or professional experts or professional experts.

### Required reading materials

*Lens, P., Kennes, C., Le Cloirec, P., Deshusses, M.: Waste Gas Treatment for Resource Recovery*  
IWA Publishing, London, UK, 2006. ISBN: 978-1843391272

*Lens, P., Grotenhuis, T., Malina, G., Tabak, H.: Soil and Sediment Remediation*  
IWA Publishing, London, UK, 2005. ISBN: 978-1843391005

*Lens P., westermann, P., Haberbauer, M., Moreno, A.: Biofuels for Fuel Cells*  
IWA Publishing, London, UK, 2005. ISBN: 978-1843390923

*Soga, T.: Nanostructured Materials for Solar Energy Conservation*  
Elsevier, 2008. ISBN: 978-0444528445

*Diallo, M., Duncan, J., Savage, N., Street, A., Sustich, R.: Nanotechnology Applications for Clean Water: Solutions for Improving Water quality (Micro and Nano Technologies)*  
William Andrew, Norwich, NY, USA, 2009. ISBN: 978-0815515784

Subject: **ENVIRONMENTAL IMPACT ASSESSMENT AND LANDSCAPE MANAGEMENT**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **3**

Practical: **2**

### Requirements

Course content: The purpose of the environmental impact assessment is to ensure that students as decision makers in the future will be able to consider the environmental impacts and can decide whether to proceed with a project. In the course, the relevant European Union Directive and regulations in other regions on Environmental Impact Assessment will be detailed through case studies. Conditions and the way of completion of a preliminary environmental study, an impact assessment and an Integrated Pollution Prevention and Control procedure will be discussed as well as key areas for assessment, such as description of the environment and significant effects on the environment, project description techniques from environmental point of view, and methods for comparison of alternatives. As a result of completion of the course, students will be able to apply principles of advanced environmental impact assessment, at R&D level and as professional experts or potential managers or professional experts.

### Required reading materials

*Duinker, P. N., Greig, L. A.: Scenario analysis in environmental impact assessment: Improving explorations of the future.*

Environmental Impact Assessment Review, 2007.

*Payraudeau, S., Van der Werf, H. M. G.: Environmental impact assessment for a farming region: a review of methods*

Agriculture, Ecosystems and Environemnet, 2005.

*Hartley, N., Wood, C.: Public participation in environmental impact assessment-Implementing the Aarhus Convention*

Environmental Impact Assessment Review, 2005.

*Hensley, D. L. : Professional Landscape Management*

Stipes Publishing , 2005. ISBN: 978-1588743749

*Van der Zanden, A. M., Cook, T. W.: Sustainable Landscape Management: Design, Construction, and Maintenance*

John Wiley&Sons, Inc., Hoboken, new jersey, USA, 2010. ISBN: 0470480939

*Worsfold, P., Townshend, A., Poole, C.: Encyclopedia of Analytical Science.*

Academic Press. London, 2005. ISBN: 978-0127641003

Subject: **THESIS PREPARATION I.**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **1**

Practical: **1**

### Requirements

Course content: The education goal of the subject is that after completing the course, students will be able to work up an environmental management or protection theme at high level, get acquainted with contentional and formal requirements of dissertation making scholarly and get practice in self-search and data collection. In the framework of making dissertation and consultation I. student get acquainted with the importance of choise of theme, data and source collection, working up literature, independent research methods and possible problems.

### Required reading materials

*Murray, R.: How to write a thesis?*

Open University Press, McGraw-Hill, UK, 2006.

*Brewer, R. C.: Your PhD Thesis: How to plan, draft, revise and edit your thesis*

Trans-Atlantic Publications, 2007. ISBN: 1842850709

*Allison, B., Race, P.: The student's guide to preparing dissertations and thesis*

Taylor & Francis Ltd., 2004. ISBN: 0-415-33486-1

Subject: **WATER RESOURCE MANAGEMENT AND WATER QUALITY PROTECTION**

Year, Semester: 1<sup>st</sup> year/2<sup>nd</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: The objective of the subject is to teach the recent developments of water resources management in an integrated way. This means the integration of the qualitative (e.g. water quality), quantitative (runoff, flows and water volumes) and ecological (aquatic and ecotone ecosystems) components of water resources, the integration of the public, the stakeholders and decision making levels (as of the older concept of IWRM). A detailed overview of the most recent problems arising from the changes of the climate is also provided with special regard to the respective changes that will be needed in the Water Framework Directive of the European Union and within this to its main tool the River Basin Management Planning (RBMP). Much of the teaching work will be based on the use a still unique computerized teaching aid (WQMCAL Version 2). As a result of completion of the course, students will be able to apply principles of advanced water resource management, at R&D level and as potential managers or professional experts.

### Required reading materials

- Jolánkai G., Bíró I.: Basic river and lake water quality models, Computer aided learning programme on water quality modelling*  
Software and description. UNESCO IHP Documents on CD-ROM Series No. 1., 2001.
- Grafton, R. Q., Hussey, K.: Water resource planning and management*  
Cambridge University Press, 2012. ISBN: 978-0-521-76258-8
- Láng I., Jolánkai G.: The VAHAVA Report, Global climate Changes, Impacts and responses in Hungary*  
Szaktudás Kiadó Ház, Budapest, 2007. ISBN: 978-963-9736-17-7
- Thornton J. A., Rast W., Holland M. M., Jolánkai G., Ryding S. O. (editors): Assessment and Control of Non-point Source Pollution of Aquatic Systems-A Practical Approach*  
UNESCO, Paris and Parthenon Publishing, Carnforth, 1999. ISBN: 1-85070-384-1
- Tsakiris, G. (Ed.): Water Resources Mangement*  
Int. Journal, EWRA, ISBN: 0920-4741

## Agricultural Laboratory Centre

Subject: **ACADEMIC LANGUAGE SKILL II.**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Practical: **2**

### Requirements

Course content: The pedagogical goals of this subject are to equip students with the essential productive skills of academic writing, to make them aware of the differences between genres, to enable them to produce technical texts in their field of science, and to prepare them to apply this knowledge in their future research work.

### Required reading materials

- Wallace, M.: Study skills in English*  
Cambridge University Press, 2006.
- Wiwczarowski, T.: Writing for Professional Communication*  
DE ATC, Debrecen Hungary, 2006.

## Department of Animal Husbandry

Subject: **SUSTAINABLE AGRICULTURAL SYSTEMS AND TECHNOLOGIES IN ANIMAL BREEDING**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: The goal of the course: understanding and ability of practical application of the principles of animal nutrition, genetic and selection systems, which improve the efficiency of animal production, considering sustainable production, the role of gene reserve stocks in sustainable

animal breeding, environmental protection, organic production, breeding systems of native animal breeds, environmental aspects of animal nutrition, the possibilities to reduce nitrogen, phosphorous, potassium, methane output, the effects of animal on environment, environment friendly technological aspects in animal keeping and breeding, the effects of feed manipulation, preservation, production on the environment, good practice in animal housing according to the environmental conditions, animal grazing, grazing technologies, grazing on protected areas, the possibilities of organic animal production, return of organic materials and by-products derived from animal production systems to the environment, and quality control of animal farms. As a result of completion of the course, students will be able to apply principles of advanced sustainable animal breeding, at R&D level and as potential managers or professional experts.

### Required reading materials

*Aland, A., Madec, F.: Sustainable animal production: The Challenges and potential Developments for Professional Farming*

Wageningen Press., 2009. ISBN: 978-9086860999

*Dryden, G.: Animal Nutrition Science*

CABI, 2008. ISBN: 978-1845934125

*McNamara, J. P., France, J., Beever, D. E.: Modelling Nutrient Utilization in Farm animals*

CABI, 2000. ISBN: 978-0851994499

*Simm, G., Villanueva, B., Sinclair, K. D., Townsend, S. (Eds.): Farm animal genetic resources.*

Nottingham University Press, 2004. ISBN: 978-1897676158

*Vaarst, M., Roderick, S., Lund, V., Lockeretz, W.: Animal health and welfare in organic agriculture*

CABI Publishing, 2004. ISBN: 978-0851886684

## Department of Nature Conservation, Zoology and Game Management

Subject: **NATURE PROTECTION II.**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **2**

### Requirements

Course content: The aim of the subject is to provide special knowledge on nature protection, and furthermore, to introduce an approach, where real values of the nature are considered important and respected, and their protection is considered necessary. Knowledge provided includes planning and managing general and special tasks in nature protection, in addition to theoretical and practical issues in high level and ability to apply the principles of nature protection in the work of any company or organization (forestry, agriculture, fishing, game management, grassland management, rural and urban development). As a result of completion of the course, students will be able to apply principles of advanced nature protection, at R&D level and as potential managers or professional experts or professional experts.

### Required reading materials

*Primack, R.: Essentials of Conservation Biology.*

Sinauer Associates Inc. Sunderland, Massachusetts, USA, 1998. ISBN: 978-0878937219

*Institute of Ecology and Botany*

Hungarian Academy of sciences, 2003. ISBN: 963 8392 30 8

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*Voloscuk, I.: The National Parks and Biosphere Reserves in Carpathians. The last Nature Paradises.*

Ass. of the Carpathian National parks and Biosphere reserbves. Tatranska Lomnica, slovakia, 1999. ISBN: 808868031X

*Genovesi, P., Shine, C.: European strategy on invasive alian species. Nature and environment*  
Concil of Europe Publisching, strasbourg, 2004. ISBN: 92-871-5488-0

*van Koppen, C. S. A., Markham, W. T.: Protecting nature: Organizations and Networks in Europe and the USA*

Edward Elgar Publishing Ltd., Cheltenham, UK, 2007. ISBN: 978-1-84542-970-6

# Institute of Water and Environmental Management

Subject: **AGROHYDROLOGY AND IRRIGATION TECHNIQUES**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **1**

## Requirements

Course content: The goal of the course: understanding and ability of practical application of agrohydrology, including the following: The forms, rise, quantitative characteristics, measurement, spatial and periodical dispersions, and density- and dispersion functions of moistures. The mechanisms, forms, measurement and calculation of the evaporation. The calculation and measurement of the infiltration. The forms, measurement and calculation of the runoff, the watershed-characteristic. The morphology and hydrology of watershed. The relationship of WFD and land-use. Review of technological practices, activities of irrigation management concerning agriculture and environmental management. Advanced knowledge on irrigation techniques, process of setting of an irrigation system, theory and practice of designing, theory of setting and installation, handing over of irrigation systems. As a result of completion of the course, students will be able to apply principles of advanced watershed management, as potential managers or professional experts.

## Required reading materials

*Brooks, K. N., Folliott, P. F., Gregersen, H.M., DeBano, L. F.: Hydrology and the Management of Watersheds.*

Iowa State University Press, Ames, 2003. ISBN: 978-0813829852

*DeBarry, P. A.: Watersheds: Proceses, Assessment and Management.*

John Wiley&Sons, 2004. ISBN: 978-0471264231

*Hooja, R.: Management of Water for Agriculture: Irrigation, Watersheds and Drainage*

Rawat Publications, 2004. ISBN: 978-8170338864

*Heathcote, I. W.: Integrated Watershed Management: Principles and Practice*

John Wiley&Sons, 2009. ISBN: 978-0470376256

*Bjornlund, H.: Incentives and Instruments for Sustainable Irrigation.*

WIT Press, Ashurst, Southampton, 2010. ISBN: 978-1845644062

Subject: **ENVIRONMENTAL TECHNOLOGY III.**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **1**

### **Requirements**

Course content: The goal of the course: understanding of R&D aspects in environmental technologies, including planning and sizing of solar, surface water and wind utilizing systems as well as geothermal systems; Sizing and design of biological gas purifying, and waste water cleaning plants; Specifications, best available technologies, technical development in the advanced energy sector. As a result of completion of the course, students will be able to apply principles of advanced sustainable animal breeding, at R&D level and as potential managers or professional experts.

### **Required reading materials**

*International Energy Agency: Deploying renewables*

OECD/IEA, 2011. ISBN: 9789264124905

*Foster, R., Ghassemi, M., Cota, A.: Solar Energy-Renewable Energy and the Environment*

CRC Press, Boca Raton, 2009. ISBN: 9781420075663

*Hester, R. E., Harrison, R. M. : Sustainability and environmental impact of renewable energy sources*

Cambridge, U.K. Royal society of Chemistry, 2003. ISBN: 9781591249153

*Moselle, B., Padilla J., Schmalensee R.: Harnessing renewable energy in electric power systems*

ASM Press, Washington, DC, RFF Press, 2010. ISBN: 9781936331864

*Sorensen, B.: Renewable Energy: Physics, engineering, Environmental Impacts, Economics & Planning*

Academic Press., 2010. ISBN: 9780123750259

Subject: **ENVIRONMENTAL INFORMATICS AND REMOTE SENSING**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **2**

### **Requirements**

Course content: The objective of the course is to improve the theoretical knowledge on environmental informatics and to acquire the method of geoinformatics during project-works. The aims of the course in details: picture analyses; data-integration, building environmental databases, operations, types and use of digital field maps, distance-type and cost-type examinations, geostatistics, decision-making by environmental informatics, practical problems of projects in environmental informatics, questions of realization and operation of information systems, case studies (mapping, environmental case studies, hydrological modelling, regional planning). The course focuses on new interpretation approaches as well, including hyperspectral analysis, high-spatial resolution data, and radiative transfer models, the tematics cover recent missions, such as Terra-Aqua, Envisat, Ikonos-Quickbird-Geoeye and SPOT-5, as well as new sensors, such as lidar, Field Spec Pro and TETRACAM. As a result of completion of the course, students will be able to apply principles of advanced environmental informatics, at R&D or as professional experts.

### Required reading materials

*Hrebicek, J., Racek, J.: Informatics for Environmental Protection. Networking Environmental Information*

Masaryk University, Brno, 2005. ISBN: 80-210-3780-6

*Günther, O.: Data management in environmental information systems, Handbook of massive data sets*

Kluwer Academic Publishers, Norwell, MA, 2002. ISBN: 1-4020-0489-3

*Ratenstrauch, C., Patig, S.: Environmental Information Systems in Industry and Public Administration*

Idea Group Publishing, London, 2001. ISBN: 978-1930708020

*Avouris, N. M., Page, B.: Environmental Informatics-Methodology and applications of Environmental Information Processing*

Kluwer Academic Publishers, Norwell, Mass., 1995. ISBN: 978-0792334453

*Lillesand, T., Kiefer, r., W., Chipman J.: Remote sensing and image interpretation*

6th. Wiley, 2007. ISBN: 978-0-470-05245-7

Subject: **PRECISION AGRICULTURE II.**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: Students will be able to plan precision agricultural systems after the successful accomplishment of the course. They can perform professional assistance-direction works connected with precision agriculture on farm and regional level. The subject-matter of instruction: Geographical location and GIS in the precision agriculture. The technical and informatical methods of the joined data collection and data preparation. Data analysis methods: systematizing application and valuation of the primer and second – traditional and digital data resources. High level spectral picture segmentation, classification and data integration. Optimised interventions for precisional manoeuvres and their automatization. Precisional animal husbandry technologies. Precisional decision-assistance systems. As a result of completion of the course, students will be able to apply principles of advanced precision agriculture, as potential managers or professional experts.

### Required reading materials

*Brase, T.: Precision agriculture*

1st. Delmar Cengage Learning, 2005. ISBN: 978-1401881054

*Srinivasan, A.: Handbook of precision agriculture: Principles and applications*

CRC Press., 2006. ISBN: 978-1560229551

*Research Systems Inc.: ENVI Tutorial, USA*

2001.

*Kennedy, H.: Introduction to 3D Data: Modelling with ArcGIS 3D Analyst and Google Earth*

Wiley, 2009. ISBN: 978-0470381243

*Dash, N. B., Mohanty, M. K.: Concepts-Applications-Agricultural-engineering*

Dist. Publ., 2007. ISBN: 978-8181891396



Subject: **THESIS PREPARATION II.**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **1**

Practical: **1**

### **Requirements**

Course content: The education object of the subject is to make students be able to work up an environmental management or protection theme in high level, get acquainted with contentional and formal requirements of dissertation making scholarly, get practice in self-search and data collection, work up the relevant bibliography, make oneself master of material and methods and be able to collect data and work up sources alone.

### **Required reading materials**

*Murray, R.: How to write a thesis?*

Open University Press, McGraw-Hill, UK, 2006.

*Brewer, R. C.: Your PhD Thesis: How to plan, draft, revise and edit your thesis*

Trans-Atlantic Publications, 2007. ISBN: 1842850709

*Allison, B., Race, P.: The student's guide to preparing dissertations and thesis*

Taylor & Francis Ltd., 2004. ISBN: 0-415-33486-1

Subject: **WASTE MANGEMENT II.**

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Lecture: **1**

Practical: **1**

### **Requirements**

Course content: The goal of the course is to provide students with advanced knowledge of the theory and practice of the waste management, and to acquire the biological, microbiological and technological background of biodegradable communal, agricultural and food waste management. Students learn about the natural methods of solid, liquid and suspended waste and waste water purification and treatment. Learn the best available application of recycling, recovery and other disposal technologies of the construction waste, radioactive waste. As a result of completion of the course, students will be able to apply special issues of advanced waste management, as professional experts.

### **Required reading materials**

*Epstein, E.: Industrial Composing: environmental Engineering and Facilities Management*  
CRC Press., 2011. ISBN: 978-143-9845-31-8

*Deublein, D., Steinhäuser, A.: Biogas from Waste and Renewable resources*  
Wiley, 2008. ISBN: 978-352-7327-98-0

*Insam, H., Franke-Whittle, I., Goberna M.: Microbes at Work: From Wastes to Resources*  
Springer, 2009. ISBN: 978-3642040429

*Christensen, T. H.: Solid waste Technology & Management*  
Balckwell Scientific Publications, 2011. ISBN: 9781405175173

*Han, D.: Concise Environmental Engineering.*  
Ventus Publishing, 2012. ISBN: 978-87-403-0197-7

## Agricultural Laboratory Centre

Subject: **ENVIRONMENTAL HEALTH**

Year, Semester: 2<sup>nd</sup> year/2<sup>nd</sup> semester

Lecture: **2**

### Requirements

Course content: The goal of the course: understanding relations in environmental health, regarding to the following: Global environmental issues. The disaster of Seveso – case study. Air pollution and health. The smog of London – case study. Water pollution and health. Soil pollution and health. Health effects of toxic substances in food. PCB poisoning – case study. Housing and health. Noise as a health hazard. Health hazards of ionising radiation and radioactive substances. Lessons from the disaster of Chernobyl. Defence of human body against exposure to environmental agents. Application of gas chromatography/mass spectrometry in environmental monitoring. Status of environmental hygiene in the World. Chemical safety. Organisation and structure of environmental hygiene in Europe. As a result of completion of the course, students will be able to apply principles of advanced environmental health, as potential managers or professional experts.

### Required reading materials

*Frumkin H. (ed.): Environmental Health. From Local to global*

John Wiley&Sons, 2010. ISBN: 978-0787973834

*Last, J. M., Wallace, R. B. (eds.): Public health and preventive medicine*

15th. Appleton and Lange, Norwalk, USA, 2007. ISBN: 978-0071441988

*Yu, M.: Environmental toxicology*

CRC Press LLC, Boca Raton, 2005. ISBN: 978-1566706704

*Greenberg, M.: Occupational and Environmental Medicine*

McGraw-Hill Higher Education, London, UK, 2005. ISBN: 978-0071464383

*Brooks, S., Gochfeld, M., Herzstein, J., Jackson, R., Schenker M.: Environmental medicine*

Mosby Publisher, St. Louise, Missouri, USA, 1995. ISBN: 978-0801664694

Subject: **ENVIRONMENTAL ECONOMY II.**

Year, Semester: 2<sup>nd</sup> year/2<sup>nd</sup> semester

Lecture: **2**

Practical: **1**

### Requirements

Course content: The goal of the course is to enlarge the knowledge of the students in the area of macro-and micro-economy. During the course the formation and the recent state of environmental management as a new scientific is introduced. The macro- and micro-economical correlations of the environment and the economy are revealed as well as the applied tool systems. The practical methods and their theoretical bases of environmental management are introduced. The students get acquainted with the methods of increasing the efficiency of sustainable development and with the principles of environmental friendly designing.

### Required reading materials

*Durlauf, S. N., Blume, L. E.: The New Palgrave Dictionary of economics*

2nd. Palgrave Macmillian, 2008. ISBN: 978-0230226395

*O'Connor, M., C. Spash: Valuation and the Environment: Theory, Method and Practice*

Edward Elgar, Cheltenham, UK, 1999. ISBN: 978-1858985381

*Pearce, D.: Economics and Environment: Essays on Ecological Economics and Sustainable Development*

Edward Elgar, Cheltenham, UK, 1998. ISBN: 1840643269

*European Commission: Environment 2010: Our Future, Our Choice-Sixth Environmental Action Programme 2001-2010*

Luxembourg: OOEPEC, 2001. ISBN: 92-894-0261-X

*Perman, R., Ma, y., McGilvray, J., Common, M.: Nature resource and environmental economics*

Pearson Education, Harlow, UK., 2003. ISBN: 978-0-273-6559-6

Subject: **PUBLIC ADMINISTRATION ORGANIZATION - ENVIRONMENTAL LAW**

Year, Semester: 2<sup>nd</sup> year/2<sup>nd</sup> semester

Lecture: **2**

### Requirements

Course content: The goal of the course: understanding and application of the principles of the substantive and procedural requirements and organisation of the environmental protection. Main topics: the subject, system, principles and methods of the regulation; environmental protection in the constitution; environmental impact assessment; environmental permission; protection of soil, water, nature, air and waste management. As a result of completion of the course, students will be able to apply principles of public administration and environmental law as potential managers or professional experts.

### Required reading materials

*Hedemann-Robinson, M.: Enforcement of European Union Environmental Law*

Routledge-Cavendish, New York, 2007. ISBN: 978-1859419175

*Henry, N.: Public Administration and Public Affairs*

11th. Longman, 2010. ISBN: 978-0205685516

*Hill, B.: Environmental Justice-Legal Theory and Practice*

Environmental Law Institute, 2009. ISBN: 978-1585761241

*Rabin, J. (Editor): Handbook of Public Administration*

3rd. Harrisburg, Middletown, USA, 2006. ISBN: 978-1574445602

*Van de Walle, S., Vogelaar, M.: Emergence and Public Administration*

Erasmus University Rotterdam, Department of Public Administration, 2010.

## Institute of Water and Environmental Management

Subject: **AGRI-ENVIRONMENTAL POLITICS**

Year, Semester: 2<sup>nd</sup> year/2<sup>nd</sup> semester

Lecture: **2**

### Requirements

Course content: The aim of the subject to improve the country-development and environmental policy knowledge of the students, founded on “Environmental Policy and Environmental Law” B.Sc. subject, for the sake of environmental management and region using founded on maintenance able using of natural resources. Main topics: the development of rural developmental- and environmental policy, its purposes, elements, fundamental principles, functional systems, its roles

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in the maintenance able development, resources and titles of the financial assistances, the main factors of rural development strategy programs. As a result of completion of the course, students will be able to apply principles of advanced agri-environmental politics, as potential managers or professional experts.

### Required reading materials

*Chasek, P. S., Downie, D. L., Brown, J. W.: Global Environmental Politics*  
5th. Westview Press., 2010. ISBN: 978-0813344423

*Goetz, S. J., Brouwer, F.: New Perspectives on agri-environmental Policies. A multidisciplinary and transatlantic approach*

Publ. Routledge. London, 2009. ISBN: 978-0415777025

*Hill, B., Davidova, S.: Understanding the Common Agricultural Policy.*

Earthscan Publications Ltd., 2010. ISBN: 9781844077779

*Ministry of Environment and Water: National Environmental Programme 2003-2008*

Line and More upon the assignment of the Ministry of Environment and Water, 2004. ISBN: 963 85511 3 5

*Seckinelgin, H.: The Environment and International Politics*

Routledge, 2009. ISBN: 9780415499545

Subject: **ENVIRONMENTAL AND QUALITY MANAGEMENT**

Year, Semester: 2<sup>nd</sup> year/2<sup>nd</sup> semester

Lecture: **2**

### Requirements

Course content: The aim of the subject is that students acquire the parameters and evolution of the quality control, the quality monitoring, and the quality management. The students realize ISO 9000-es standard system and TQM category, elements, its international and Hungarian rule of law. The students learn the environmental quality factors, the ecological environmental qualification methods, and the parameters of the competitiveness and environmental production systems. They recognize the relationship between the environmental status and the development of human quality of life. As a result of completion of the course, students will be able to apply principles of advanced environmental and quality management, as potential managers or professional experts.

### Required reading materials

*Culley, W. C.: Environmental and Quality Systems Integration*

Lewis Publishers Boca Raton, 1998. ISBN: 978-1566702881

*Hoyle, D.: ISO 9000 Quality Systems. Handbook.*

5th. Elsevier, 2006. ISBN: 978-0750667852

*Russo, M. V.: Environmental Management. Readings and Cases*

2nd. Sage Publications Inc., 2008. ISBN: 978-1412958493

*ISO. (2008): The Integrated Use of management System Standards*

ISO Publication, 2008. ISBN: 978-92-67-10473-7

*Oakland, J. S.: Total Quality Management*

Butterworth-Heinemann, 2003. ISBN: 978-0750657402

Subject: **THESIS PREPARATION III.**

Year, Semester: 2<sup>nd</sup> year/2<sup>nd</sup> semester

Lecture: **1**

Practical: **1**

### **Requirements**

Course content: The education object of the subject is to make students be able to work up an environmental management or protection theme in high level, work out the part of Results and appreciation, Conclusion and suggestions, Summary and assemble the dissertation by reason of prescribed demands.

### **Required reading materials**

*Murray, R.: How to write a thesis?*

Open University Press, McGraw-Hill, UK, 2006.

*Brewer, R. C.: Your PhD Thesis: How to plan, draft, revise and edit your thesis*

Trans-Atlantic Publications, 2007. ISBN: 1842850709

*Allison, B., Race, P.: The student's guide to preparing dissertations and thesis*

Taylor & Francis Ltd., 2004. ISBN: 0-415-33486-1