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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UNIVERSITY OF DEBRECEN

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UNIVERSITY OF DEBRECEN

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

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.
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
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 Hôdmezövásárhely, later Mezőtûr).

The University of Debrecen was established with 5 university-, three college faculties and three research institutes on 1st 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

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.
CHAPTER 5
THE ORGANIZATIONAL STRUCTURE OF THE UNIVERSITY

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, Bőszörményi út 138.
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E-mail: komlosi@agr.unideb.hu

Vice Dean for Educational Affairs: Dr. habil. Csaba Juhász
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Fax: +36-52/508-454 88454
E-mail: juhasz@agr.unideb.hu

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
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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, Bőszörményi 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
CHAPTER 6
THE DEPARTMENTS OF THE FACULTY

INSTITUTE OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE
Bőszörményi út 138., Debrecen, 4032

Full Professor, Head of Institute          János Kátaí 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
Bőszörményi út 138., Debrecen, 4032

Full Professor, Head of Institute        István Komlósi D.Sc.

Department of Animal Husbandry
Bőszörményi 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.
Department of Nature Conservation, Zoology and Game Management
Bőszörményi 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
Bőszörményi 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
Bőszörményi út 138., Debrecen, 4032

Head of Department: András Jávor C.Sc.
Professor: András Kovács D.Sc.
Assistant Lecturer: Ms. Zsófia Rózsáné Várzségi Ph.D.
Senior Research Fellow: Ms. Szilvia Kusza Ph.D.
THE DEPARTMENTS OF THE FACULTY

INSTITUTE OF FOOD SCIENCE
Bőszörményi út 138., Debrecen, 4032

Full Professor, Head of Institute  Béla Kovács Ph.D.
Professor  János Csapó D.Sc.
Technical Assistant  Ms. Éva Bacskaíné Bódi
Associate Professor  Ms. Andrea Tóthné Bogárdi
Assistant 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
Bőszörményi út 138., Debrecen, 4032

Head of Institute  János Nagy D.Sc.
Professor  Béla Barányi 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
Bőszörményi 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

Assistant Lecturer
Ádám Csihon
Péter Dremák Ph.D.

Assistant Professor
Nándor Rakonczás Ph.D.

Secretary
Ms. Andrea Gátiné Laskai

INSTITUTE OF CROP SCIENCES
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Head of the Institute
Péter Pepó D.Sc.

Department of Landscape Ecology
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Head of Institute
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Professor
Mihály Sársvári 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

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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.
THE DEPARTMENTS OF THE FACULTY

**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 Kővics C.Sc.

Associate Professor
András Bozsik C.Sc.

Assistant Professor
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 Őri

Technical Assistant
Ms. Nóra Bessenyei Tarpay

Csaba Kiss

Ms. Hajnalka Pákozdy

Ms. Istvánné Sőrés

Gábor Tóth M.D.

Associate Professor
Ms. Tünde Pusztahelyi Ph.D.

**INSTITUTE OF WATER AND ENVIRONMENTAL MANAGEMENT**
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Deputy Head
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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 Bökfi

Associate Professor
Ms. Elza Kovács Ph.D.

Assistant Lecturer
Ms. Tünde Fórián Ph.D.
CHAPTER 6

Assistant Professor
Ms. Ildikó Gombosné Nagy Ph.D.
Ms. Lili Mézes Ph.D.
Attila Nagy Ph.D.
Csaba Pregun Ph.D.

Secretary
Ms. Imre Lászlóné Huszka
Ms. Zsuzsanna Szathmáríné Pongor

FACULTY OF ECONOMICS AND BUSINESS
Bőszörményi 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.

Research Fellow

Ferenc Buzás Ph.D.
CHAPTER 7
UNIVERSITY CALENDAR

Academic calendar
2015/2016

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

CHAPTER 8
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,
consultancy or other sectors where environmental management is involved.
## CHAPTER 9
### CURRICULUM OF THE FULL TIME PROGRAMME

<table>
<thead>
<tr>
<th>Neptun code</th>
<th>1st semester</th>
<th>2nd semester</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>L</td>
<td>S</td>
</tr>
<tr>
<td>MTMKG006</td>
<td>2</td>
<td>ESE</td>
</tr>
<tr>
<td>MTMKG002</td>
<td>3</td>
<td>ESE</td>
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<td>MTMKG001</td>
<td>3</td>
<td>ESE</td>
</tr>
<tr>
<td>MTMKG009</td>
<td>3</td>
<td>ESE</td>
</tr>
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<td>ESE</td>
</tr>
<tr>
<td>MTMKG011</td>
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<td>ESE</td>
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</table>

**Subjects**

- **Academic language skill I.**
- **Agri-environmental protection**
- **Environmental chemistry-environmental physics**
- **Environmental impact assessment and landscape management**
- **Environmental laboratory measurement techniques, ecotoxicology**
- **Environmental Technology II.**
<table>
<thead>
<tr>
<th>Subjects</th>
<th>Neptun code</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; semester</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; semester</th>
<th>Prerequisites of taking the subject</th>
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</thead>
<tbody>
<tr>
<td>Land use and regional planning II.</td>
<td>MTMKGE005</td>
<td>L 2 S 2 P 2 ESE 2 Crd.</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>None</td>
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<tr>
<td>Management and environmental sociology</td>
<td>MTMKGE018</td>
<td></td>
<td></td>
<td>None</td>
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<tr>
<td>Natural Resource Management</td>
<td>MTMKGE004</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>L 2 S 2 ESE 5 Crd.</td>
<td>None</td>
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<tr>
<td>Research methodology-scientific discussion</td>
<td>MTMKGE003</td>
<td>L 3 S 3 ESE 3 Crd.</td>
<td>L 3 S 3 ESE 5 Crd.</td>
<td>None</td>
</tr>
<tr>
<td>Rural Development</td>
<td>MTMKGE007</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>None</td>
</tr>
<tr>
<td>Sustainable agricultural systems and technologies in crop management</td>
<td>MTMKGE008</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>None</td>
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<tr>
<td>Technical infrastructure systems</td>
<td>MTMKGE013</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>L 2 S 2 ESE 3 Crd.</td>
<td>None</td>
</tr>
<tr>
<td>Thesis preparation I.</td>
<td>MTMKGE027</td>
<td>L 1 S 1 ESE 1 Crd.</td>
<td>L 1 S 1 ESE 5 Crd.</td>
<td>None</td>
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<tr>
<td>Subjects</td>
<td>Neptun code</td>
<td>1st semester</td>
<td>2nd semester</td>
<td>Prerequisites of taking the subject</td>
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<tr>
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<tr>
<td>Water Resource Management and Water Quality Protection</td>
<td>MTMKGE012</td>
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<table>
<thead>
<tr>
<th>Subjects</th>
<th>Neptun code</th>
<th>1st semester</th>
<th>2nd semester</th>
<th>Prerequisites of taking the subject</th>
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<tbody>
<tr>
<td>Water Resource Management and Water Quality Protection</td>
<td>MTMKGE012</td>
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### Compulsory courses

#### 2. year

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Neptun code</th>
<th>1st semester</th>
<th>2nd semester</th>
<th>Prerequisites of taking the subject</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>Academic language skill II.</td>
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<tr>
<td>Agri-environmental politics</td>
<td>MTMKGE021</td>
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<td>Agrohydrology and irrigation techniques</td>
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<td>Environmental and quality management</td>
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<td>Environmental economy II.</td>
<td>MTMKGE022</td>
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<td>Environmental Health</td>
<td>MTMKGE026</td>
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<td>Environmental informatics and remote sensing</td>
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<td>Environmental Technology III.</td>
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<td>Nature protection II.</td>
<td>MTMKGE014</td>
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### CURRICULUM OF THE FULL TIME PROGRAMME

<table>
<thead>
<tr>
<th>Compulsory courses</th>
<th>1st semester</th>
<th>2nd semester</th>
<th>Prerequisites of taking the subject</th>
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</thead>
<tbody>
<tr>
<td>Precision agriculture II</td>
<td>MTMKGE024</td>
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<td>1</td>
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<tr>
<td>Public administration organization - Environmental law</td>
<td>MTMKGE019</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Sustainable agricultural systems and technologies in animal breeding</td>
<td>MTMKGE015</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Thesis preparation II</td>
<td>MTMKGE028</td>
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<tr>
<td>Thesis preparation III</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt; semester</td>
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<td>Water management</td>
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<td>Hydrology</td>
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Required elective courses:

<table>
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<th>Neptun code</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; semester</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; semester</th>
<th>Prerequisites of taking the subject</th>
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<tbody>
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## Required elective courses

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Neptun code</th>
<th>1st semester</th>
<th>2nd semester</th>
<th>Prerequisites of taking the subject</th>
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<tbody>
<tr>
<td>Advanced environmental technologies</td>
<td>MTMKGE033</td>
<td>2</td>
<td>ESE 2</td>
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<tr>
<td>Geoinformatics</td>
<td>MTMKGE034</td>
<td></td>
<td>1 1 AW5 3</td>
<td>None</td>
</tr>
<tr>
<td>Soil Science</td>
<td>MTMKGE032</td>
<td>2</td>
<td>ESE 2</td>
<td>None</td>
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</tbody>
</table>
CHAPTER 10

COURSE DESCRIPTIONS

Institute for Land Utilisation, Technology and Regional Development

Subject: LAND USE AND REGIONAL PLANNING II.
Year, Semester: 1st year/1st 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

American Farmland Trust: Saving the Farm: A Handbook for Conserving Agricultural Land

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

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

Pretty, J.: The living land: Agriculture, food and community regeneration in rural Europe

Subject: RURAL DEVELOPMENT
Year, Semester: 1st year/1st 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 regiona 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
**Institute of Agricultural Chemistry and Soil Science**

Subject: **AGRO- AND SOIL ECOLOGY**

Year, Semester: 1st year/1st 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 subsystems 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*

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

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

*Bardgett, R. D., Usher, M. B., Hopkins, D. W.: Biological biodiversity and function in soils*
CHAPTER 10
Killham, K.: Soil Ecology
1994.
Lavelle P.-Spain, V.A.: Soil Ecology

Subject: ENVIRONMENTAL CHEMISTRY-ENVIRONMENTAL PHYSICS
Year, Semester: 1st year/1st 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-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
Srivastava, M., Sanghi R.: Chemistry for Green Environment
Montehith, J. L., Unsworth, N.H.: Principles of environmental physics
Manahan, S. E.: Environmental chemistry

Institute of Water and Environmental Management

Subject: AGRI-ENVIRONMENTAL PROTECTION
Year, Semester: 1st year/1st 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,
COURSE DESCRIPTIONS

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

Birol, E., Koundouri, P.: Choice Experiments Infroming Environmental Policy

Jack, B.: Agriculture and EU Environmental Law


Subject: NATURAL RESOURCE MANAGEMENT

Year, Semester: 1st year/1st 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

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

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

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

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


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

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

Agricultural Laboratory Centre

 Subject: **ACADEMIC LANGUAGE SKILL I.**
Year, Semester: 1st year/2nd 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.*

*Wallace, M.: Study skills in English*
Subject: MANAGEMENT AND ENVIRONMENTAL SOCIOLOGY
Year, Semester: 1st year/2nd 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, oragnizational 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
Pacces, A. M.: The Law and Economics of Corporate Governance: Changing Perspectives
Coffee, J.: The Professions and Corporate Governance
Renneboog, L.: Advances in Corporate Finance and Asset Pricing

Department of Landscape Ecology
Subject: SUSTAINABLE AGRICULTURAL SYSTEMS AND TECHNOLOGIES IN CROP MANAGEMENT
Year, Semester: 1st year/2nd 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 modell 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 modells 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.
Institute for Land Utilisation, Technology and Regional Development

Subject: TECHNICAL INFRASTRUCTURE SYSTEMS
Year, Semester: 1st year/2nd 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 aconomics


Cheremisonoff, N. P.: Handbook of solid waste mangement and waste minimization technologies.
Institute of Food Science

Subject: ENVIRONMENTAL LABORATORY MEASUREMENT TECHNIQUES, ECOTOXICOLOGY
Year, Semester: 1st year/2nd 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
Montaser, A.: Inductively coupled plasmas mass spectometry

Institute of Water and Environmental Management

Subject: ENVIRONMENTAL TECHNOLOGY II.
Year, Semester: 1st year/2nd 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
CHAPTER 10

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.

Required reading materials


Lens, P., Grotenhuis, T., Malina, G., Tabak, H.: Soil and Sediment Remediation

Lens P., westermann, P., Haberbauer, M., Moreno, A.: Biofuels for Fuel Cells


Subject: ENVIRONMENTAL IMPACT ASSESSMENT AND LANDSCAPE MANAGEMENT

Year, Semester: 1st year/2nd 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


Payraudeau, S., Van der Werf, H. M. G.: Environmental impact assessment for a farming region: a review of methods
Agriculture, Ecosystems and Environment, 2005.


34
Subject: **THESS PREPARATION I.**

Year, Semester: 1st year/2nd 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 conventional 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 choice 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?*

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

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

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

Year, Semester: 1st year/2nd 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.
Agricultural Laboratory Centre

Subject: ACADEMIC LANGUAGE SKILL II.
Year, Semester: 2nd year/1st 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
Wiwezaroski, T.: Writing for Professional Communication

Department of Animal Husbandry

Subject: SUSTAINABLE AGRICULTURAL SYSTEMS AND TECHNOLOGIES IN ANIMAL BREEDING
Year, Semester: 2nd year/1st 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*

Dryden, G.: *Animal Nutrition Science*

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


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

**Department of Nature Conservation, Zoology and Game Management**

**Subject:** NATURE PROTECTION II.
**Year, Semester:** 2nd year/1st semester
**Lecture:** 2

**Requirements**

Course content: The aim of the subject is to provide special knowlegde 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.

**Required reading materials**


*Institute of Ecology and Botany*
Institute of Water and Environmental Management

Subject: **AGROHYDROLOGY AND IRRIGATION TECHNIQUES**

Year, Semester: 2nd year/1st 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**


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

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

*Bjornlund, H.: Incentives and Instruments for Sustainable Irrigation.*
Subject: ENVIRONMENTAL TECHNOLOGY III.
Year, Semester: 2nd year/1st 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
Hester, R. E., Harrison, R. M.: Sustainability and environmental impact of renewable energy sources
Moselle, B., Padilla J., Schmalensee R.: Harnessing renewable energy in electric power systems
Sorensen, B.: Renewable Energy: Physics, engineering, Environmental Impacts, Economics & Planning

Subject: ENVIRONMENTAL INFORMATICS AND REMOTE SENSING
Year, Semester: 2nd year/1st 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-Geoeeye 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.
CHAPTER 10

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
Ratenstrauch, C., Patig, S.: Environmental Information Systems in Industry and Public Administration
Avouris, N. M., Page, B.: Environmental Informatics-Methodology and applications of Environmental Information Processing
Lillesand, T., Kiefer, r., W., Chipman J.: Remote sensing and image interpretation

Subject: PRECISION AGRICULTURE II.
Year, Semester: 2nd year/1st 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. Optimalised 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.: Precisison agriculture
Srinivasan, A.: Handbook of precision agriculture: Principles and applications
Research Systems Inc.: ENVI Tutorial, USA
Kennedy, H.: Introduction to 3D Data: Modelling with ArcGIS 3D Analyst and Google Earth
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 aquainted 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?*  
* Brewer, R. C.: *Your PhD Thesis: How to plan, draft, revise and edit your thesis*  
* Allison, B., Race, P.: *The student's guide to preparing dissertations and thesis*  

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 completition 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*  
* Deublein, D., Steinhauser, A.: *Biogas from Waste and Renewable resources*  
* Christensen, T. H.: *Solid waste Technology & Management*  
* Han, D: *Concise Environmental Engineering.*  
CHAPTER 10

Agricultural Laboratory Centre

Subject: ENVIRONMENTAL HEALTH
Year, Semester: 2nd year/2nd semester
Lecture: 2

Requirements


Required reading materials

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

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

Yu, M.: Environmental toxicology

Greenberg, M.: Occupational and Environmental Medicine

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: 2nd year/2nd 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

O'Connor, M., C. Spash: Valuation and the Environment: Theory, Method and Practice
Subject: PUBLIC ADMINISTRATION ORGANIZATION - ENVIRONMENTAL LAW
Year, Semester: 2nd year/2nd 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
Henry, N.: Public Administartion and Public Affairs
Hill, B.: Environmental Justice-Legal Theory and Practice
Rabin, J. (Editor): Handbook of Public Administartion
Van de Walle, S., Vogelaar, M.: Emergence and Public Administartion
Erasmus University Rotterdam, Department of Public Administartion, 2010.

Institute of Water and Environmental Management

Subject: AGRI-ENVIRONMENTAL POLITICS
Year, Semester: 2nd year/2nd 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
CHAPTER 10

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

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


Seckinelgin, H.: The Environment and International Politics

Subject: ENVIRONMENTAL AND QUALITY MANAGEMENT

Year, Semester: 2nd year/2nd 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


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

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

Oakland, J. S.: Total Quality Management
Subject: **THESIS PREPARATION III.**  
Year, Semester: 2nd year/2nd 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?*


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