UNIVERSITY OF DEBRECEN
Faculty of the Agricultural and Food Sciences and Environmental Management

DEBRECEN, HUNGARY

Animal Husbandry Engineering MSc
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UNIVERSITY OF DEBRECEN

The history of the University and Debrecen

About Debrecen

With 205,000 inhabitants Debrecen is the second largest city in Hungary and the center of the North Great Plain Region. The Eastern gate of Europe, as Debrecen is often referred to, is also the seat of Hungarian Protestantism, and as such is often called the "Calvinist Rome". The numerous university faculties, colleges and professional schools have turned Debrecen into the country's most important educational center. More recently, the city's main focus is the development of its industrial park, and centers for knowledge management in information technology, nanotechnology, pharmacy and biotechnology.

Summer is the time of festivals: thousands of people from other parts of Hungary as well as from abroad visit the famous Debrecen Flower Carnival, the Debrecen Jazz Days, the Béla Bartók International Choir Competition and the International Military Band Festival. The new Conference Center hosts professional and cultural programs. Week by week, many people support the city's most famous sport clubs, especially the football, handball and basketball teams. Those wishing to take a rest are welcome in the Great Forest, where the famous Debrecen Spa Bath and the Mediterranean Aquaticum are located.

Higher education in Debrecen

The history of Debrecen's higher education dates back to the 16th century. The Calvinist Reformed College, established in 1538, played a central role in education, teaching in the native language and spreading Hungarian culture in the region as well as in the whole country. The College was a sound base for the Hungarian Royal University, founded in 1912. Apart from the three academic faculties (arts, law, theology) a new faculty, the faculty of medicine was established, and the University soon became one of the regional citadels of Hungarian higher education.

Today the University of Debrecen is classified as a “University of National Excellence” and offers the highest number of academic programs in the country, hence it is one of the best universities in Hungary. Its reputation is a result of its quality training, research activities and the numerous training programs in different fields of science and engineering in English.

With 14 faculties and a student body of almost 30,000, of which about 3700 are international students, the University of Debrecen is one of the largest institutions of higher education in Hungary.
DEAN’S WELCOME

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.
THE ORGANIZATIONAL STRUCTURE OF THE UNIVERSITY

RECTOR OF THE UNIVERSITY OF DEBRECEN

Rector Zoltán Szilvássy M.D., Ph.D, D.Sc.
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FACULTY OF AGRICULTURAL AND FOOD SCIENCES AND ENVIRONMENTAL MANAGEMENT

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REGISTRAR’S OFFICE

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Address 4032 Debrecen, Bőszörményi út 138.
Phone/Fax +36-52/508-409, +36-52/508-317
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Officer László Lévai
Officer Mrs. Gizella Kerekes Guthy
Officer Mrs. Mónika Bátori Pintye
Officer Zsuzsanna Házi
DEPARTMENTS OF THE FACULTY

Institute of Agricultural Chemistry and Soil Science

Head of the Institute: Prof. Dr. habil. János Kátai

Associate professor:
Dr. habil. Imre Vágó
Dr. Andrea Balláné Kovács
Dr. Mária Dr. Micskeiné Csubák

Assistant professor:
Dr. Sándorné Kincses
Dr. Rita Erdeiné Kremper
Dr. Zsolt Sándor

Research assistant:
Dr. Magdolna Tállai

Secretary
Gizella Szász

Institute of Animal Science, Biotechnology and Nature Conservation

Department of Animal Husbandry

Head of the Department: Prof. Dr. István Komlósi

Professor emeritus: Dr. Sándor Mihók

Associate professor:
Dr. Béla Béri
Dr. László Stündl
Dr. Gabriella Novotniné Dankó
Dr. József Prokisch
Assistant professor
Dr. János Posta
Dr. Levente Czeglédi
Dr. Péter Bársony

Assistant lecturer:
Dr. Nóra Dr. Pálffyné Vass

Technical assistant:
Babka Beáta
Sztrik Attila
Gulyás Gabriella

Secretary:
Károlyné Kiss
Marianna Korcsmárosné Varga
Ágnes Gere
Anikó Nagy
Sándor Boros

Department of Nature Conservation, Zoology and Game Management

Head of the Department: Dr. habil. Lajos Juhász

Professor:
Dr. Károly Rédei

Assistant professor:
Dr. Lajos Kozák
Dr. László Szendrei
Dr. Péter Gyüre

Assistant research fellow:
Dr. László Kövér
Technical assistant
Norbert Tóth

Department of Animal Nutrition and Food Biotechnology
Head of the Department: Prof. Dr. László Babinszky
Associate professor:
Dr. Csaba Szabó
Senior lecturer.
Dr. Judit Dr. Gálné Remenyik

Animal Genetics Laboratory
Head of the Department: Prof. Dr. András Jávor
Professor: Dr. András Kovács
Senior research fellow: Dr. Szilvia Kusza
Assistant lecturer: Zsófia Dr. Rózsáné Dr. Várszegi

Institute of Food Science
Head of the Institute: Prof. Dr. Béla Róbert Kovács
Professor:
Dr. Béla Róbert Kovács
Dr. János Csapó
Associate professor:
Dr. Erzsébet Karaffa
Dr. Péter Sipos
Assistant professor:
Dr. Ferenc Árpád Peles
Dr. Nikolett Czipa
Assistant lecturer:
Dr. Diána Ungai
Dávid Andrási

Technical assistant:
Andrea Tóthné Bogárdi
Éva Bacskainé Bódi

Secretary:
Tünde Simon

Institute for Land Utilisation, Technology and Regional Development

Head of the Institute: Dr. János Nagy, DSc

Professor:
Dr. Béla Baranyi, DSc
Dr. Gyula Horváth

Associate professor:
Dr. Zoltán Hagymássy
Dr. Endre Harsányi
Dr. Tamás Rátonyi

Assistant professor:
Dr. Adrienn Széles
Dr. András Vántus
Dr. Andorkó Imre

Senior research fellow:
Dr. Attila Csaba Dobos

Secretary:

Zsuzsanna Dorogi
Sándorné Széles

**Institute of Horticulture**

Head of the Institute: Prof. Dr. habil. Imre Holb

Associate professor: Dr. habil Mária Takácsné Hájos

Assistant professor: Dr. Nándor Rakonczás

Assistant lecturer:

Péter Dremák
Ádám Csihon

Assistant research fellow:

Ferenc Abonyi

Secretary: Andrea Gátiné Laskai

**Institute of Crop Sciences**

**Department of Agricultural Botany, Crop Physiology and Biotechnology**

Professor: Prof. Dr. Miklós Gábor Fári

Associate professor: Dr. Szilvia Veres

Assistant professor:

Dr. Péter Makleit
Dr. Zsuzsanna Lisztes-Szabó
Dr. Éva Domokosné Szabolcsy

Assistant lecturer:

Szilvia Kovács

Dr. Brigitta Tóth
Department of Crop Production and Applied Ecology

Head of the Institute: Prof. Dr. Péter Pepó
Dr. Sárvári Mihály professor emeritus
Associate professor: Dr. József Csajbók
Assistant professor:
Dr. Erika Kurasy
Dr. Lajos Fülöp Dóka
Dr. András Szabó
Assistant lecturer:
Dr. Enikő Vári
Adrienn Novák
Technical assistant:
Oláhné Tóth Ibolya
Laboratory assistant:
Csákyné Faragó Erzsébet
Secretary:
Endréné Szendrei
Gyöngyi Kovács

Genetics Group

Dr. Pál Pepó

Institute of Plant Protection

Head of the Institute: Dr. habil. György Kövics
Associate professor:
Dr. László Radócz
Dr. András Bozsik
Assistant professor:
Dr. Antal Nagy

Senior research fellow:
Dr. Gábor Tarcali

Secretary: Tünde Szabóné Asbolt

Central Laboratory:

Associate professor:
Dr. habil. Tünde Pusztahelyi

Assistant research fellow:
Nóra Óri

Technical assistants:
Nóra Bessenyiné Tarpay
Mrs. István Sőrés
Hajnalka Pákozdi
Mrs. Gábor Tóth
Csaba Kiss

Institute of Water and Environmental Management

Head of the Institute: Prof. Dr. habil János Tamás

Deputy Head of the Institute: Dr. habil Csaba Juhász

Professor:
Dr. János Tamás
Dr. Lajos Blaskó

Associate professor:
Dr. Csaba Juhász

Dr. Elza Kovács
Assistant professor:
Dr. Attila Nagy
Dr. Csaba Pregun

Senior research fellow: Dr. József Zsembeli

Assistant lecturer:
Dr. Lili Mézes
Dr. Tünde Fórián
Dr. Ildikó Gombosné Nagy

Assistant research fellow:
Nikolett Szőllösi
Péter Riczu

Technical assistant:
Katalin Bökfő
András Kaszás Tóth
Kamilla Berényi-Katona

Secretary:
Zsuzsanna Szathmáriné Pongor
Lászlóné Huszka Imre
### UNIVERSITY CALENDAR

**Academic year 2015/2016**

<table>
<thead>
<tr>
<th>academic year</th>
<th>course/time</th>
<th>examination period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BSc**

| 1st semester | | |

| 1st year | | |
| 2nd year | | |
| 3rd year | | |

| 2nd semester | | |

| 1st year | | |
| 2nd year | | |
| 3rd year | | |

**MSc**

| 1st semester | | |

| 1st year | | |
| 2nd year | | |

| 2nd semester | | |

| 1st year | | |
| 2nd year | | |
ANIMAL HUSBANDRY ENGINEERING MSc PROGRAMME

About the course:

The MSc in Animal Science is designed to develop your undergraduate knowledge and improve it through application and research. The field of Animal Science is broad and the programme reflects this diversity, with emphasis on Physiology, Nutrition and Genetics. Gene Conservation, Functional Food and Molecular Biology are the key research areas of the Institute.

Requirements:

Application requirements: BSc degree or higher in Biological or Animal Science. BSc degree or higher in a biologically-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 are 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:

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-59</td>
<td>fail (1)</td>
</tr>
<tr>
<td>60-69</td>
<td>pass (2)</td>
</tr>
<tr>
<td>70-79</td>
<td>satisfactory (3)</td>
</tr>
<tr>
<td>80-89</td>
<td>good (4)</td>
</tr>
<tr>
<td>90-100</td>
<td>excellent (5)</td>
</tr>
</tbody>
</table>

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 animal science research, lecturing, consultancy or other science-based sectors of the animal science industry. Our Institute has a good relationship with animal husbandry enterprises of the region.
The distribution of contact hours by semester and course
(Animal Science MSc, in English DEATC, MTK)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Contact Hours</th>
<th>Course Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundation Primary Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied Genetics</td>
<td>2 1 T 3</td>
<td>Dr. Komlósi István</td>
</tr>
<tr>
<td>Physiology of Production Traits</td>
<td>2 1 T 3</td>
<td>Dr. Novotníné Dr. Dankó Gabriella</td>
</tr>
<tr>
<td>Informatics and Computing</td>
<td>0 2 P 2</td>
<td>Dr. Herdon Miklós</td>
</tr>
<tr>
<td>Applied biochemistry</td>
<td>2 1 T 3</td>
<td>Dr. Győri Zoltán</td>
</tr>
<tr>
<td>Fodder and Food Chemistry</td>
<td>2 1 T 3</td>
<td>Dr. Karaffa Levente</td>
</tr>
<tr>
<td>Microbiology</td>
<td>2 0 T 3</td>
<td>Dr. Komlósi István</td>
</tr>
<tr>
<td>Reproductive Biology</td>
<td>2 1 T 3</td>
<td>Dr. Kovács András</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>8 5 13 4 2 6</td>
<td></td>
</tr>
<tr>
<td><strong>Prime Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Animal Husbandry</td>
<td>2 1 T 3</td>
<td>Dr. Jávor András</td>
</tr>
<tr>
<td>Aquatic Ecology and Hydrobiology</td>
<td>2 1 T 3</td>
<td>Dr. Grigorszky István</td>
</tr>
<tr>
<td>Biometry</td>
<td>2 1 P 3</td>
<td>Dr. Komlósi István</td>
</tr>
<tr>
<td>Cytogenetics</td>
<td>2 1 T 3</td>
<td>Dr. Kovács András</td>
</tr>
<tr>
<td>Molecular Genetics in Animal Breeding I</td>
<td>2 0 T 3</td>
<td>Dr. Czeglédi Levente</td>
</tr>
<tr>
<td>Quality Management</td>
<td>2 0 T 2</td>
<td>Dr. Varga Emilné dr. Szűcs Edit (A tárgy a 2010-es tantervben választhatóként szerepel!) Oktató neve: Szűcs Edit Gizella ???</td>
</tr>
<tr>
<td>Management</td>
<td>2 0 T 2</td>
<td>Dr. Pakurár Miklós</td>
</tr>
<tr>
<td>Animal Nutrition</td>
<td>2 1 T 3</td>
<td>Dr. Babinszky László</td>
</tr>
<tr>
<td>Feed preparation, processing, mixing and trading</td>
<td>2 2 T 5</td>
<td>Dr. Babinszky László</td>
</tr>
<tr>
<td>Meat and Milk Processing</td>
<td>2 1 T 3</td>
<td>Dr. Jávor András</td>
</tr>
<tr>
<td>Nutrition Therapy</td>
<td>2 0 T 2</td>
<td>Dr. Csiki Zoltán</td>
</tr>
<tr>
<td>Organisation of Breeding</td>
<td>2 0 T 2</td>
<td>Dr. Komlósi István</td>
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<tr>
<td>Sectoral Economics and Planning</td>
<td>2 2 T 4</td>
<td>Dr. Nábrádi András</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>4 2 6 10 5 17 4 0 4 8 3 11</td>
<td></td>
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<tr>
<td><strong>Disciplinary Courses</strong></td>
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<tr>
<td>Livestock Judging</td>
<td>1 2 P 3</td>
<td>Dr. Bodó Imre</td>
</tr>
<tr>
<td>Management of Local Genetic Resources</td>
<td>2 1 T 3</td>
<td>Dr. Hajas Pál (Nincs tematika!)</td>
</tr>
<tr>
<td>Ecological Management of Animals</td>
<td>2 1 T 3</td>
<td>Dr. Stündl László</td>
</tr>
<tr>
<td>Molecular Genetics in Animal Breeding II</td>
<td>0 3 P 3</td>
<td>Dr. Czeglédi Levente</td>
</tr>
<tr>
<td>Application of Biotechnology in Animal Breeding</td>
<td>1 1 T 2</td>
<td>Dr. Kovács András</td>
</tr>
<tr>
<td>Inland Fisheries management</td>
<td>1 2 T 3</td>
<td>Dr. Stündl László</td>
</tr>
<tr>
<td>Pond Fish Culture</td>
<td>1 2 T 3</td>
<td>Dr. Stündl László</td>
</tr>
<tr>
<td>Courses</td>
<td>Contact Hours</td>
<td>Course Instructor</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------------------------</td>
<td>--------------------------------------------------------</td>
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<tr>
<td></td>
<td>Semester I</td>
<td>Semester II</td>
</tr>
<tr>
<td></td>
<td>lec.</td>
<td>pr</td>
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<tr>
<td>Recording and Breeding Programs</td>
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<td>2</td>
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<tr>
<td>Feed Analysis</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Food Safety, Quality and Auditing</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Scientific Writing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Design of animal farms, machinery and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>architecture</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Elective courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication, Rhetorics</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Human Resource Management</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Environmental Impact</td>
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</tr>
<tr>
<td>Assessment and Auditing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fish Farm Business Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breeding of Laboratory Animals and Nutrition</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Feed Safety, Auditing</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
COURSE DESCRIPTIONS

BASIC PRIME COURSES

Applied Genetics

Number of classes/week: 2 + 1 T

Course credits: 3

Course instructor: Dr. István Komlósi, Professor

Condition of enrolment for the course: -


Compulsory/ Recommended literature, readings:

Physiology of production traits

Number of classes/week: 2+1 T

Course credits: 3

Course instructor: Dr. Gabriella Novotníň Dankó, Associate professor

Condition of enrolment for the course: Animal physiology and animal breeding knowledge

Short course description:

Interaction of the farm animal and the environment of production. Function of the digestive system; process of feed-digestion; the intermediary metabolism; characteristic of ruminant digestion. Physiology of muscle system. Biology of meat production. The endocrine system. Physiology of reproduction. Physiology of milk production. Specialties and dysfunctions in metabolism of high-yield milk cows. Energy turnover and thermoregulation. Microclimate of the stall. The reproduction physiology of the hen. Production of other animal products for human consumption (e.g. rabbit meat, honey).

Compulsory/ Recommended literature, readings (in English):

Informatics and Computing

Number of classes/week: 0 + 2 P

Course credits: 2

Course instructor: Dr. Miklós Herdon, Professor

Condition of enrolment for the course: BSc level courses in Mathematics and Computing

Short course description:


Compulsory/ Recommended literature, readings:


**Applied Biochemistry**

**Number of classes/week:** 2+1 T

**Course credits:** 3

**Course instructor:** Dr. Zoltán Győri, Professor

**Condition of enrolment for the course:** experience in organic chemistry

**Short course description:**


**Compulsory/ Recommended literature, readings (in English):**


Feed and Food Chemistry

Number of classes per week: 2 + 1 T

Course credits: 3

Course instructor: Prof. Dr. Zoltán Győri, Professor

Condition of enrolment for the course: -

Short course description:

The objective of the course is to provide students with up-to-date knowledge about feed and food components. Students will learn the roles and importance of minerals, water, carbohydrates, proteins (chemical reactions and linking of proteins, denaturation through physical and chemical methods, functional characteristics of proteins, quantitative determination, grouping, knowing the transformation of food and feed proteins through processing and storage), lipids, vitamins, natural colorants, taste and aroma components, other organic materials, enzymes, additives, toxic materials, packaging materials, cleaning agents and disinfectants in food and feed production. Furthermore, they can deepen their knowledge about the chemistry of functional food production.

Compulsory/ Recommended literature, readings:


Microbiology

Number of classes/week: 2+0, T

Course credits: 3

Course instructor: Dr. Levente Karaffa, Associate Professor

Condition of enrolment for the course: -

Short course description: The aim of this course is two-fold: first, it is to obtain a general understanding of microorganisms (bacteria, fungi, yeasts, viruses), including their classification, metabolism, the way they interact with their environments and with other living organisms, such as plants, animals and humans. We will characterize the cellular biology of the selected microorganisms (cell wall, cell membrane, intracellular structures), and will analyse their functions. Energy metabolism and reproduction will also be discussed. Classification of bacteria will be based on the Second Edition of Bergey’s Manual of Systematic Bacteriology. Second, the course will also deal with the applied aspects of microbiology including industrial fermentations (biogas, ethanol, hydrogen formation), environmental applications (bioremediation, biodegradation), agricultural, as well as food technologies (preservation, food and feed production).

Compulsory/ Recommended literature, readings:

Lecture notes


Reproductive Biology

Number of classes/week: 2+1 T

Course credits: 3

Course instructor: Dr. András Kovács, Professor

Condition of enrolment for the course:

Short course description:


History and application of artificial insemination in different species (bee, fishes, birds, mammals, wild animals). Semen collection (artificial vagina, massage, electroejaculation, taken from the epididymis alive, or post mortem). Semen evaluation (volumen, density, motility, morphology, viability status by staining and microscopy, or flow cytometry), extension, cryopreservation, application for artificial insemination. Oocyte collection from live and dead animals, in vitro maturation, in vitro fertilization and in vitro cultivation. Embryo flushing, cryopreservation and transfer. Cryopreservation of gonadal cells and early embryos and their importance for gene bank purposes.

Compulsory/ Recommended literature, readings (in English):

Artificial Insemination in Sheep - : West Virginia University Agricultural Experiment Station, 1974
PRIME COURSES

**World Animal Husbandry**

**Number of classes/week:** 2+1 T

**Course credits:** 3

**Course instructor:** Dr. András Jávor, Professor

**Conditions of enrolment for the course:** -

**Short course description:**


**Compulsory/Recommended literature, readings:**

Aquatic Ecology

Number of classes/week: 2+1 T

Course credits: 3

Course instructor: Dr. István Grigorszky, Associate professor

Condition of enrolment for the course: -

Short course description:

Aquatic ecology course is introducing an extraordinarily broad and interesting field of the science. The main aim of this course is that students will be capable to interpret and use in their practice the interplay between aquatic organisms and their physical, chemical, and biological environment. This course encompasses all freshwater ecosystems, including spring, streams, rivers, lakes, wetlands. During this study a wide diversity will be discussed of different organisms, ranging from tiny bacteria to large fishes, facing a myriad of different processes such as biogeochemical cycles, genetic differentiation, and climate change. Applied research part of this course makes major contributions to biotechnology, fisheries, water management, nature conservation, and environmental policy of aquatic sciences. Reassessments and syntheses in aquatic ecology are stimulating to the discipline as a whole, as well as enormously useful to graduate and postgraduate students in natural and agricultural sciences.

Compulsory/ Recommended literature, readings (in English):


**Biometry**

**Number of classes/week:** 2 + 1 P

**Course credits:** 3

**Course instructor:** Dr. István Komlósi, Professor

**Condition of enrolment for the course:** -

**Short course description:**


**Compulsory/ Recommended literature, readings:**


Cytogenetics

Number of classes/week: 2+1, T

Course credits: 3

Course instructor: Dr. András Kovács, Professor

Condition of enrolment for the course: Applied Biochemistry


Compulsory/ Recommended literature, readings:


Molecular Genetics in Animal Breeding I

Number of classes/week: 2 + 0 T

Course credits: 2

Course instructor: Dr. Levente Czeglédi, Assistant professor

Condition of enrolment for the course: -

Short course description:
Basic of molecular genetics: DNA structure, DNA synthesis, genetic code, protein synthesis, Genome structure, Genome projects, Structure of the gene, Gene maps, Types of molecular genetic markers, use of genetic markers in animal breeding; Most important QTLs and major genes identified in farm animals (cattle, pig, sheep, goat, horse), Cloning, Transgenic animals

Compulsory/ Recommended literature, readings:
Piper, L. (1997): The genetics of sheep. Wallingford: CAB International
Management

Number of classes/week: 2 +0 T

Course credits: 2

Course instructor: Dr. Miklós Pakurár, Associate professor

Condition of enrolment for the course: -

Short course description:
Introduces MSc students to the history, development, most important schools of thought, trends and theories of management science. Additionally, we will present the most important relationship forms, 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.

Compulsory and recommended literature:
Quality Management

Number of classes/week: 2 +0 T

Course credits: 2

Course instructor: Edit Gizella Szücs, College Professor

Condition of enrolment for the course: -

Short course description:


Compulsory/ Recommended literature, readings (in English):

Animal Nutrition

Number of classes/week: 2 + 1 T

Course credits: 3

Course instructor: Dr. László Babinszky, Professor

Condition of enrolment for the course: -

Short course description:

Characterization of feed for animal nutrition (forage, grain). Mould in feedstuffs and mycotoxicosis. Regulation of feed intake of ruminants and non ruminant species.

Energy, protein, vitamin and mineral element requirements for maintenance and production (meat, milk, wool, egg). Requirements for reproductive activities. Nutrition technologies concerning species, age, type of utilization. The special digestive apparatus of cattle, sheep and goat and its nutrition-physiological consequences. Protein and energy turnover of ruminants.

Compulsory/ Recommended literature, readings:


Feed Preparation, Processing, Mixing and Trading

Number of classes/week: 2+2 T
Course credits: 5
Course instructor: Dr. László Babinszky, Professor
Condition of enrolment for the course: -


Compulsory/ Recommended literature, readings:
Milk and meat processing

Number of classes/week: 2+1 T

Course credits: 3

Course instructor: Dr. András Jávor, Professor

Conditions of enrolment for the course: -

Short course description:

Compulsory/Recommended literature, readings (in English):


Nutrition Therapy

Number of classes/week: 2+0 T

Course credits: 2

Course instructor: Dr. Zoltán Csiki M.D., Ph.D, AGAF

Condition of enrolment for the course: Animal Nutrition

Short course description:

Medical Nutrition Therapy is an essential component of comprehensive health care services. Individuals with a variety of conditions and illnesses can improve their health and quality of life by receiving medical nutrition therapy. MNT can increase consumer health and well-being, and increase productivity and satisfaction levels through decreased doctor visits, hospitalizations and reduced prescription drug use. The main aim of this course is that students will be capable of interpreting and using the interplay between the human organism and animal derived nutrients, i.e. foods. This course encompasses all animal derived foods. A wide selection of foods – meat, milk and egg - will be presented with special emphasis on their health-related effects, including food allergies, intolerances and effects on general well being and quality of life of human beings. Synthesising the nutrition related health topics is useful to graduate and postgraduate students in natural and agricultural sciences.

Compulsory/ Recommended literature, readings (in English):


Organisation of Breeding

Number of classes/week: 2 + 0 T

Course credits: 2

Course instructor: Dr. István Komlósi, Professor

Condition of enrolment for the course: -

Short course description:

Organisation of breeding in the European Union and other countries with developed cattle breeding. Laws and regulations at international level. The development of animal breeding structure during the history. The role of ministry and other public organisations in. Recognised breeding associations in different species, breeds. Breeding objectives. Breeding programmes. Performance recording and registration in different species. Breeding value evaluation in different species. Institutions, firms, associations linked to the breeding industry.

Compulsory/ Recommended literature, readings:

Performance Codexes of different species
Relevant EU regulations and laws
Sectoral Economics and Planning

Number of classes/week: 2+2, T

Course credits: 4

Course instructor: Dr. András Nábrádi, Professor

Condition of enrolment for the course: -

Short course description:

Compulsory/ Recommended literature, readings:
Maggie Shaver (2007): Storey’s guide to raising meat goats, managing breeding, marketing, Publisher: Storey Publishing, LLC; 1 edition
Jerry Belanger (2000): Storey’s guide to raising dairy goats, managing breeding, marketing Publisher: Storey Publishing, LLC.
Kelly Klober (1996): Storey’s guide to raising pigs, managing breeding, marketing, Publisher: Storey Publishing, LLC.
Leonard Mercia (2000): Storey’s guide to raising poultry, managing breeding, marketing, Publisher: Storey Publishing, LLC.
Heather Smiss Thomas (1997): Storey’s guide to raising beef cattle, managing breeding, marketing, Publisher: Storey Publishing, LLC.
Julius Ruechel (2006): Grass-Fed Cattle, Publisher: Storey Publishing
DISCIPLINARY COURSES

Livestock Judging

Number of classes/week: 1+2 P

Course credits: 3

Course instructor: Prof. Em. Dr. Imre Bodó

Condition of enrolment for the course: -

Short course description:


Compulsory/Recommended literature, readings:


Ecological Management of Animals

Number of classes/week: 2+1 T

Course credits: 3

Course instructor: Dr. László Stündl, Associate professor

Condition of enrolment for the course: -

Short course description:


The role and importance of grassland management and grazing in the world, Europe and Hungary. Possibilities and methods of livestock grazing, animal production on grassland. Grazing etology.

Compulsory/ Recommended literature, readings:


Chaerika, N. et al. (2003): Know to move, move to know. Ecological knowledge and herd management strategies. FAO.

Molecular Genetics in Animal Breeding II.

Number of classes/week: 0 + 3 P

Course credits: 3

Course instructor: Dr. Levente Czeglédi, Assistant professor

Condition of enrolment for the course: Molecular Genetics in Animal Breeding I.

Short course description:

DNA extraction from animal tissue; determination of DNA concentration, Polymerase Chain Reaction (PCR), agarose gel-electrophoresis, restriction endonuclease, PCR-RFLP (restriction fragment length polymorphism), SSCP (single strand conformation polymorphism), capillary electrophoresis, microsatellite analysis, isolation of RNA, cDNA synthesis, gene expression by real-time PCR

Compulsory/ Recommended literature, readings (in English):


Application of Biotechnology in Animal Breeding

Number of classes/week: 1+1 T

Course credits: 2

Course instructor: Dr. András Kovács, Professor

Condition of enrolment for the course: -

Short course description: Genetic investigations for the diagnosis of carriers and susceptible individuals. Genetic investigations to recognize important characteristics for the breeders.


Biometrical methods for the identification and application of the contacts of major genes and their markers. Biotechnology in animal nutrition, food production, medicine and other fields.

Literature recommended:


Inland Fisheries Management

Number of classes/week: 1 + 2 T

Course credits: 3

Course instructor: Dr. László Stündl, Associate professor

Condition of enrolment for the course: Aquatic Ecology

Short course description:

All key management issues of inland fresh waters are covered: e.g., stock control, population dynamics, utilisation, including administrative and legal issues, recreation and nature conservation.

Compulsory/ Recommended literature, readings:


FAO (2003): Inland Fisheries. FAO, Rome
Pond Fish Culture

Number of classes/week: 1 + 2 T

Course credits: 3

Course instructor: Dr. László Stündl, Associate professor

Condition of enrolment for the course: Aquatic Ecology

Short course description:

A detailed and practice oriented knowledge is provided on pond aquaculture from engineering, water management, foods and nutrition, to breeding techniques, stocking, culture and harvesting methods.

Compulsory/ Recommended literature, readings:

Gorda S. (1999): Fish culture, szakmérnöki jegyzet, Debrecen


Feed Analysis

Number of classes per week: 1 + 2 P

Course credit: 3

Course instructor: Dr. Béla Kovács, Professor

Condition of enrolment for the course: Biochemistry, Feed and food chemistry

Short course description:


Compulsory/ Recommended literature, readings:

Methodologies, analysis standards
AOAC methods.
Food Quality, Safety, Auditing

Number of classes per week: 2 + 1 P

Course credits: 3

Course instructor: Dr. Ferenc Peles, Assistant professor

Condition of enrolment for the course: Basics of quality management

Short course description:

Compulsory/ Recommended literature, readings (in English):


Scientific Writing

Number of classes/week: 1+1, P

Course credits: 3

Course instructor: Dr. Wiwczaroski Troy, Associate professor

Condition of enrolment in the course:

Short course description:

Scientific professionals must be able to interrogate, process and critique highly structured texts which are often written in compact, difficult language. The process of learning how to write in an academically acceptable way requires formal introduction and training. This course instructs students in strategies for handling the creation such texts, in order to

- Create appropriate titles for their publications
- Formulating thesis statement(s), paragraph content and argumentation
- Explain read information in one's own words, i.e. avoiding plagiarism
- Handle difficult vocabulary and phraseology
- Properly use summarizing and paraphrasing techniques, abstract writing
- Properly use citations, especially of electronic references
- Understand requirements of individual scientific publications
- Write scientific reports

Compulsory/ Recommended literature, readings (in English):

Malmsfors, B. (2006): Writing and presenting scientific papers. Nottingham University Press,
**Design of animal farms, machinery and architecture**

**Number of classes/week:** 2 + 1 T  

**Course credits:** 3  

**Course instructor:** Dr. Ferenc Kalmár, College professor  

**Condition of enrolment for the course:** -  

**Short course description:**  

**Compulsory/ Recommended literature, readings:**  
ELECTIVE COURSES

Communication and Rhetoric

Number of classes/week: 1+0 T
Course credits: 2
Course instructor: Dr. Csilla Juhász, Associate professor
Condition of enrolment for the course: -

Short course description:

Compulsory/ Recommended literature, readings:
**Human Resource Management**

**Number of classes/week:** 1 +0 T

**Course credits:** 2

**Course instructor:** Dr. Csaba Berde, Professor

**Condition of enrolment for the course:**-

**Short course description:**


**Compulsory/ Recommended literature, readings:**


Environmental Impact Assessment and Audit

Number of classes/week: 1+1 T

Course credits: 3

Course instructor: Dr. János Tamás, Professor

Course content/description:


Compulsory and recommended literature:

Fish farm business management

Number of classes/week: 1+1 T

Course credits: 2

Course instructor: Dr. Szűcs István, associate professor

Condition of enrolment for the course:
Aquatic ecology, Pond fish culture and Inland fisheries courses

Short course description:
Beyond specific micro- and macroeconomics and aquaculture farm management, the planning of production, financing and marketing issues are also discussed, mainly via case studies.

Compulsory/ Recommended literature, readings (in English):


Nincs a tantervben!
**Breeding of Laboratory Animals and Nutrition**

**Number of classes/week:** 1+0 T

**Course credits:** 2

**Course instructor:** Dr. János Gundel, Professor

**Condition of enrolment for the course:** -

**Short course description:** What are laboratory animals? Choice of species and/or type. Breeding of different laboratory animals (herd book, selection’s methods, breeding methods, etc.). Production of inbreed and outbreed flocks and their keeping. Individual marking methods. Propagation of laboratory animals. Feeds and feeding of laboratory animals. Preparation, processing, preservation and storing of feeds. Housing technologies of laboratory animals. Hygienic of animal houses/rooms (incl. feeding and drinking). Transporting of laboratory animals. Registration programs for laboratory animals. Treatment, storage and elimination of hazardous waste material (such as litter, non-used medications, remaining feed, animal cadavers), which originate from the housing of laboratory animals.

**Compulsory/ Recommended literature, readings:**


Feed Safety, Auditing

Number of classes per week: 2 + 0 P

Course credits: 2

Course instructor: Dr. Ferenc Peles, Assistant professor

Condition of enrolment for the course: Animal Nutrition

Short course description:

The regulation, role and the national and international institution of feed control.
Development and auditing feed quality management systems.
Requirements for establishing an agricultural firm.
Tracking and tracing in feed production.
The history and development of national feed control.
Legislation. Codex Pabularis Hungaricus.
The role of the authorities in food and feed safety management.
Legislation and interpretation of feed safety.

Compulsory/ Recommended literature, readings (in English):

Related legislation and regulations
Source-book of the department of Feed and Food Safety of the Agricultural Extension Agency