University of Debrecen
Faculty of Agricultural and
Food Sciences and
Environmental Management

PLANT PROTECTION MSc Program

2021

TABLE OF CONTENTS

DEAN'S WELCOME

On January 1, 2000, the University of Debrecen was born with the need for international competitiveness, which is now the oldest continuously operating higher education institution in the country. It is one of the excellent universities in Hungary, with its 14 faculties and 24 doctoral schools, offering the widest domestic training. Today, the University of Debrecen carries out its agricultural training, research and development activities in three organizational units: the Faculty of Agriculture, Food Science and Environmental Management (MÉK), the Faculty of Economics (GTK) and the Institutes for Agricultural Research and Educational Farm (AKIT). The Faculty of Agriculture, Food Science and Environmental Management - adapting to today's scientific challenges - formulates both its training and research activities according to the circular bioeconomy model, which is based on the recycling of materials and values, by increasing the added value of the produced product, through services and smart solutions. In the ranking of agricultural and higher education institutions in the world, Debrecen is always in the most prominent place, currently it is among the best between 150-200.

The Faculty of Agriculture, Food Science and Environmental Management of the University of Debrecen currently has nearly 1,400 students, and in addition to our Hungarian-language courses, more and more foreign students attend our courses taught in English. Our undergraduate and master's programs, our talent management colleges, and our doctoral schools all play a decisive role in higher agricultural education and scientific supply. It is especially important for us to maintain a wide-ranging system of professional and economic relations with the enterprises of the region, which, on the one hand, provides the conditions for practical training and, on the other hand, helps to utilize the scientific results created at the University. Following the good example of our predecessors, we try to provide students with up-to-date knowledge and practice-oriented knowledge, so that they can enhance and improve the reputation of our institution and Hungarian agriculture.

Dr. László Stündl

associate professor

dean

HISTORY OF THE UNIVERSITY

The University of Debrecen, the oldest institution of higher education in the country operated continuously in the same city, is one of the research universities of national excellence in Hungary offering the widest spectrum of educational programs in 14 faculties and 24 doctoral schools.

The roots of higher education in the city reach all the way back to the 16th century and the foundation of the Reformed College of Debrecen in 1538. The College played a central role in Hungarian education and culture for centuries. This is the date featured on the symbol of the university as well, the *gerundium,* a tool originally used by the students of the Reformed College to put out fires, showing respect for ancestors and traditions.

In 1912 with Act XXXVI, originally submitted as a bill by Count János Zichy, Minister of Religion and Public Education, the Hungarian Parliament decided on the establishment of two universities, one in Pozsony [Bratislava] and the other in Debrecen. Thus the Hungarian Royal University of Debrecen was established in the *cívis* town with five faculties (Faculty of Reformed Theology, Faculty of Law, Faculty of Medicine, Faculty of Arts, Linguistics and History, and the Faculty of Mathematics and Science). However, the university opened only two years later, in 1914 with three faculties. First, students studied in the building of the Reformed College, which soon proved to be too small. The city of Debrecen granted a huge (112 acre) land in the Great Forest for the university, and also provided first 5 then an additional 3 million Golden Koronas for the construction of a new building. In 1918 Charles IV inaugurated the central building of the newly founded Faculty of Medicine. The teaching of mathematics and natural sciences started within the Faculty of Arts from the 1923/24 academic year. The independent Faculty of Sciences was opened only in 1949.

In 1921 the university was named after Count István Tisza, former prime minister and statesman who also studied in the Reformed College and who was assassinated on October 31, 1918. Thus the name of the institution was changed to István Tisza Hungarian Royal University of Debrecen.

The construction of the main building of the university started in the 1920s and it was officially opened in 1932. At the time it was the third largest investment project of the country after the building of the Parliament and the Buda Castel Palace. Construction lasted for four years, even so only one third of the original plans could be realized.

After the Second World War the fragmentation of the university (then already having five faculties) was started in 1949 due to political reasons. In the same year the Faculty of Law was temporarily suspended, in 1950 the Faculty of Theology was separated from the university, and it returned to the College with support from the church. Making medical

training independent, the Medical University of Debrecen was organized in 1951. The university bore the name of István Tisza until 1945, then it was named University of Debrecen, then from 1952 it operated under the name of Lajos Kossuth University.

In the 1980s negotiations already started about the reunification of fragmented higher education in Debrecen. Events leading to integration, however, accelerated only after 1996 when an amendment stipulated that after December 31, 1998 universities had to provide educational programs of adequate quality in several disciplines.

Finally, on January 1, 2000 the University of Debrecen was established with the integration of the Agricultural University of Debrecen, the Medical University of Debrecen, Lajos Kossuth University, and the István Wargha Teacher Training College of Hajdúböszörmény. The university having an important role and position in Hungarian higher education started its operation with five university and three college faculties organized into three centers, the Center for Agricultural and Applied Economic Sciences, the Medical and Health Science Center, and the Center of Arts and Sciences.

Section 26 of Act CCIII of 2013 on the amendment of particular acts establishing the central budget of Hungary for 2014 included provisions concerning the organizational structure of the university, thus the centers were no longer used as organizational units as of January 1, 2014.

Today the University of Debrecen is a leading and prominent institution of higher education in Hungary. It is not only at the forefront of Hungarian and international education but also active in the fields of research, innovation and development, and enjoys fruitful links with the business sector. The ever-changing social and economic environment demands continuous renewal from the institution and there is a constant need to adapt to new requirements. The University of Debrecen's mission is to contribute to the education of future generations in cooperation with Hungarian and international partners, with high-quality interdisciplinary programs, and research built on versatile and practical experience.

Besides education, the institution also provides European-quality patient care with comprehensive services to fulfil its obligations in the city, county, and region and often on the national level as well. As of July 1, 2017, with the merger of the Kenézy Gyula Hospital and Clinic, the University of Debrecen Kenézy Gyula Teaching Hospital was established, expanding the capacities of the institution both in patient care and education.

HISTORY OF THE FACULTY

The Great Plain and, more broadly, the Tisza River Basin is the center of Hungary's agri-food economy. That is why it was a logical decision from our predecessors to have a higher education and research center in the region to support the production and processing of raw materials, which helps to create and maintain a competitive agriculture by continuously providing qualified human resources and putting scientific results into practice.

In Eastern Hungary, agricultural higher education started in 1868 with the establishment of the Debrecen National Higher School of Economics. Between 1874 and 1906, the institution operated as the Secondary School of Economics, and until 1944 under the name of the Royal Hungarian Academy of Economics. Between 1945 and 1949, our institution operated under the name of the Debrecen Department of the Hungarian University of Agricultural Sciences, Faculty of Agricultural Sciences. In 1953, training resumed at the Debrecen Agricultural Academy. Between 1962 and 1970, specialist training rose to university level at the College of Agricultural Sciences. Between 1970 and 1999, the institution received the “university rank”, the University of Agricultural Sciences in Debrecen served two rural faculties (Szarvas, initially Hódmezővásárhely, later Mezőtúr).

On January 1, 2000, the University of Debrecen was established with five university faculties, three college faculties and three research institutes. The Faculty of Agricultural Economics and Rural Development was established in 2002 and by 2006 the number of faculties of the University had increased to 15. The Faculty of Agriculture, Food Science and Environmental Management (MÉK) and the Faculty of Economics and Rural Development (GVK), as well as three research institutes, formed the Center for Agricultural and Management Sciences (AGTC) until 2014.

ADMINISTRATION UNITS FOR INTERNATIONAL PROGRAMMES

COORDINATING CENTER FOR INTERNATIONAL EDUCATION

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Administrative Assistant	Ms. Dóra Deme
Administrative Assistant	Ms. Lilla Fónai
Administrative Assistant	Ádám Losonczi
Administrative Assistant	Ms. Annamária Rácz

The Coordinating Centre for International Education supports the international degree programmes of the University of Debrecen in giving new students information on admission and entrance exam. It has tasks in promoting and is in charge of tasks like enrolment, study contracts, modifying student status or degree programme, activating student status, modifying students' personal data, requesting and updating student cards, providing certificates for the Immigration Office (for residence permit), issuing student status letters and certificates on credit recognition, concluding health insurance contract and providing Health Insurance Card, helping students with visa process application.

INTERNATIONAL OFFICE AT THE FACULTY OF AGRICULTURAL AND FOOD SCIENCES AND ENVIRONMENTAL MANAGEMENT

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International Office	Mariett Papp
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The International Office has been functioning since 2014 in order to ensure the smooth running of the international degree courses. The office is responsible for student administration (full-time students, full-time transfer students, visiting/Erasmus students), providing certificates for students, considering and accepting requests, solving problems related to course registration, giving information about internship, final exam, thesis, etc.

DEAN'S OFFICE

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Institute of Agricultural Chemistry and Soil Science

Institute of Animal Science, Biotechnology and Nature Conservation

Department of Animal Husbandry

Animal Genetics Laboratory

Department of Animal Nutrition and Food Biotechnology

Department of Nature Conservation, Zoology and Game Management

Institute of Crop Sciences

Department of Agriculture Botany and Crop Physiology

Department of Crop Production and Applied Ecology

Institute of Food Science

Institute of Food Technology

Institute of Horticulture

Institute for Land Utilisation, Technology and Regional Development

Institute of Nutrition

Institute of Plant Protection

Institute of Water and Environmental Management

Agricultural Laboratory Center

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INSTITUTE OF WATER AND ENVIRONMENTAL MANAGEMENT

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ACADEMIC CALENDAR

General structure of the academic year:

Fall semester	1st – 2nd week	Registration*	2 weeks
	1st – 14th week	Study Period for non-graduating students	14 weeks
	1st – 9th week	Study Period for graduating students	9 weeks
	directly after the study period	Exams for non-graduating students	7 weeks
	directly after the study period	Exams for graduating students	3 weeks
Spring semester	1st – 2nd week	Registration*	2 weeks
	1st – 14th week	Study Period for non-graduating students	14 weeks
	1st – 10th week	Study Period for graduating students	10 weeks
	directly after the study period	Exams for non-graduating students	7 weeks
	directly after the study period	Exams for graduating students	5 weeks

ACADEMIC CALENDAR OF THE FACULTY OF AGRICULTURAL AND FOOD SCIENCES AND ENVIRONMENTAL MANAGEMENT 2020/2021

The academic calendar for the given semester can be found on the faculty's website:
https://mek.unideb.hu/en/useful-information-your-study#overlay-context=en

THE PLANT PROTECTION ENGINEERING GRADUATE PROGRAM

INTRODUCTION OF THE PROGRAM

Name of graduate program:	Plant Protecion Graduate Program
Level:	MSc
Qualification:	Plant Protection Engineer
Mode of attendance:	Full-time
Faculty:	Faculty of Agricultural and Food Sciences and Environmental Management
Program coordinator:	László Radócz, professor
Program length:	4 semesters
Credits total:	120 credits

The aim of the Plant Protection Programme is to train specialists of plant protection who are able to fulfill directional, managing, organizing, consulting, regulating and marketing tasks, based on their wide theoretical and practical knowledge to prevent losses during crop production. Such experts are able to identify the organisms, which are threatening healthy plants (incl. pathogens, pests and weeds) and they get acquainted with their biology and reproduction, and also with the effects and mechanisms of pesticides concerning even the environment and humane hygiene, moreover apply integrated viewpoints of alternatives of chemical protection. They can prevent harms and damages caused by different pests or environmental effects, and they are applying procedures of ecological and integrated plant protection in order to reduce the pesticide-load of the environment. In their work they are always attentive to the safety of food, processors, consumers and the environment. Having a degree in higher education they are permitted to use restricted chemicals which might be special risks for the environment. The further aim is to prepare the interested and inspired students for research work and PhD training in the fields of plant protection.

COURSE DESCRIPTIONS FOR PLANT PROTECTION MSC

The list of subjects in alphabetical order.

Weed ecology, weed competition	MTMNO7032A
Weed management	MTMNO7024A

Alternative plant production and rural development (MTMNO7011A)

Name and code of the subject: Alternative management and rurual development (MTMNO7011A)
Name and title of the person responsible for the subject: Dr. Péter Horváth
Subject type: lecture
Teaching timetable of the subject, type of examination: 3 lecture, essay in a given topic
Credit value of the subject: 3

Purpose of teaching the subject: The aim of the subject is to get the students acquainted with the situations, characteristics, resources and development of rural areas and rural economy, and their possibilities for diversification.

Content of the subject (14 weeks):
1. What is rural?
2. Basics of rural development I.
3. Basics of rural development II.
4. Characteristics of rural economy
5. Resources in rural economy
6. Spatial processes influencing the situation of rural areas
7. Development and performance of rural areas
8. The role of agriculture in rural economy
9. Programs in rural development I.
10. Programs in rural development II.
11. Rural Development Program 2014-2020
12. Diversification of rural economy: rural tourism
13. Diversification of rural economy: alternative farming
14. Student presentation

Type of mid-term examination: written
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): colloquium
Teaching aids: -
Recommended literature:
The on-line seminar materials and presentations of the lecturer (available on the e-learning system

Applied plant biotechnology and resistance biology (MTMNO7014A)

ECTS Credit Points: 3
14 hour(s) lecture and 14 hour(s) seminar per semester
Type of exam: oral, presentation
Requirements:
- for signature: Participation in lectures and practices. Regular preparation for practical training with periodic inspections. From diagnostics part written exam, (part) grade recommendation - based on ZH result. Symptomatic exam (recognition of diseases at least 20 out of 25) during the last week of education. Oral examination at the end of the semester in the theoretical part of general plant

pathology.
- for a grade: 1.From diagnostics part written exam, (part) grade recommendation - based on ZH result. 2.Symptomatic exam (recognition of diseases at least 20 out of 25) during the last week of education.

lectures:

1.-2.: History of biotechnology and plant tissue culture
3 – 4: Biotechnology of asexual reproduction: Micropropagation. Somatic embryogenesis, somatic seeds / somatic seedlings. Plant tissue culture in bioreactors. Clonal agriculture
5-6.: Biotechnological methods of sexual reproduction. Haploidy, diploid technique
7-8.: In vitro gene banks, virus elimination, cryopreservation
9-10.: Basic of molecular breeding of plants, nuclear and organellar genome organization. Genetic transformation of crops
11 – 12: : Resistance biology, resistance breeding in crop production
13-14.: Protein biotechnology, green biorefinery

practices:

1.-2.: Presentation of a plant in vitro laboratory, acquaintance with the rules of sterile work
3-4.:Micropropagation: direct/indirect organogenesis
5-6.: Somatic embryogenesis,
production of artificial seeds by encapsulation. Automatization in plant tissue culture - plant cloning bioreactors. Elicitation.
7-8.hours: Anther culture, in vitro androgenesis; embryo preparation.
9-10.: Plant DNA isolation, PCR reaction, horizontal gel electrophoresis of DNA. Demonstration practice of particle bombardment by genebooster
11-12.: Green biomass processing for biorefinery purposes. Protein isolation and determination. Proteomic analysis by 1D/2D SDS PAGE - isoelectric focusing
13-14.: Proteomic analysis by 1D/2D SDS PAGE – gel electrophoresis and evaluation

literature:

Altman A., Hasegawa P.M. (2012): Plant biotechnology and agriculture (Prospects for the 21st century)
Kardung M. et al. (2020): Development of the Circular Bioeconomy: Drivers and Indicators
Freeman and Beattie (2008): An Overview of Plant Defenses against Pathogens and Herbivores

Biological plant protection I. MTMNO7035A

Name and code of the subject: Biological plant protection II., MTMNO7035A
Name and title of the person responsible for the subject: Dr. László Radócz associate professor
Additional instructors involved in teaching the subject:-
Name and level of the program: Plant Protection MSc
Subject type: optional
Teaching timetable of the subject, type of examination: 2+0/Practical
Credit value of the subject: 3
Purpose of teaching the subject:
Demonstration of the use of biological plant protection against plant pathogens and weeds.

Introduction to related biotechnological processes.
Content of the subject (14 weeks):
1. Basics of biological plant protection against pathogens,
2. Mycoparasitism
3. Antibiotics
4. Saprobion competition
5. Viruses against plant pathogens
6. Hypovirulence and mycoviruses
7. Bacteria against plant pathogens,
8. Hyperparasitic fungi
9. Natural enemies of flowering parasites,
10. History of biological weed control
11. Biological weed control with microorganisms
12. Biological weed control with animals
13. Applications of bioherbicides
14. Bioherbicides in the world
Type of mid-term examination: mid-year audit
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): Practical colloquium
Teaching aids: lecture slides
Recommended literature:
1. Radócz L .: Modern plant protection, II-IV. (Fundamentals of Plant Protection in Major Field and Horticultural Crops). University Publishing House, Debrecen (2010). (ISBN: 978-606-10-0181-1).
2. Fischl G .: Basics of biological plant protection. Farmer Publishing House, Budapest (2000). (ISBN 963 9239 57 7)
3. http: //www.tankonyvtar.hu/en/tartalom/tamop425/0010_1A_Book_08_Novenyvedelem/adatok.1

Chemistry of plant protection MTMNO7001A

Title and Code of the subject: Chemistry of plant protection MTMNO7001A
ECTS Credit Points: 2
Type of the subject: compulsory / optional
Ratio of theory and practice: 2/2 (credit%)
Type and number of classes per semester: 28 hour(s) lecture and 28 hour(s) practice per semester
Number of teaching hours / week : 2+2 (lecture and practice)
Type of exam: exam / practical course mark
Subject in the curriculum: semester 1
Preliminary requirements: -

Summary of content - theory: The aim of the subject to let the students to know the physical and chemical properties, the biological efficiency of pesticides. The dangers of poisoning of pesticides. The safety regulations of storage, transportation and application of pesticides, the basis of biochemistry, and the general characterisation and mode of action of inorganic and organic fungicides, zoocides and herbicides.
Course objectives:

1.Introduction
2.The physical and chemical properties, the biological efficiency of pesticides.
3.The dangers of poisoning of pesticides.
4.The safety regulations of storage, transportation and application of pesticides.
5.The biochemical basis of metabolism of pesticides. The construction and characterisation of enzymes.
6.Macromolecules I.: carbohydrates
7.The inhibition possibilities of synthesis of carbohydrates,
8.The inhibition possibilities of the breakdown processes of carbohydrates
9.Macromolecules II.: lipid
10.The inhibition possibilities of synthesis and breakdown processes of lipids
11.Macromolecules III.: nucleic acids.
12.The inhibition possibilities of synthesis of proteins
13.The inhibition possibilities of the breakdown processes of proteins
14.Photosynthesis

Summary of content - practice: Characterisation and effects of fungicides, zoocides and herbicides. Skills of making solutions, The role of water in making solutions, water harndness
1.The general characterisation and mode of action of inorganic fungicides.
2.General characterisation, grupping and mode of action of organic fungicides I.
3.Organic fungicids and mode of their actions II.
4.Characterisation and classification of zoocides, characterisation and classification of insecticides natural insecticides, synthetic pyrethroids, organophosphate insecticides, carbamate insecticides.
5.Hormones altering the metamorphosis, hormone synthesis inhibitors, attractants, repellents, ferromones,
6.Acaricides, nematicides, molluscicides. rodenticides. Pesticides for soil sterilization, Pesticides for protecting stored products.
7.Plant hormones controlling the growth, hormone synthesis inhibitors, Opportunities for inhibition of photosynthesis.
8.Classification and inhibition possibilities of herbicides I.
9.Herbicides and their inhibition possibilities II.
10.Herbicides and their inhibition possibilities III.
11.Making solutions with different concentrations (counting)
12.Making solutions with different concentrations (in practice)
13.The chemical basics of water hardness, Measurement of water hardness
14.The chemical basics of water softening
Literature, handbooks in English
1.Biochemistry. Christopher K. Mathews, K. E. van Holde, The Benjamin/Cummings Publishing Company, 1990. ISBN: 0-8053-5015-2.

2.The biochemistry and uses of pesticides. Kenneth A. Hassall, Macmillan Press., 1990. ISBN: 0-333-49789-9.

3.Pesticide chemistry, Gy. Matolcsy, M. Nádasy, V. Andriska, Akadémiai kiadó, Budapest, 1988. ISBN: 963-05-4573 X.

4.The biochemistry and uses of pesticides. Kenneth A. Hassall, Macmillan Press., 1990. ISBN: 0-333-

49789-9.

5.Interactions between herbicides and the soil, R. J. Hance, ACADEMIC PRESS. INC. (London) LTD. 1980. ISBN: 0-12-323840-4.

Responsible lecturer: Balláné Dr. Kovács Andrea (associate professor)
Terms of course completion:
1.Take a written exam at the end of the semester
Form of examination:
writing test
Requirement(s) to get signature:
Take part in practice, Successful completion of lab practice
Exam questions:
Equal to the course and practice objectives

Collection and preparation of insects and plants MTMNO7029A

Name and code of the subject: Collection and preparation of insects and plants MTMNO7029A
Name and title of the person responsible for the subject: Dr. Antal Nagy, associate professor
Additional instructors involved in teaching the subject: Eszter Szilágyi
Name and level of the program: Plant protection MSc
Subject type: facultative subject
Teaching timetable of the subject, type of examination: 0+2, P
Credit value of the subject: 3

Purpose of teaching the subject:
Review of sampling methods of insect and plants and test them in field conditions. Preservation of the collected economically important species (pests and weeds), making a pest and weed collections. Review of the tasks and organization of natural history collections and museums.
Content of the subject (14 weeks):
1. Task and importance of scientific collections, organization and establishment of natural history collections.
2. collecting and preserving methods of plants
3. Visit the scientific collections of the University of Debrecen
4. Overview sampling methods od insects, methods of data collection
5. Theoretical background of collection and preservation of economically important taxa: Nematoda, Mollusca, Blattoptera, Orthoptera
6. Theoretical background of collection and preservation of economically important taxa: Coleoptera, lepidoptera, Hymenoptera, hetroptera, Cicadomorpha, Aphids
7. Field samplings 1.
8. Field samplings 2.
9. Field samplings 3.
10. Processing the collected samples.
11. Processing the collected samples.
12. Processing the collected samples.
13. Processing the collected samples.

14. Processing the collected samples.

Type of mid-term examination: the attendance of practices (at least 70%) is obligatory
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): insect and plant collections made during practices is evaluated
Teaching aids: slides of presentations

Recommended literature:
Murray S. Upton and Beth L. Mantl (2010): Methods for Collecting, Preserving and Studying Insects and other terrestrial arthropod. AUSTRALIAN ENTOMOLOGICAL SOCIETY. Canberra https://doi.org/10.1111/j.1440-6055.2012.00871.x

Crop production MTMNO7003A

Environmental protection and ecotoxicology, MTMNO7002A

ECTS Credit Points: 3
14 hour(s) lecture and 14 hour(s) seminar per semester
Type of exam: oral, presentation
Requirements:
- for signature: Participation in lectures and practices. Means of preparation: from class notes, and from the articles handed out by the lecturer.
- for a grade: The course will end with a presentation project work. This presentation must based on local ecotoxicological or human toxicological problems caused by the agribusiness. It needs to discuss possible solutions.

lectures+ practices:

1. Basics of toxicology, historical backgrounds, basic concepts. CSA
2. Global environmental problems. Role of pesticides in the contamination of soil, water and air and their effects to the living creatures. SZSZ
3. Bioaccumulation, biomagnification in organisms and biocoenosises. SZSZ
4. Usage of agrochemicals. CSA
5. Registration process of agrochemicals in the EU and Hungary. CSA
6. Categorization of pesticide active agens based on modes of action and their human toxicological problems. CSA
7. Acut toxicity. CSA
8. Chronic toxicity, toxins produced by phytopathogens. CSA
9. Basics of mutagenity, mutagenic pesticides SZSZ
10. Molecular fundaments of cancer developement, carcinogenic pesticides SZSZ
11. Basic concepts in teratology, teratogenic pesticides SZSZ
12. Hormone modulants. Basic concepts i immunology, immunemodulant pesticides. SZSZ
13. Genetically modified organisms in crop production. CSA
14. Ecotoxicological evaluation of GM organisms, their effects and hazards. CSA

Forecasting and integrated pest management MTMNO7015A

General plant pathology and diagnostics, MTMNO7004A

ECTS Credit Points: 3
42 hour(s) lecture and 42 hour(s) seminar per semester
Type of exam: practical course mark
Requirements:
- for signature: Participation in lectures and practices. Regular preparation for practical training with periodic inspections. From diagnostics part written exam, (part) grade recommendation - based on ZH result. Symptomatic exam (recognition of diseases at least 20 out of 25) during the last week of education. **Oral examination** at the end of the semester in the theoretical part of general plant pathology.
- for a grade: From diagnostics part written exam, (part) grade recommendation - based on ZH result. Symptomatic exam (recognition of diseases at least 20 out of 25) during the last week of education.

Summary of content - theory:
lectures:

1. Introduction of plant pathology, universal and national history of plant pathology
2. Introduction of plant pathology, universal and national history of plant pathology
3. Formation of mycotoxins and their role in food safety
4. Endogenous (genetic) diseases. Exogenous, non-infectious diseases (climatic, edaphic factors, toxic substances)
5. Endogenous (genetic) diseases. Exogenous, non-infectious diseases (climatic, edaphic factors, toxic substances)
6. Infectious diseases: viruses, viroids, subviral forms
7. Infectious diseases: viruses, viroids, subviral forms
8. Prokaryotes (bacteria, selective bundle bacteria)
9. Prokaryotes (bacteria, selective bundle bacteria), diseases caused by phytoplasmas (and spiroplasmas)
10. Epidemiological concepts, types; Plant protection forecast options of plant diseases for major diseases
11. Disease control: agrotechnical, mechanical, chemical protection
12. Knowledge of plant pathophysiology: host-parasite interactions; forms of resistance, tolerance and their role in plant protection
13. Knowledge of plant pathophysiology: host-parasite interactions; forms of resistance, tolerance and their role in plant protection
14. Mycorrhizae; biological control against plant pathogens

practices:

1. Basic diagnostic
2. Symptomatic summary I-II.

3. Symptomatic summary I-II.
4. Classical possibilities of diagnosis: direct microscopic examination, microscopic preparations, production of pure culture (media, sterile work, plating, plate casting)
5. Classical possibilities of diagnosis: direct microscopic examination, microscopic preparations, production of pure culture (media, sterile work, plating, plate casting)
6. Examination of pure cultures by microscopic, biochemical methods (microscopic measurements, spore counting, classical and modern bacteriological methods); modern possibilities of diagnosis: Serological methods (principles, simple and complex serology, ELISA types, polyclonal and monoclonal antibody application)
7. Nucleic acid and protein based techniques (PCR, gel electrophoresis, RAPD, RFLP, dot-blot hybridization) Cultivation on live plants: reinfection, indicator plants, test plants
8. Detailed symptomatic overview: symptoms of apple and pear diseases
9. Symptoms of the disease of stone fruits, grape, berries
10. Symptoms of disease of courgette plants, cabbage, pepper, tomato
11. Symptoms of potato and legumes disease
12. Symptoms of cereal diseases
13. Symptoms of sunflower and corn diseases
14. Overview of additional diseases

Literature

Agrios, G.N. (2005): Plant Pathology, Fifth Edition. Academic Press.
Sambamurti A.P.S.S. (2006): A Textbook of Plant Pathology. IK International.
Dhingra, O.D. – Sinclair, J.B. (1995): Basic Plant Pathology Methods. Lewish Publishers
For practical trainings:
compulsory:

- Fox, R.T.V. (1993): Principles of Diagnostic Techniques in Plant Pathology. CAB International. pp. 213
- Dhingra, O.D. – Sinclair, J.B. (1995): Basic Plant Pathology Methods. (Second Ed.) Lewish Publishers.
- Shurtleff, M.C., Averre III, C.W. (1997): The Plant Disease Clinic and Field Diagnosis of Abiotic Diseases.

recommended:

Klement, Z., Rudolph, K., Sands, D.C. (eds.) (1990): Methods in Phytobacteriology. Akadémiai Kiadó, Budapest.

Herbology MTMNO7006A

Title of the subject: HerbologyCredit: 5
Type of the subject: compulsory
Ratio of theory and practice: 60 /40 (credit%)
Type and number of classes per semester: 70 hours per semester (3 h lecture / 2 h practice per week)
Type of exam: exam / practical course mark

Subject in the curriculum: semester 1
Preliminary requirements: -

Summary of content - theory: The knowledge to be acquired is concise, as well as a 14 week breakdown of lectures.
Description of goal:
Definition of weeds, harms of weeds. Life types of weeds. Reproduction and dormancy of weeds. Identification of weed species. Identification of weed seedlings and seeds. Competition among weeds and crops. Allelopathy. Climate change and weeds.
Students can recognise significant weed species and know biological founds of weed control, able to pretend spread of weeds.

Course objectives:
1.Life types of weeds
2.Damage of weeds
3.Allelopathy and its significance in plant protection
4.Propagation of weeds, dormancy, knowledge of generative and vegetative propagation formulas
5.Weed surveying methods
6.Physical, mechanical, agrotechnical, biology, chemical weed control methods
7.Methods of applying herbicides, spraying aids
8.Uptake and translocation of herbicides
9.Herbicide resistance, development, inheritance, possibilities of prevention development, knowledge of resistant weed biotypes
10.Herbicide groups
11.Herbicide groups
12.Seedling identifications
13.Seedling identifications
14.Seed identifications
Summary of content - practice: The knowledge to be acquired is concise, as well as a 14 week breakdown of practice.
Description of goal:
Training of plant protection, who are in possession of an appropriate economic approach, they know the cultivation of plants, knows effective ways to control weeds. They know the temporal appearance of weeds and effective and in many cases preventive protection against them.

Skills to be learnt:
1. Identification of Therophyta weed species
2. Identification of Hemitherophyta weed species
3.Identification of Hemikryptophyta weed species
4.Identification of Geophyta weed species
5.Identification of Hidrophyte and other weed species
6.Integrated weed management (IWM)
7.Field practice (Herbicides application methods)
8.Allelopathic examination with some major weeds
9.Allelopathic examination with some major weeds
10.Allelopathic examination with some invasive weeds
11.Allelopathic examination with some invasive weeds

12.Seed identification
13.Seedling identification
14.Seedling identification
Literature, handbooks in English
1.Alden S. Crafts (1975): Modern Weed Control. University of California Press. ISBN 0-520-02733-7
2.Cobb, A., Reade, J. (2010): Herbicides and Plant Physiology. Wiley Ltd. USA ISBN-13: 978-1-4051-2935-0
3.Haflinger, E., Scholz, H (1981): Grass weeds. Ciba-Geigy Ltd. Switzerland
4.Steven R. R., Jodie S. H. (1984): Weed Ecology Implications for Vegetation Management. A Wiley-Interscience Publication. USA ISBN 0-471-87674-7

Responsible lecturer: Arnold Szilágyi, assistant lecturer
Other lecturer(s): -
Terms of course completion:
Successful completion of weed detection, Completing exercises

Form of examination:
Written examination
Requirement(s) to get signature:
Attendance at the lecture is recommended, attendance at the exercises is mandatory (4 allowed absences per semester).

Horticulture MTMNO7010A

Title and Code of the subject: Horticulture MTMNO7010A ECTS Credit Points: 3
Type of the subject: compulsory / optional
Ratio of theory and practice: ../.. (credit%) 65 / 35
Type and number of classes per semester: 28 hour(s) lecture and 14 hour(s) practice per semester
Number of teaching hours / week : 2+1 (lecture and practice)
Type of exam: exam / practical course mark
Subject in the curriculum: semester 2
Preliminary requirements: -

Summary of content - theory:
Knowledge the modern growing technology of more considerable horticultural plant, ability to choice the optimal growing place, skill to define the factors which determine the quality and their application in the growing. The students know the raw material needs of processing industry and the fresh market and are capable of the selection of proper technology and varieties.
Characterization and development of horticultural production. Grouping of vegetables, according to a heat claim and the applied propagation methods. The characterisation of most important vegetable species. Fruit-growing in the world and directions of his development. Fruit-growing and his change of technology. New directions of the development. Grape growing, wine processing is his situation in the world, the tendencies of his change. Domestic wine-growing landscapes and wine-growing regions.

1.Importance, characterization and development of horticultural production

2.The grouping of vegetables according to a heat claim and the applied propagation methods.
3.The environmental claim of a tomato and sweet pepper their growing.
4.The characterisation of Cucurbitaceae crops – melons, cucumber, pumpkin, grafting vegetables
5.The characterisation of root vegetables - the growing of the carrot, parsley, beetroot and celery
6.The general characterisation of the onion, growing from seeds (one-year growing method) and from sets (two year method).
7.The environmental claim of a sugar pea and green beans, different types, growing.
8.The environmental claim of sweet corn, special types and growing.
9.Characterization of the major fruit species, growing regions and propagation
10.Establishment of fruit orchards, canopy formation
11.Cultivation, fertilization and irrigation of fruit orchards
12. Plant protection, harvest and storage of fruits
13. Importance of vine production, morphology, biological phases and propagation of vine
14. Establishment of vine orchards, cultivation methods
Summary of content - practice:
Skills to be learnt: They know the risk factor of plant cultivation and, if present, the possibilities of preventing and remedying economic and environmental damage.
1.Characterization of horticultural production
2.The roil of varieties – some variety selection criteria.
3.Vegetable transplant production.
4.Transplants hardening
5.Mulches and row covers.
6.Biodegradable mulches
7.High tunnels
8.Ventilation in freestanding high tunnels
9.Basic information for establishment of fruit orchard
10.Layout system of orchard
11.Weed management and integrated plant protection in orchard
12.The role of weather station installation in modern orchards
13.Plantation maintenance of grapes
14.Environmental problems and plant protection of grapes
Literature, handbooks in English
1.Sánchez, E. S. (2010): Vegetable Gardening, The Pennsylvania State University, 64 p.
http://www.webgrower.com/regional/pdf/PA_Veg_agrs115.pdf
2.Ric Bessin, R. (ed.) (2012): Vegetable Production Guide for Commercial Growers. Cooperative Extension Service • University Of Kentucky College of Agriculture, Lexington, 132 p.
http://www2.ca.uky.edu/agcomm/pubs/id/id36/id36.pdf
3.Parshant Bakshi V.K.Wali (2011): Practical manual for fruit production.
https://www.researchgate.net/publication/270509577_Practical_manual_of_fruit_production
4.Strik, B. C. (2011): Growing table grapes.
https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/ec1639.pdf

Recommended literature:
5.Kemble, J. M. (2020): Vegetable Crop Handbook, Southeastern U.S.,355 p.
https://www.aces.edu/wp-content/uploads/2019/12/2020_SEVG_final_web.pdf
6.Tree FruitProduction Guide. Pennsylvania 2012–2013.
https://polk.extension.wisc.edu/files/2014/02/Tree-Fruit-Production-Guide-Penn-State-2013.pdf

7.Hamman, R. A. et al, (1998): The Colorado grape growers' guide. Colorado State University, https://extension.colostate.edu/docs/pubs/garden/550a.pdf

Responsible lecturer: Mária Takács-Hájos CSc, associate professor
Terms of course completion:
1.Completing assignments / exercises 2.Submitting essay 3.Giving presentation
Form of examination: practical course mark
Requirement(s) to get signature:
Presentation, report. Student may skip class maximum 3 times during the semester.

Human hygiene and first aids MTMNO7021A

Informatics and agricultural extension MTMNO7013A

Name and code of the subject: Informatics and agricultural extension (MTMNO7013A)
Name and title of the person responsible for the subject: Dr. Péter Lengyel, Dr. Péter Horváth
Additional instructors involved in teaching the subject: -
Name and level of the program: Növényorvosi MSc
Subject type: lecture an practice
Teaching timetable of the subject, type of examination: 1 lecture + 2 practice, written mid-term exams
Credit value of the subject: 3

Purpose of teaching the subject: Understanding the structure of the spreadsheet program, using worksheet functions, and solving basic and complex worksheets. Learning how to make reports from data, which analyze tools can be used and interpretation of results.

Content of the subject (14 weeks):
1. Data input, data types, basic operations. The use of worksheets: basic formatting and data format
2. Structure of data tables, spreadsheet function semantics. References, sorting, and filtering
3. Date and time functions, text functions. The use of operators and arguments in date, time and text functions
4. Logical functions and lookup and reference functions. Learning the use of conditions in functions
5. Data features, tables as databases, database functions
6. Data analysis and reports. The use of PIVOT tables
7. Mid-term exam (Excel), Power BI basics
8. Transform databases, Create reports, visuals
9. Creating complex report
10. Mid-term exam (Power BI)
11. Agricultural extension
12. Agricultural advisory system
13. Swot analysis
14. Student presentations

Integrated pest management, IPM MTMNO7025A

Name and code of the subject: (IPM) Integrated plant protection, MTMNO7025A
Name and title of the person responsible for the subject: Dr. László Radócz associate professor
Additional instructors involved in teaching the subject:-
Name and level of the program: Plant Protection MSc
Subject type: obligatory
Teaching timetable of the subject, type of examination: 3+2/Oral exam
Credit value of the subject: 3

Purpose of teaching the subject:
Demonstration of integrated plant protection as an integral part of the work process of the agricultural production. It is extremely important that participants do not limit plant protection to the use of pesticide products, but consider plant protection as a combined system of different protection practices within the cultivation activity. An essential requirement is that students recognize the most important pests (know what, when, where to look); recognize the damage. In accordance with the knowledge of Plant Protection Chemistry, detailed knowledge should be taught and reference should be made to all possible control procedures (including plant protection products that can be used), but there should be a reference to plant protection knowledge when describing preparations. Pest control should be taught according to the approach and requirements of integrated pest management.

Content of the subject (14 weeks):
1. Modern plant protection of autumn cereals,
2. Modern plant protection for spring cereals
3. Modern plant protection of maize,
4. Modern plant protection of sunflowers,
5. Plant protection of winter oilseed rape
6. Modern plant protection of potatoes and tobacco,
7. Modern plant protection of peppers and tomatoes
8. Modern plant protection of cucumbers, melons, pumpkins,
9. Modern plant protection of cabbages (cabbage, cauliflower, turnips, radishes, lettuce),
10. Modern plant protection of onions
11. Modern plant protection of sugar beet,
12. Modern plant protection of peas, alfalfa, soybeans
13. Modern plant protection of nurseries,
14. Modern plant protection of greenhouses

Type of mid-term examination: mid-year audit
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): Practical colloquium
Teaching aids: lecture slides

Recommended literature:
1. Radócz L .: Modern plant protection, II-IV. (Fundamentals of Plant Protection in Major Field and Horticultural Crops). University Publishing House, Debrecen (2010). (ISBN: 978-606-10-0181-1).
2.http://www.tankonyvtar.hu/en/tartalom/tamop425/0010_1A_Book_08_Novenyvedelem/adatok.1

Molecular biology MTMNO7012A

Title and Code of the subject: Molecular Biology
Code: MTMNO7012AECTS Credit Points: 3
Type of the subject: compulsory / optional
Ratio of theory and practice: 50/50 (credit%)
Type and number of classes per semester: 14 hour(s) lecture and 14 hour(s) practice per semester
Number of teaching hours / week : 1+1 (lecture and practice)
Type of exam: oarl exam / practical course mark
Subject in the curriculum: semester 1.
Preliminary requirements: -

Summary of content – theory and practice:
Course objectives:
1.Macromolecules of the cells - KE
2.Genetic elements and their characteristics - KE
3.DNA replication in the prokaryotic and in the eukaryotic cells - KE
4.Protein synthesis – transcription - KE
5.Protein synthesis – translation - KE
6.Chemical identification methods for the organisms - KE
7.Serological methods - KE
8.Basics and main types of molecular blotting techniques - PK
9.Basics of PCR and standard PCR - PK
10.Real-time PCR - PK
11.Molecular identification - KCs
12.Molecular techniques on the field of plant protection - KCs13.

Responsible lecturer: Dr. Erzsébet Karaffa

Form of examination: Oral examination
Requirement(s) to get signature:
The attendance in the class is highly recommended.
The course will end with a presentation from an article, and discussion the introduced results based on molecular methods on the field of plant protection. It is also necessary to answer for all the problen solving tasks connected to the practices.
Means of preparation: notes from class and articles provided by the lecturer

Mycology and fungal toxicology I. MTMNO7028A

Name and code of the subject: Mycology and fungal toxicology I, MTMNO7028A
Name and title of the person responsible for the subject: Dr. László Radócz associate professor
Additional instructors involved in teaching the subject:-
Name and level of the program: Plant Protection MSc
Subject type: optional
Teaching timetable of the subject, type of examination: 4+1/Practical

Credit value of the subject: 5

Purpose of teaching the subject:
Students should learn about the most important edible and toxic large fungi, the types of poisoning, and how to control them. Be aware of the ecological significance of fungi, their body composition and possible ways of forming their fruiting bodies.

Content of the subject (14 weeks):
1. The place of fungi is the living world, their body structure
2. Types of hyphae and fruiting bodies,
3. The ecological role of fungi
4. Type of production site,
5. Mycorrhizae
6. Damage caused by fungi and their recovery
7. Rules for mushroom collection
8. Qualification of mushrooms, mushroom testing
9. Cultivation of mushrooms
10. Cultivation of oyster mushrooms
11. Growing shii-take mushrooms
12. Growing of other mushroom species
13. Processing and preserving mushrooms
14. The dietary significance and nutritional value of mushrooms.

Type of mid-term examination: field report
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): Practical colloquium
Teaching aids: lecture slides

Recommended literature:
1. Ewald G. Handbook of Mushrooms. Artamira Publishing House, Budapest (2010). (ISBN 978-963-9889-13-2)
2. Rimóczi I. Mushrooms of Central-Europe. CD-ROM Kossuth Publishing House, Budapest (2000) (ISBN: 963-09-398

Mycology and fungal toxicology II. MTMNO7030A

Outlines of plant pathology I. MTMNO7017A

Title and Code of the subject: Outlines of plant pathology I.
Code: MTMNO7017AECTS Credit Points: 3
Type of the subject: compulsory / optional
Ratio of theory and practice: 50/50 (credit%)
Type and number of classes per semester: 14 hour(s) lecture and 14 hour(s) practice per semester
Number of teaching hours / week : 1+1 (lecture and practice)
Type of exam: oarl exam / practical course mark

Subject in the curriculum: semester 3.
Preliminary requirements: -

Summary of content:
Description and means of identification of the diseases (abiotic diseases, viruses, bacteria, phythoplasms, fungi) main cultivated field crops and vegetables in Hungary and the European Union. Integrated management technologies against the diseases of the field crops and vegetables.

Theory:
Course objectives:
1.Wheat diseases
2.Wheat diseases
3.Diseases of other cereals (barlyey, rye, oat)
4.Diseases of corn maize
5.Sunflower diseases
6.Sugarbeet diseases
7.Soybean diseases
8.Diseases of peas and beans
9.Diseases of peas and beans
10.Diseases of Cucurbitaceae crops (pumpkin, squash, gourds, cucumber and melons)
11.Diseases of Cruciferaceae crops (oilseed rape and cabbages)
12.Diseases of peppers
13.Tomato diseases
14.Potato diseases
Practice:
1.Pest management of wheat diseases
2.Pest management of wheat diseases
3.Pest management of diseases of other cereals (barlyey, rye, oat)
4.Pest management of diseases of corn maize
5.Pest management of sunflower diseases
6.Pest management of sugarbeet diseases
7.Pest management of soybean diseases
8.Pest management of diseases of peas and beans
9.Pest management of diseases of peas and beans
10.Pest management of diseases of Cucurbitaceae crops (pumpkin, squash, gourds, cucumber and melons)
11.Pest management of diseases of Cruciferaceae crops (oilseed rape and cabbages)
12.Pest management of diseases of peppers
13.Pest management of tomato diseases
14.Pest management of potato diseases
Literature:
Agrios, G.N. (2005): Plant Pathology, Fifth Edition. Academic Press.
Sambamurti A.P.S.S. (2006): A Textbook of Plant Pathology. IK International.

Responsible lecturer: Dr. Gábor Tarcali
Form of examination: Oral examination
Requirement(s) to get signature: Attendance to the courses.

Outlines of plant pathology II. MTMNO7022A

Name and code of the subject: Outlines of plant pathology II., MTMNO7022A
Name and title of the person responsible for the subject: Gábor Tarcali; senior research fellow
Additional instructors involved in teaching the subject: András Csótó
Name and level of the program: plant doctor MSc
Subject type: mandatory
Teaching timetable of the subject, type of examination: 2+2 C
Credit value of the subject: 3

Purpose of teaching the subject: The aim of teaching the course is to acquaint students with the biology, means of identification of the diseases (abiotic diseases, viruses, bacteria, phythoplasms, fungi) of main cultivated fruits in Hungary and the European Union and their integrated management technologies.

Content of the subject (14 weeks):
1. Apple diseases/I.;
2. Apple diseases/II.;
3. Pear diseases;
4. Quince diseases;
5. Peach diseases;
6. Apricot diseases;
7. Plum diseases;
8. Cherry and sour cherry diseases
9. Diseases of currants and gooseberry;
10. Raspberry diseases;
11. Strawberry diseases;
12-13. Grape diseases;
14. Diseases of nuts

Type of mid-term examination: Attendance at lectures is recommended. Attendance at the practical lessons is mandatory. The condition for signature is 70% attendance at the practical lessons.
Method of assessment (semester examination mark - colloquium): Oral examination.
Teaching aids: slideshows of the course

Recommended literature: Plant Pathology 5th ediion George Agrios No. of pages: 952 Academic Press 2005 Hardcover ISBN: 9780120445653

PCR in microbiology MTMNO7034A

Planning and evaluating of plant protection trials MTMNO7026A

Plant protection entomology I. MTMNO7008A
Name and code of the subject: Plant protection entomology I, MTMNO7008A

Name and title of the person responsible for the subject: Dr. Antal Nagy, associate professor
Additional instructors involved in teaching the subject: Eszter Szilágyi
Name and level of the program: Plant protection MSc
Subject type: applied natural sciences
Teaching timetable of the subject, type of examination: 2+1, E
Credit value of the subject: 3

Purpose of teaching the subject: Characterisation of the most important pest species of Lepidoptera and Hymenoptera orders considering their biology, economic importance, control and monitoring methods (especially cultural and biological methods).

Content of the subject (14 weeks):
Lepidoptera in general. Most important pests of Mandibulata, Exoporia, Monotrysia
2. Most important pests of Lionetiidae, Gracilariidae
3. Most important pests of Coleophoridae, Plutellidae, Acrolepiidae, Argyresthiidae, Ypsolophidae, Tineidae
4. Most important pests of Gelechiidae, Depressariidae, Oecophoridae, Agonoxenidae, Yponomeutidae
5. Most important pests of Tortricidae 1.
6. Most important pests of Tortricidae 2.
7. Most important pests of Pyralidae, Choreutidae
8. Most important pests of Cossidae, Sesiidae, Zygenidae, Geometridae,
9. Most important pests of Lasiocampidae, Lymantriidae, Arctiidae, Noctuidae 1.
10. Most important pests of Noctuidae 2.
11. Most important pests of Saturniidae, Shingifdae, Pieridae, Papilionidae, Nymphalidae
12. Hymenoptera in general. Most important pests of Tentredinidae 1.
13. Most important pests of Tenthredinidae 2.
14. Most important pests and beneficial species of Vespidae, Ischneumonidae
Type of mid-term examination: lectures are suggested, the attendance of practices (at least 70%) is obligatory
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): damage and pest recognition, test (exam)
Teaching aids: slides of presentations
Recommended literature:
Marczali Zs. (2020): Modul of applied entomology: Field pests in temperate zone of Europe http://dtk.tankonyvtar.hu/xmlui/handle/1234567892953

Plant protection entomology II. MTMNO7018A

Plant protection entomology III. MTMNO7023A

Name and code of the subject: Plant protection entomology III, MTMNO7023A
Name and title of the person responsible for the subject: Dr. Antal Nagy, associate professor
Additional instructors involved in teaching the subject: Eszter Szilágyi
Name and level of the program: Plant protection MSc
Subject type: applied natural sciences

Teaching timetable of the subject, type of examination: 2+2, E
Credit value of the subject: 3
Purpose of teaching the subject: Characterisation of the animal pest assemblages of the main crops, vegetables and fruits grown in Hungary and Europe. Appearance of pest in consecutive phenological stages of the host plant(s). IPM against the most important pest of the main cultures.
Content of the subject (14 weeks):
1. Poliphagous pest of crops (in arable lands)
2. Pest assemblages of cereals and their IPM
3. Pest assemblages of potato and sugar beet and their IPM
4. Pest assemblages of tobacco and sunflower and their IPM
5. Pest assemblages of lucerne and legumes (pea, bean and soy) and their IPM
6. Pest assemblages of tomato, green pepper and onion and their IPM
7. Pest assemblages of cucumber, watermelon, marrow and Brassica sp. (rapeseed) and their IPM
8. Poliphagous pests of fruit trees (in orchards)
9. Pest assemblages of apple and pear and their IPM
10. Pest assemblages of peach, apricot and plum and their IPM
11. Pest assemblages of grape, goosberry and currant and their IPM
12. Pest assemblages of raspberry and strowberry and their IPM
13. Pest assemblages of small cultures (wallnut, root crops, horse radish and asparagus) and their IPM
14. Pest assemblages of tored products
Type of mid-term examination: lectures are suggested, the attendance of practices (at least 70%) is obligatory
Method of assessment (semester examination mark - report, practical grade, colloquium, examination): damage and pest recognition, test (exam)
Teaching aids: slides of presentations
Recommended literature: collected articles

Plant protection in greenhouses MTMNO7033A

Plant protection law and administration, food safety MTMNO7016A

Name and code of the subject: Plant protection law and administration MTMNO7016A
Name and title of the person responsible for the subject: Dr. Gabor Tarcali senior research fellow
Additional instructors involved in teaching the subject:
Name and level of the program: Expert of plant protection, MSc
Subject type: obligatory
Teaching timetable of the subject, type of examination: 3 + 0 C
Credit value of the subject: 3

Purpose of teaching the subject:
The student should get acquainted with the Hungarian plant protection organization and the current administration. The student should get acquainted with the Hungarian plant protection legislation. At the skill level, the student should master the rules for the use of plant protection products and be able to apply them in practice.
Content of the subject (14 weeks)
1. Introduction, historical overview

2. Organization of the plant protection administration, plant protection authorities
3. Plant protection legislation
4. Obligation to protect against pests
5. Regulations for quarantine and dangerous pests, quarantine rules
6. Plant protection regulations in the European Union
7. Plant health rules, plant passport
8. Phytosanitary inspection of propagating material
9. Authorization of active substances and plant protection products
10. Rules for the use of plant protection products
11. Rules for the use of plant protection products
12. Rules for the use of plant protection products
13. Environmental regulations, protection of bees and living waters
14. Legal consequences, administrative procedure

Type of mid-term examination:
Participation in the lectures.
Method of assessment (semester examination mark - report, practical grade, colloquium, examination):
Written examination at the end of the semester.
Teaching aids:
Slide presentations of the knowledge to be submitted and the disease lists are available in advance in PDF files.

Recommended literature:
- Current legislation on plant protection (XLVI of 2008 Act, 43/2010. (IV. 26.) FVM Decree, Directive 2009/128 / EC of the EU Parliament and the Council),
- Gabor Tarcali: Plant Protection Law and Administration, Educational Handbook, 2020

Plant protection zoology and ecology MTMNO7005A

Title and Code of the subject: MTMNO7005A Plant protection zoology and ecologyECTS Credit Points: 3
Type of the subject: compulsory / optional
Ratio of theory and practice: 3/0 (credit%)
Type and number of classes per semester: 56 hour(s) lecture and 28 hour(s) practice per semester
Number of teaching hours / week : 4+2 (lecture and practice)
Type of exam: exam / practical course mark
Subject in the curriculum: semester 1
Preliminary requirements: -

Summary of content - theory: Basic and applied insect ecology: structure, dynamic and growth of population, characteristics of natural and agricultural landscapes and ecosystems, basic production biology, basic chemical ecology, population interaction especially (insect-plant, host-pray and host-parasite interactions), types of dormancy. Basic biogeography and invasion biology. General biology (anatomy and physiology, reproduction biology etc.) of Nematodes, Gastropoda, Myriapoda, Diplopoda and Insects.
Characterisation of the most important pest species of Nematode, Gastropod, Myriopode and some

Insect order: Saltatoria and Coleoptera. Characterisation of beneficial organisms belonging to the studied groups.
Course objectives:

1.Introduction
2.Nematoda, Mollusca, Myriapoda, Diplopoda
3.Insect morphology, physiology and reproduction biology
4.Lepismatidea, Blattoptera, Orthoptera
5.Coleoptera in general: Carabidae, Melolonthidae
6.Elateridae, Tenebrionidae
7. Mordellidae, Coccinellidae, Bituridae, Nitidulidae, Silvanidae, Laemopphloidae, Trogositidae, Cryptophagidae, Anobyidae, Bostrichidae
8.Chrysomelidae
9.Cerambycidae, Buprestidae, Bruchidae
10.Curculionidae
11. Scolitidae, Attelabidae, Apionidae, Sylphidae
12.Plant protection ecology I.
13.Plant protection ecology II.
14.Plant protection ecology III.
Summary of content - practice: Characterisation and identification practices of studied invertebrate taxa and species and damages caused by the economically most important species.
Skills to be learnt: Use of identification keys of studied taxa. Recognition of symptoms caused by the economically most important Nematoda, Gastropoda, Orthoptera and Coleoptera pests and recognition (identification) of the most important species of the studied taxa.
1.Introduction, use of equipment and laboratory
2.Nematoda, Mollusca, Myriapoda, Diplopoda
3.different types of insect larvae, and symptoms caused by Coleoptera pests
4.Lepismatidea, Blattoptera, Orthoptera
5.Coleoptera in general: Carabidae, Melolonthidae
6.Elateridae, Tenebrionidae
7. Mordellidae, Coccinellidae, Bituridae, Nitidulidae
8.Silvanidae, Laemopphloidae, Trogositidae, Cryptophagidae,, Anobyidae, Bostrichidae
9.Chrysomelidae I
10.Chrysomelidae II
11.Cerambycidae, Buprestidae, Bruchidae
12.Curculionidae
13. Scolitidae, Attelabidae, Apionidae, Sylphidae
14.Beneficial species: Nematoda, Coleoptera
Literature, handbooks in English
1.Marczali Zs. (2020): Modul of applied entomology: Field pests in temperate zone of Europe http://dtk.tankonyvtar.hu/xmlui/handle/123456789/2953
2.Pénzes-Kónya, E. & Varga J (2020): Ecology for students of Medical Plant Production Expert higher level vocational training programme. https://dtk.tankonyvtar.hu/handle/123456789/3634
3.Marczali Zs. (2020): Insect ecology https://dtk.tankonyvtar.hu/handle/123456789/2949
4.Marczali Zs. (2020): Insect Physiology https://dtk.tankonyvtar.hu/handle /123456789/3205

Responsible lecturer: Dr. Antal Nagy (associate professor)

Other lecturer(s): Dr. Szabolcs Szanyi (assistant lecturer)

Terms of course completion:
1.Make symptom and pest recognition (identification) based on processed materials
2.Take an exam at the end of the semester
Form of examination:
writing test
Requirement(s) to get signature:
symptom and pest recognition (identification) based on processed materials

Exam questions:
Equal to the course objectives

Plant protectional application technology MTMNO7009A

Title of the subject: Plant protectional application technologyMTMNO7009ACredit: 2
Type of the subject: compulsory
Ratio of theory and practice: 33 /66 (credit%)
Type and number of classes per semester: 42 hours per semester (1 h lecture / 2 h practice per week)
Type of exam: exam / practical course mark
Subject in the curriculum: semester 2
Preliminary requirements: -

Summary of content - theory: The knowledge to be acquired is concise, as well as a 14 week breakdown of lectures.
Description of goal:
Students will learn the main types of sprayers and the main structural parts. Students able to use the equipment's of crop protection. Students able to use the equipment's of orchard protection.

Course objectives:

1.Main types of the sprayers
2.The flow system of the sprayers
3.Sprayer pumps
4.Field sprayer structures
5.Sprayer Nozzles
6.Orchard sprayers I.
7.Orchard sprayers II.
8.Application Control of the sprayers and it's Equipment
9.Electronic Control of the sprayers and GPS Guidance system
10.Sprayer aircraft
11.Environmentally friendly pest control methods
12.Plant protection equipment's
13.Operating of the sprayers
14.Operating of the sprayers
Summary of content - practice: The knowledge to be acquired is concise, as well as a 14 week

breakdown of practice.
Description of goal:
Training the skill of plant protection machine and adjusting the plant protection sprayer.
Training the skill of orchard protection machine and adjusting the orchard protection sprayer.

Skills to be learnt:

1.Training the flow system of the sprayers
2.Training the flow system of the sprayers
3.Training the Sprayer pumps
4.Training the Field sprayer structures
5.Training the Sprayer Nozzles
6.Training the Orchard sprayers I.
7.Training the Orchard sprayers II.
8.Training the Application Control of the sprayers and it's Equipment
9.Training the Electronic Control of the sprayers and GPS Guidance system
10.Field practice
11.Field practice
12.Field practice
13.Operating of the sprayers
14.Operating of the sprayers
Literature, handbooks in English
1.Erich-Christian Oerke, Roland Gerhards, Gunter Menz, Richard A. Sikora: Precision Crop Protection, ISBN-10: 1892769646
2.Csizmazia Zoltán: A növényvédelem gépei, DE MTK
Responsible lecturer: Zoltán Hagymássy associate professor
Other lecturer(s): - Árpád Illés assistant lecturer

Terms of course completion:
Completing exercises

Form of examination:
Written and oral examination
Requirement(s) to get signature:
Attendance at the lecture is recommended, attendance at the exercises is mandatory (4 allowed absences per semester).

Plant protectional mycology MTMNO7007A

Name and code of the subject: Plant protection mycology MTMNO7007A
Name and title of the person responsible for the subject: Dr. Gabor Tarcali senior research fellow
Additional instructors involved in teaching the subject: Csüllög Kitti
Name and level of the program: Expert of plant protection, MSc
Subject type: obligatory
Teaching timetable of the subject, type of examination: 2 + 1 C
Credit value of the subject: 3

Purpose of teaching the subject:
The student should be familiar with the system of plant pathogenic fungi. Through their most important morphological and taxonomic characteristics, the life cycle and biology the student can develop an integrated approach to plant protection against fungal diseases. Fungi, in a broader sense, are responsible for 40-65% of plant diseases. The topic is one of the defining parts of plant protection. In detailed plant pathology (per plant), knowledge of these is essential.

Content of the subject (14 weeks)
Lectures:
1. Introduction to mycology
2. Protozoa
3. Chromista (Oomycota)
4. Chromista (Oomycota), Mycorrhizae
5. Fungi (Chytridiomycota; Zygomycota)
6. Ascomycota
7. Ascomycota
8. Ascomycota
9. Ascomycota
10. Ascomycota
11. Basidiomycota
12. Basidiomycota
13. Basidiomycota
14. Summary

Practices:
1. Introduction to mycology
2. Life cycles and biology of Protozoa
3. Life cycles and biology of Chromista (Oomycota)
4. Life cycles and biology of Chromista (Oomycota), Mycorrhizae
5. Life cycles and biology of Chytridiomycota and Zygomycota fungi
6. Life cycles and biology of Acomycota fungi
7. Life cycles and biology of Acomycota fungi
8. Life cycles and biology of Acomycota fungi
9. Life cycles and biology of Acomycota fungi
10. Life cycles and biology of Acomycota fungi
11. Life cycles and biology of Basidiomycota fungi
12. Life cycles and biology of Basidiomycota fungi
13. Life cycles and biology of Basidiomycota fungi
14. Life cycles and biology of Basidiomycota fungi

Type of mid-term examination:
Participation in lectures and practices.
Regular theoretical and practical preparation with periodic inspections.
Method of assessment (semester examination mark - report, practical grade, colloquium, examination):
Oral examination at the end of the semester.

Teaching aids: Slide presentations of the knowledge to be submitted and the disease lists are available in advance in PDF files.

Recommended literature:
Agrios, G.N. (2005): Plant Pathology, Fifth Edition. Academic Press.
Sambamurti A.P.S.S. (2006): A Textbook of Plant Pathology. IK International.
Richard Gáborjányi, R., Takács, A.P .: Plant Pathology, University of Pannonia, Georgikon Faculty, Plant Protection Institute, Keszthely

Weed biology MTMNO7019A

Weed ecology, weed competition MTMNO7032A

Weed management MTMNO7024A

Name and code of the subject: Weed management (MTMNO7024A)
Name and title of the person responsible for the subject: Arnold Szilágyi, assistant lecturer
Additional instructors involved in teaching the subject: -
Name and level of the program: Plant Protection MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 1+2 P: Practical examination
Credit value of the subject: 3
Purpose of teaching the subject: Description of weeds and weed control technologies of the most important field and horticultural crops.

Content of the subject (14 weeks):
1. Weed control of tobacco
2. Weed control of alfalfa
3. Weed control of root vegetables
4. Weed control of legume (pea, bean, soybean)
5. Weed control of onion
6. Weed control of cucumber, melon (water melon), pumpkin
7. Weed control of tomato, paprika (pepper)
8. Weed control of apple
9. Weed control of pear
10. Weed control of drupes or stone fruits (plum, sour cherry, cherry)
11. Weed control of drupes or stone fruits (appricot, peach)
12. Weed control of grape
13. Weed control of strawberry
14. Weed control of ACC inhibitors

Type of mid-term examination:
Attendance at the lecture is recommended.
Method of assessment (semester examination mark - report, practical grade, colloquium, examination):
Practical examination

Teaching aids:
1. Alden S. Crafts (1975): Modern Weed Control. University of California Press. ISBN 0-520-02733-7
2. Cobb, A., Reade, J. (2010): Herbicides and Plant Physiology. Wiley Ltd. USA ISBN-13: 978-1-4051-2935-0
3. Steven R. R., Jodie S. H. (1984): Weed Ecology Implications for Vegetation Management. A Wiley-Interscience Publication. USA ISBN 0-471-87674-7

Internship

Students have to carry out a 4-week internship involved in the model curriculum. The internship course must be signed up for previously via the NEPTUN study registration system in the fall semester (3rd semester). Its execution is the criteria requirement of getting the pre-degree certificate (absolutorium).

Work and Fire Safety Course

According to the Rules and Regulations of University of Debrecen a student has to complete the online course for work and fire safety. Registration for the course and completion are necessary for graduation. For MSc students the course is only necessary only if BSc diploma has been awarded outside of the University of Debrecen.

Registration in the Neptun system by the subject: MUNKAVEDELEM

Students have to read an online material until the end to get the signature on Neptun for the completion of the course. The link of the online course is available on webpage of the Faculty.

Physical Education

According to the Rules and Regulations of University of Debrecen a student has to complete Physical Education courses at least in two semesters during the Bachelor training and one semester during the Master training. Our University offers a wide range of facilities to complete them. Further information is available from the Sport Centre of the University, its website: http://sportsci.unideb.hu.

Thesis

A Thesis is the creative elaboration of a professional task in written form. By solving the task, the student relies on his/her studies using national and international literature under the guidance of an internal and external supervisor (referee). By solving the task, the food safety and quality engineering student certifies that he/she is capable to apply the acquired knowledge in practice and to summarize the completed work and its results in a professional way, to solve the tasks related to his/her topic creatively and to complete individual professional work. By preparing and defending thesis students who complete the Food Safety and Quality Engineering graduate program prove that they are capable of the practical applications of the acquired skills, summarizing the work done and its results in a professional way, creatively solving the tasks related to the topic and doing individual professional work. The faculty academic calendar sets the thesis submission deadline.

A student in master program has to prepare a thesis as a prerequisite of the final exam. The requirements of the thesis content, the general aspects of evaluation and the number of credits assigned to the thesis are determined by the requirements of the program. In food safety and quality engineering program the credits assigned to the thesis is 25.

Thesis topics are announced by the departments for the students in each semester. A thesis topic can be suggested by the student as well and the head of department shall decide on its acceptance.

Thesis is evaluated by the referee, and it is evaluated and qualified individually by the department. The Head of the Department makes suggestion on its qualification to the Final Exam Board.

If the thesis is evaluated with a fail mark by the referee, and the student is not allowed to take the final exam and is supposed to prepare a new or modified thesis. The student has to be informed about it. Conditions on resubmitting the thesis are defined by the program coordinator.

Final examination (Final Exam)

Students having obtained the pre-degree certificate will finish their studies by taking the final exam. Final exam can be taken in active student status in the forthcoming exam period after gaining the pre-degree certificate then after termination of student status in any exam period within two years according to the valid education requirements. After the fifth year of the termination of student status the candidate is not allowed to take the final exam. Only students who do not have outstanding charges are allowed to take the final exam. (E.g.: Students who obtained a pre-degree certificate until 1 September 2020 can take the final exam until 1 September 2022.)

A student having obtained the pre-degree certificate (absolutorium) will finish his/her studies training by taking the final exam. A final exam is the evaluation and control of the knowledge and skills acquired in tertiary education during which the candidate has to certify that he/she is able to apply the obtained knowledge in practice.

A final exam can be taken in the forthcoming exam period after obtaining the pre-degree certificate. The Department announces two final exam dates in a year, one at the beginning of January and one at the end of June. A final exam has to be taken in front of the Committee on the fixed date. If a candidate does not pass his/her final exam by the termination of his/her student status, he/she can take his/her final exam after the termination of the student status on any of the final exam days of the relevant academic year according to existing requirements on the rules of the final exam.

The Final exam consists of two parts according to the curriculum.

1) Written and oral exam on the given topics.
2) Thesis Defence (a presentation of the thesis, answering questions, comments then answering questions based on the knowledge related to the thesis topic)

A final exam can be started if the candidate can be submitted to the final exam on the basis of definite opinion of the referees. The two parts must be held on the same day.

The parts of the final exam are evaluated on a five-point scale by members with voting rights in the Final Exam Board. The final grade for the final exam will be decided on by voting in a closed sitting after the final exam, then. In case of equal votes, the committee chair will make the decision. Final exam results will be announced by the committee chair. Results of the final exam and thesis defence will be announced at the end of the given exam day (when all candidates finished final exam and thesis defence on the given day). A note of the final exam will be taken.

Improving failed final exam

If a thesis is evaluated with a fail mark by the Final Exam Board a final exam has to be retaken with a new or modified thesis.

If any of part if the final exam is a fail it must be retaken according to the existing rules of the university. Final exam can be retaken twice. The ensuing final exam period is the soonest that the re-sit is allowed.

Final exam board

Committee chair and members of the committee are called upon and mandated by the dean with the consent of the Faculty Council. They are selected from the acknowledged internal and external experts of the professional field. Traditionally, it is the chair and in case of his/her absence or indisposition the vice-chair who will be called upon, as well. The committee consists of – besides the chair – at least one member (a professor, an associate professor or college professor) and at least two questioners (instructors) and the examiner. In controversial cases the chair makes the decision. The mandate of a Final Examination Board lasts for three years. The division of the candidates to the mandatory final exam board is announced by the Registry Office.

DIPLOMA

Within 30 days of the successful final exam the diploma is issued and given out by the Faculty at the graduate's special request. Otherwise, the diploma will be awarded to him/her at the graduation ceremony of the Faculty.

The diploma is an official document decorated with the coat of arms of Hungary which verifies the successful completion of studies in the Food Safety and Quality Engineering graduate program. The diploma contains the following data: name of HEI (higher education institution); institutional identification number; serial number of diploma; name of diploma holder; date and place of his/her birth; level of qualification; training program; specialization; mode of attendance; place, day, month and year issued. Furthermore, it has to contain the dean's (or vice-dean's) original signature and the seal of HEI. It has to contain the dean's (in case of being prevented from attending the vice- dean for educational affairs) original signature and the imprint of the official stamp of the tertiary institute.

At the graduate's special request a certificate on the completion of studies is issued. The document does not contain any reference to qualification, it merely proves that the candidate has taken a successful final exam. The Faculty keeps a record of the certificates issued.

Calculation of a diploma grade according to this formula:

The qualification of the diploma is the simple arithmetic average results of the weighted academic average of all semesters of the given training, the result of the oral complex final exam, and the thesis.

Grade=(A+B+C)/3, where

A: Weighted academic average of all semesters of the given training

B: Grade of the oral complex final exam

C: Grade awarded for defending the thesis

On the basis of the calculated average grade the classification of the award:

Outstanding	4,81 – 5,00
Excellent	4,51 – 4,80
Good	3,51 – 4,50
Satisfactory	2,51 – 3,50
Pass	2,00 – 2,50

Award with Honour

An Award with Honour is permitted where a student obtained grade 5 in all subjects of the final exam. The average of thesis grade, his/her exam grades and mid-semester grades during his/her studies is at least 4.00. Moreover, he/she is not permitted to have a grade worse than grade 3 during his/her studies.

MODEL CURRICULUM OF PLANT PROTECTION MSC

The curriculum of the program is available in excel format on the webpage of the Faculty of Agricultural and Food Sciences and Environmental Management:
(https://mek.unideb.hu/en/plant-protection).

Head of Program: Dr. László Radócz

31 March, 2021

Code	Subjects	1st Semester				2nd Semester				3rd Semester				4th Semester				Head of Subject
		14 wks				14 wks				14 wks				14 wks				
		lecture	practice	evaluation	credit	lecture	practice	evaluation	credit	lecture	practice	evaluation	credit	lecture	practice	evaluation	credit	
	Applied Natural Sciences	hrs/week (lecture, practice, evaluation form, credits)																
MTMNO7001A	Chemistry of plant protection	3	1	P	3													Mrs. Andrea Balla-Kovács PhD
MTMNO7002A	Environmental protection and ecotoxicology	1	1	E	3													Antal Nagy PhD
MTMNO7003A	Crop production	2	1	E	3													József Csajbók PhD
MTMNO7004A	General plant pathology and diagnostics	3	3	E	3													Gábor Tarcali, PhD
MTMNO7005A	Plant protection zoology and ecology	4	2	E	3													Antal Nagy PhD
MTMNO7006A	Herbology	3	2	P	3													Arnold Szilágyi
MTMNO7012A	Molecular biology	1	1	P	3													Mrs. Erzsébet Karaffa PhD
MTMNO7007A	Plant protectional mycology					2	1	E	3									Gábor Tarcali PhD
MTMNO7008A	Plant protection entomology I.					2	1	E	3									Antal Nagy PhD
MTMNO7009A	Plant protectional application technology					1	2	P	3									Zoltán Hagymássy PhD
MTMNO7010A	Horticulture					2	1	P	3									Mrs. Mária Takács-Hájos PhD
MTMNO7011A	Alternative plant production and rural development					3	0	E	3									Prof. Attila Bai PhD
MTMNO7013A	Informatics and agricultural extension					1	2	E	3									Péter Lengyel PhD
MTMNO7014A	Applied plant biology, biotechnology and resistance									1	1	E	3					Prof. Miklós Fári DSc
MTMNO7015A	Forecasting and integrated pest management									3	2	E	3					László Radócz PhD
MTMNO7016A	Plant protection law and administration, food safety													3	0	E	3	Gábor Tarcali PhD
	Sum total:	17	11		21	11	7		18	4	3		6	3	0		3	

MTMNO7GYA	***Summer practice at a plant doctor practitioner***					0	160	P	3										László Radócz PhD
SI-001A	Physical education					0	2	A	0										
	Obligatory special plant protection subjects																		
MTMNO7017A	Outlines of plant pathology I.									2	1	E	3						Gábor Tarcali PhD
MTMNO7018A	Plant protection entomology II.									2	1	E	3						Antal Nagy PhD
MTMNO7019A	Weed biology									2	1	E	3						Arnold Szilágyi
MTMNO7020A	Pest management in eco-farms									1	0	P	3						Gábor Tarcali PhD
MTMNO7021A	Human hygiene and first aids									0	2	P	3						József Legoza Dr med.univ.
MTMNO7022A	Outlines of plant pathology II.													2	2	E	3		Gábor Tarcali, PhD
MTMNO7023A	Plant protection entomology III.													2	2	E	3		Antal Nagy PhD
MTMNO7024A	Weed management													1	2	P	3		Arnold Szilágyi
MTMNO7025A	Integrated pest management, IPM													3	2	E	3		László Radócz PhD
	Sum total:									7	5		15	8	8		12		
	Facultative subjects	**(Select minimum 12 credits)**																	
MTMNO7026A	Planning and evaluating of plant protection trials	1	0	P	3														Antal Nagy PhD
MTMNO7029A	Collection and preparation of insects and plants	0	2	P	3														Antal Nagy PhD
MTMNO7028A	Mycology and fungal toxicology I.					4	1	P	5										László Radócz PhD
MTMNO7032A	Weed ecology, weed competition					1	0	P	3										Arnold Szzilágyi
MTMNO7033A	Plant protection in greenhouses					1	1	P	3										Gábor Tarcali PhD
MTMNO7030A	Mycology and fungal toxicology II.									2	3	P	5						László Radócz PhD
MTMNO7034A	PCR in microbiology													1	1	P	3		Károly Pál PhD
MTMNO7035A	Biological plant protection I.									2	0	W	3						Antal Nagy PhD
MTMNO7036A	Biological plant protection II.													2	0	W	3		László Radócz PhD
	Thesis preparation																		
MTMNO7D1A	Thesis project work I.					0	2	P	5										Supervisor

MTMNO7D 2A	Thesis project work II.			0	2	P	10					Supervisor
MTMNO7D 3A	Thesis project work III.							0	2	P	15	Supervisor

E = Oral examination
E = Written examination
P = Practical examination
A = Acceptance