

BULLETIN

UNIVERSITY OF DEBRECEN

ACADEMIC YEAR 2015/2016

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

FOOD ENGINEERING BSc

Coordinating Center for International Education

Table of Contents

UNIVERSITY OF DEBRECEN.....	4
DEAN'S WELCOME.....	5
HISTORY OF THE FACULTY.....	6
MISSION OF THE FACULTY.....	7
THE ORGANIZATIONAL STRUCTURE OF THE UNIVERSITY.....	8
THE DEPARTMENTS OF THE FACULTY.....	9
UNIVERSITY CALENDAR.....	16
FOOD ENGINEERING BSC PROGRAMME.....	17
CURRICULUM OF THE FULL TIME PROGRAMME.....	18
COURSE DESCRIPTIONS.....	27

CHAPTER 1 UNIVERSITY OF DEBRECEN

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

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

Legal status of the University of Debrecen: state university

Founder of the University of Debrecen: Hungarian State Parliament

Supervisory body of the University of Debrecen: Ministry of Education

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

Number of Faculties at the University of Debrecen: 14

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

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

Number of students at the University of Debrecen: 28812

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

Full time teachers of the University of Debrecen: 1421

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

CHAPTER 2

DEAN'S WELCOME

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

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

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

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

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

Prof. Dr. István Komlósi
Dean

CHAPTER 3 HISTORY OF THE FACULTY

History of the Faculty

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

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

CHAPTER 4
MISSION OF THE FACULTY

Mission of the Faculty

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

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

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

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

CHAPTER 5
THE ORGANIZATIONAL STRUCTURE OF THE UNIVERSITY

RECTOR OF THE UNIVERSITY OF DEBRECEN

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

FACULTY OF AGRICULTURAL AND FOOD SCIENCES AND ENVIRONMENTAL
MANAGEMENT

Dean: Prof. Dr. habil. István Komlósi
Address: 4032 Debrecen, Böszörményi út 138.
Phone: +36-52/508-412; 88438
Fax: +36-52/486-292
E-mail: komlosi@agr.unideb.hu

Vice Dean for Educational Affairs: Dr. habil. Csaba Juhász
Address: 4032 Debrecen, Böszörményi út 138.
Phone: +36-52/508-454 88454
Fax: +36-52/508-454 88454
E-mail: juhasz@agr.unideb.hu

Vice Dean of Scientific Affairs: Dr. László Stündl
Address: 4032 Debrecen, Böszörményi út 138.
Phone: +36-52/508-444 88226
Fax: +36-52/486-292
E-mail: stundl@agr.unideb.hu

DEAN'S OFFICE

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

REGISTRAR'S OFFICE

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

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

CHAPTER 6
THE DEPARTMENTS OF THE FACULTY

INSTITUTE OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE

Böszörményi út 138., Debrecen, 4032

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

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

Böszörményi út 138., Debrecen, 4032

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

Department of Animal Husbandry

Böszörményi út 138., Debrecen, 4032

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

CHAPTER 6

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

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

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

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

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

Animal Genetics Laboratory Böszörményi út 138., Debrecen, 4032

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

INSTITUTE OF FOOD SCIENCE

Böszörményi út 138., Debrecen, 4032

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

INSTITUTE FOR LAND UTILISATION, TECHNOLOGY AND REGIONAL DEVELOPMENT

Böszörményi út 138., Debrecen, 4032

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

INSTITUTE OF HORTICULTURE

Böszörményi út 138., Debrecen, 4032

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

CHAPTER 6

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

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

Head of the Institute	Péter Pepó D.Sc.
-----------------------	------------------

Department of Landscape Ecology Böszörményi út 138., Debrecen, 4032

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

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

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

Genetics Group

Böszörményi út 138., Debrecen, 4032

Head Pál Pepó C.Sc.

INSTITUTE OF PLANT PROTECTION

Böszörményi út 138., Debrecen, 4032

Head of Institute György János Kövics C.Sc.

Associate Professor András Bozsik C.Sc.

László Radócz C.Sc.

Assistant Professor Antal Nagy Ph.D.

Senior Research Fellow Gábor Tarcali Ph.D.

Secretary Ms. Tünde Szabóné Asbolt

AGRICULTURAL LABORATORY CENTRE

Böszörményi út 138., Debrecen, 4032

Assistant Research Fellow Ms. Nóra Óri

Technical Assistant Ms. Nóra Bessenyei Tarpay
Csaba Kiss

Ms. Hajnalka Pákozdy

Ms. Istvánné Sörös

Gábor Tóth M.D.

Associate Professor Ms. Tünde Pusztahelyi Ph.D.

INSTITUTE OF WATER AND ENVIRONMENTAL MANAGEMENT

Böszörményi út 138., Debrecen, 4032

Deputy Head Csaba Juhász Ph.D.

Head of Institute János Tamás D.Sc.

Assistant Research Fellow Péter Riczu

Ms. Nikolett Szöllösi

Professor Lajos Blaskó D.Sc.

Technical Assistant Ms. Kamilla Berényi-Katona

Ms. Katalin Bökfí

Associate Professor Ms. Elza Kovács Ph.D.

Assistant Lecturer Ms. Tünde Fórián Ph.D.

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

FACULTY OF ECONOMICS AND BUSINESS

Böszörményi út 138., Debrecen, 4032

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

THE DEPARTMENTS OF THE FACULTY

Zoltán Csiki M.D., Ph.D.

Ms. Zita Hajdu Ph.D.

Ms. Judit Katonáné Kovács Ph.D.

Sándor Kovács Ph.D.

Ms. Ildikó Tar Ph.D.

Ferenc Buzás Ph.D.

Research Fellow

CHAPTER 7

UNIVERSITY CALENDAR

Academic calendar

2015/2016

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

CHAPTER 8

FOOD ENGINEERING BSC PROGRAMME

About the course:

The BSc in Food Engineering is aimed to train professionals who are able to operate, supervise and develop food processing technologies. The studies contain the physical, chemical and biological basics of engineering with special emphasis on the food quality and safety related issues. Besides becoming acquainted with the operations and technological processes the students also learn economic, management and analytical subjects. Therefore, the main goal of the education is to train people who are able to fully provide the functions in relation with the everyday tasks of operation from the engineering, biological and chemical work to the management duties based on their comprehensive theoretical bases.

Requirements:

Application requirements: General Certificate of Education (G.C.E), upper-intermediate English language certificate

Length of the Study programme: 6 semesters for academic studies+1 semester long farm management practise period

Number of ECTS credits: 180+30

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

The knowledge of the students will be tested several times depending on the class types during the entire course. The training ends in a Final Exam (FE) of the whole semester material and a minimum of four FE dates will be set during the examination period. Unsuccessful students may repeat. During the semester there are two tests: the mid-term test in the 8th week and the end-term test in the 15th week. Students have to sit for the tests.

Tests are evaluated according to the followings:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)
90-100	excellent (5)

absence for any reason counts as 0%.

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

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

Careers:

Graduated students may find employment in the food industry, raw material and product qualification, food analysis, inspection, quality assurance or may work for the authorities. Graduates may progress to MSc in Food Engineering, MSc in Food Quality and Assurance or MSc in Nutrition.

CHAPTER 9

CURRICULUM OF THE FULL TIME PROGRAMME

Compulsory courses														Prerequisites of taking the subject
1. year														
Subjects	Neptun code	1 st semester						2 nd semester						
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.			
Agricultural and Food Microbiology I.	MTBE010						2		1	ESE		3		None
Agricultural botany	MTBE005	2		1	ESE	5								None
Analytical chemistry	MTBE109						2		2	ESE		5		None
Basic equipment for food industries	MTBE110						2		1	ESE		4		None
Economic Sciences I.	MTBE021	4			ESE	3								None
Economic Sciences II.	MTBE029						4		1	ESE		3		None
Environmental management, environmental technology	MTBE108						2			ESE		3		None
General and inorganic chemistry	MTBE100	2		1	ESE	5								None
History of agriculture and EU knowledge	MTBE002	2			ESE	3								None
Informatics	MTBE007			2	ESE	3								None

Compulsory courses														Prerequisites of taking the subject	
1. year (continued)															
Subjects	Nepton code	1 st semester						2 nd semester							
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.				
Introduction to food safety	MTBE106						2							3	None
Mathematics I.	MTBE003	2		1	AW5	5									None
Mathematics II.	MTBE098						2				1		AW5	3	None
Organic and biochemistry	MTBE009						2				1		ESE	4	None
Raw materials of food processing	MTBE105	2			ESE	3									None
Technical basics of agricultural machinery	MTBE107						2				1		ESE	3	None
Thermodynamics	MTBE099	2		2	AW5	4									None
Zoology, animal physiology I.	MTBE006	2		1	ESE	4									None

Compulsory courses														Prerequisites of taking the subject			
2. year																	
Subjects	Neptun code	1 st semester					2 nd semester					L	S		P	Exam	Crd.
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.						
Agricultural and Food Microbiology II.	MTBE101	2		1	ESE	5											None
Business studies and skills in English I.	MTBE128	2			AW5	2											None
Business studies and skills in English II.	MTBE129						2						AW5	2			None
Colloid Chemistry	MTBE103						2						ESE	2			None
Economic Sciences III.	MTBE035	4			ESE	4											None
Electrotechnics	MTBE102	2		2	ESE	3											None
Food chemistry	MTBE112	2			ESE	4											None
Food hygiene	MTBE111	1		1	ESE	4											None
Grant proposal writing in the target language	MTBE132											2	AW5	2			None
Introduction to intercultural communication I.	MTBE131	2			AW5	2											None
Measurement and control	MTBE119						2					2	ESE	4			None

Compulsory courses														Prerequisites of taking the subject
2. year (continued)														
Subjects	Neptun code	1 st semester						2 nd semester						
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.			
Principles of food technology I.	MTBE116							2			2	ESE	5	None
Professional Language Skills I.	MTBE125			2	AW5	2								None
Professional Language Skills II.	MTBE126										2	AW5	2	None
Professional Practice				80	SIGN	30								None
Unit Operations in Food Processing I.	MTBE113	2		2	ESE	6								None
Unit Operations in Food Processing II.	MTBE114							2			2	ESE	5	None

Compulsory courses														Prerequisites of taking the subject	
3. year															
Subjects	Nepton code	1 st semester					2 nd semester					Crd.			
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.				
Basic of quality assurance	MTBE121	2			ESE	2									None
Business studies and skills in English III.	MTBE130	2			AW5	2									None
English for environmental management and politics	MTBE136						2					AW5	1		None
Food Analytics	MTBE124						3			2		ESE	6		None
Food Industry Economics	MTBE123											ESE	0		None
Food Industry Technologies and Quality Assurance	MTBE122	2		1	AW5	5									None
Instrumental analytics	MTBE120	2		2	ESE	5									None
Intercultural communication	MTBE135										2	ESE	2		None
Legal English I.	MTBE133			2	AW5	2									None

Compulsory courses														Prerequisites of taking the subject			
3. year (continued)																	
Subjects	Neptun code	1 st semester					2 nd semester					Crd.					
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.						
Legal English II.	MTBE134							2	AW5		2		2	AW5	2	None	
Principles of food technology II.	MTBE117					2					2			2	AW5	5	None
Principles of food technology III.	MTBE118							2			2			ESE	5	None	
Professional Language Skills III.	MTBE127			2	ESE	2										None	
Professional Practice	MTBE			80	SIGN	0										None	
Project work	MTBE135											3		AW5	2	None	
Regulation and Administration of Agriculture	MTBE104									2		1		ESE	4	None	
Statistics	MTBE036	1		1	ESE	2										None	
Thesis project	MTBE084			2	AW5	7										None	
Thesis project	MTBE085											2		ESE	8	None	
Unit Operations in Food Processing III.	MTBE115	2		2	ESE	5										None	

Compulsory courses													Prerequisites of taking the subject	
4. year														
Subjects	Neptun code	1st semester					2nd semester							
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.			
Professional Practice	MTBE				SIGN	0								None

Required elective courses													Prerequisites of taking the subject		
2. year															
Subjects	Neptun code	1 st semester					2 nd semester								
		L	S	P	Exam	Crd.	L	S	P	Exam	Crd.				
Packaging technology	MTBE140						2							2	None
Quality control of plant origin products	MTBE138	2			ESE	3									None
Wine microbiology and chemistry	MTBE139	2		1	ESE	2									None

Required elective courses													Prerequisites of taking the subject
3. year													
Subjects	Neptun code	1 st semester				2 nd semester				Exam	Crd.		
		L	S	P	Exam	L	S	P	Exam				
Baking technology	MTBE141	1		1	AW5	2							None
Processing technologies of consumer goods	MTBE142					2			ESE	2			None
Qualification of animal products	MTBE143	1			ESE	2							None
Wine making technology	MTBE144					2		1	ESE	2			None

CHAPTER 10

COURSE DESCRIPTIONS

Agricultural Laboratory Centre

Subject: **MATHEMATICS I.**

Year, Semester: 1st year/1st semester

Lecture: **2**

Practical: **1**

Requirements

Course content:

Major goal of the subject:

The main goal of the subject is that the students could be introduced to the basic methods and terminology or definitions in mathematics which can be used in economics. The differential calculus of one-variable functions and its practical application is in the center of interest as well as the extreme value and elasticity calculation of one-variable functions.

During the course of practical lessons students should gain experience in problem solving from the various topics of the subject.

Main topics:

Theory of sets. Sets of numbers, Classification and characteristics of one-variable real functions. Theorems of limit calculation. Limit calculation, continuity and derivate of functions. Examination of functions, elasticity. Extrame values calculation of functions with practical applications. Practical applications of the differential calculus.

Required reading materials

F. Bíró-Sz. Vincze: A gazdasági matematika alapjai

Debreceni Egyetemi Kiadó, 2010. ISBN: 9786933180426

K. Sydsater-P.I. Hammond: Matematika közgazdászoknak

Aula Kiadó, 2006. ISBN: 9789639478565

G. Denkinger-L. Gyurkó: Analízis gyakorlatok

Nemzeti Tankönyvkiadó, 2003. ISBN: 9789631946130

Department of Nature Conservation, Zoology and Game Management

Subject: **ZOOLOGY, ANIMAL PHYSIOLOGY I.**

Year, Semester: 1st year/1st semester

Lecture: **2**

Practical: **1**

Requirements

Course content: The target of the course is to ensure the general knowledge of students in zoology, to introduce the structure and functioning of the animal cell, the types of animal tissues, their basic

CHAPTER 10

structure, significance, the general definitions of reproduction and ontogenesis. To introduce the main taxonomic units, and to teach to recognize invertebrate and vertebrate species in practice, to evaluate these species considering their nature conservation and possible economic values and to evaluate the human effects on the world of animals are also educational objectives.

Required reading materials

Allaby, M.: A dictionary of zoology.

OUP Oxford, 2003. ISBN: 978-0198607588

Barnes, R.D.: Invertebrate Zoology

VI.. Holt Saunders International Edition, 1982.

Kardong, K.V.: Vertebrates Comparative Anatomy, Function and Evolution

IV.. McGraw-Hill Higher Education,

Department of Plant Biotechnology

Subject: **AGRICULTURAL BOTANY**

Year, Semester: 1st year/1st semester

Lecture: **2**

Practical: **1**

Requirements

Course content: Anatomy, morphology and taxonomy of the most important plant families and their species and cultivars.

Thematic plan of lectures:

1. Basic plant cytology 1. Cell wall, phospholipid membranes, cytosol, nucleus, nucleolus. Endoplasmic reticulum, ribosomes, Golgi apparatus and vesicles.
2. Basic plant cytology 2. Chloroplast and mitochondria, vacuole.
3. Plant histology 1. Meristematic tissues, permanent tissues. Epidermis, parenchyma, sclerenchyma, kollenchyma, aerenchyma, xylem, phloem.
4. Plant histology 2. Anatomy of root, stem, leaf. Secondary growth, wood anatomy.
5. Plant morphology 1. Root structure, stem structure, leaf structure.
6. Plant morphology 2. Flower structure, inflorescence structure.
7. Fruit and seed development and structure.
8. Plant taxonomy 1. Bryophyta, Pteridophyta.
9. Plant taxonomy 2. Spermatophyta: Gymnospermatophyta and Angiospermatophyta.
10. Plant taxonomy 3. Dicotyledoneae: Ranunculaceae, Papaveraceae, Caryophyllaceae, Chenopodiaceae, Amaranthaceae, Polygonaceae, Fagaceae, Betulaceae, Juglandaceae.
11. Plant taxonomy 4. Cannabaceae, Urticaceae, Grossulariaceae, Rosaceae, Fabaceae.
12. Plant taxonomy 5. Linaceae, Vitaceae, Apiaceae, Brassicaceae, Cucurbitaceae, Malvaceae, Solanaceae.
13. Plant taxonomy 6. Cuscutaceae, Convolvulaceae, Scrophulariaceae, Lamiaceae, Orobanchaceae, Asteraceae. Monocotyledoneae: Asparagaceae, Alliaceae, Poaceae, Cyperaceae.

Required reading materials

Dirk R. Walters, David J. Keil: Vascular plant taxonomy.

Kendall/Hunt Pub.Co., Cornell University, 1988.

O P Sharma: Plant taxonomy.

Tata McGraw-Hill Education, 1993. ISBN: 00746037369780074603

Subhash C. Datta: Systematic Botany.

New Age International, 1988. ISBN: 8122400132

Faculty of Economics and Business

Subject: **ECONOMIC SCIENCES I.**

Year, Semester: 1st year/1st semester

Lecture: **4**

Requirements

Course content: The aim of the subject is to make the students get acquainted with the basic theoretical and practical economic knowledge (Microeconomics, Macroeconomics, Agricultural Economics and European Union Studies) for student, which could help them in the following work.

Thematic plan of course:

1. Basic economic theory
2. Demand function and Supply function
3. Consumption behavior
4. Production function, resources
5. Production cost in the short run and in the long run
6. Perfect Competition
7. Monopoly, Price Discrimination
8. Externalities
9. Introduction of the macroeconomics
10. SNA (GDP, GNI, GNDI)
11. Labor market
12. Goods market
13. Money market
14. Financial policy
15. Monetary policy

1. Output of Hungarian agriculture
2. Farm structure
3. Land use
4. Crop production
5. Animal production
6. Agricultural products
7. Employment in Agriculture
8. Basic information about EU
9. EU law, treaties
10. Institutions and bodies
11. Life in the EU
12. EU policies
13. Financed support
14. Common Agricultural Policy (CAP)
15. Rural Development

Required reading materials

Solt Katalin: Mikroökonómia

TRI-Mester Kiadó, 2001.

*Bauerné Gáthy Andrea-Odor Kinga-Popovics Péter (szerk.): Mikroökonómia feladatgyűjtemény-
Alapszint*
2009.

Bock Gyula: Mikroökonómiai feladatok

TRI-Mester Kiadó, 2001.

Solt Katalin: Makroökonómia

TRI-Mester Kiadó, 2001.

Subject: **HISTORY OF AGRICULTURE AND EU KNOWLEDGE**

Year, Semester: 1st year/1st semester

Lecture: **2**

Requirements

Course content:

I. Agricultural history

Aim: Introducing students to the universal and Hungarian agricultural history and its development, deepening the specific and general profession culture with special regard to the development history of the European and Hungarian agriculture. In addition to the past, it is also part of the curriculum to describe the present and near future, as well as its development peculiarities.

II. EU knowledge

Aim: Reviewing the past, present, history and interconnections of the general European integration processes, as well as the theory and practice of the European Union subsidisation (structural) policy, with special regard to the basic principles and Hungarian practice of the Common Agricultural Policy (CAP).

Thematic plan of lectures:

Lecture 1. Course requirements, thematics. Fundamental conception.

Lecture 2. Development of agriculture, ancient forms of agriculture in the Worlds and the early Hungarian society

Lecture 3. Feudal economic-social relations in the middle-ages and the late middle-ages and the history of agricultural development in Europe (6th – 15th century)

Lecture 4. Feudal economic-social relations in the middle-ages and the late middle-ages and the history of agricultural development in Europe (10th – 17th century)

Lecture 5. Development history of the capitalist economy and agriculture between the 15th – 19th century

Lecture 6. The economy and agro-economy of Hungary in the transition era from classic feudalism to capitalism (1711-1867)

Lecture 7. The unfolding and the developed capitalist economy and agriculture in the dualist Hungary (1849-1914)

Lecture 8. Main characteristics and development history of world economy between the two world wars (1920-1945)

Lecture 9. Development history of the Hungarian agriculture between the two world wars (1918-1939)

Lecture 10. Main tendencies of the economic and agricultural development of the developed countries after the second world war

Lecture 11. Development history of the Hungarian agriculture after 1945

Lecture 12. General characteristics and tendencies of the transition of the Hungarian agriculture after the change of the political regime in 1989/90

Lecture 13. Brief development history and regional (structural) subsidisation politics of the EU

Lecture 14. Regions and regionalism in the European Union and Hungary

Required reading materials

European Commission: Communication from Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions-A Budget for Europe

2020.

European Commission: Proposal for a regulation of the European parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy

2011.

European Commission: Proposal for a regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for rural development

2011.

Subject: **INFORMATICS**

Year, Semester: 1st year/1st semester

Practical: 2

Requirements

Course content:

Irrespective of their preliminary study requirements, students are required to gain advanced IT skills to be used in their further studies and in their graduate professional practical work.

It implies:

- obtaining the necessary knowledge on Internet-use.
- developing an advanced-level knowledge of MS-Office (Word; Excel; Power Point) to be able to solve complex tasks.

The course is basically application oriented, a number of practical tasks are to be solved.

Required reading materials

Joyce Cox, Curtis Frye, Steve Lambert, Joan Peppernau, Katherine Murray: Microsoft Office Step by Step

2007.

Paul McFedries: Formulas and Functions with Microsoft Office Excel 2007

Institute of Agricultural Chemistry and Soil Science

Subject: **GENERAL AND INORGANIC CHEMISTRY**

Year, Semester: 1st year/1st semester

Lecture: **2**

Practical: **1**

Requirements

Course content:

Learn the basics and principles of General and inorganic chemistry. Understanding the agricultural production determining and food processing influencing chemical properties and reactions (plant and animal physiology, plant nutrition and animal feeding, food conservations, etc). Basic knowledge for the learning of organic chemistry, biochemistry, and food chemistry.

Chemical systems and environments. Atomic structure: basic and electronic structure of atoms. The Bohr-, Sommerfeld- and quantum theory, quantum numbers and atomic orbitals. Electron configurations and periodicity. Ionic, covalent, metallic and dative bonding. Chemical nomenclature. Molecular geometry. Gaseous, liquid and solid state. Reactions in aqueous solutions. Solutions, colligative properties. Reaction kinetics, reversible reactions, equilibrium. Protolytic reactions: acid-base concepts, pH, buffers, indicators, salt hydrolysis. Complexes and chelate compounds. Electrochemistry: voltaic cells, electrolysis, electrode potential, rH, oxidation-reduction reactions, oxidation states. Colloid chemistry, gels.

Non-metallic elements and their compounds: hydrogen, oxygen, nitrogen, carbon, phosphorus, sulfur, boron, halogen elements. Silicon and soil forming silicates. Metallic elements and their compounds: alkali metals and alkaline earth metals. Transition elements, essential and toxic trace elements.

Required reading materials

Blake, R.: Introductory chemistry.

Pearson, London-New York, 2005. ISBN: 9780131446021

Ebbing, D.D., Gammon, S.D.: General Chemistry

Cengage learning, Stamford, 2009. ISBN: 9780618857487

Institute of Food Science

Subject: **RAW MATERIALS OF FOOD PROCESSING**

Year, Semester: 1st year/1st semester

Lecture: **2**

Requirements

Course content: The course aims to introduce students the agricultural raw materials of food processing, their grouping, physical and chemical properties important for qualification and valuation, factors influencing their quality and their industrial importance. The detailed topics are:

- Definitions
- Cereals (wheat, rye, oat, rice, corn, millet and others) and pseudocereals
- Legumes, pulses (pea, bean, peanut, soybean, alfalfa, lupin)
- Food industrial crops (sunflower, rape, poppy, tobacco, potato, sugarbeet)

- Fruits and vegetables
- Meat (porcine, cattle, ovine, poultry, game meat)
- MilkEgg

Required reading materials

N. L. Kent : Technology of Cereals with special reference to wheat
2nd. Pergamon Press, 1980.

S. A. Watson, P. E. Ramstadt: Corn: Chemistry and Technology
AACC Inc., 1991.

D. K. Salunkhe, R. N. Adsule, J. K. Chavan, S.S. Kadam: World oilseeds.
Van Nostrand Reinhold, 1992.

O. Lamikanra: Fresh-cut Fruits and Vegetables: Science, Technology and Market.
CRC Press., 2002.

A.M. Pearson, T.R. Dutson: Quality Attributes and Their Measurement in Meat, Poultry and Fish Products.
Springer Publish., 1995.

Subject: **THERMODYNAMICS**

Year, Semester: 1st year/1st semester

Lecture: **2**

Practical: **2**

Requirements

Course content:

Basic concepts of the chemical thermodynamics: System, wall and features. Extensive and intensive properties. Temperature, internal energy. Main laws of thermodynamics. Work, volume work cycle. Enthalpy. Material and energy balances. Entropy and its calculation. Thermodynamic potential functions. The thermodynamic system of relationships. Euler and Gibbs-Duhem equation. Equilibrium conditions for extensive and intensive parameters. One-component systems: gases. Ideal gas state.

Isothermal and adiabatic process. Poisson equation. Real gas equation of state. Van der Waals equation. Liquids. Gibbs phase rule. Clausius-Clapeyron equation. Phase diagram of water. Multi-component systems. Mixtures. Partial molar quantities. Ideal mixtures. Dalton's Law. The chemical potential. Realistic mixtures, activity. Binary mixtures of vapor-liquid equilibrium. Raoult's Law. Azeotropic mixtures. The Basics of distillation. Colligative traits. Dilute solutions, vapor pressure and boiling point increase decrease. Freezing point depression. Osmotic pressure and its biological significance. Gas dissolution fluid. Henry's law. Mutual solubility of liquids. Limited immiscible liquids. Immiscible liquids. Steam distillation. Partition coefficient. Dissolution of solids and liquid, the solubility is a function of temperature. Mutual solubility of solids. Chemical equilibrium. The equilibrium constant and the standard free energy change of reaction. Van't Hoff equation, exothermic and endothermic reactions. The equilibrium constant changes in pressure, Le Chatelier-Braun principle. Reaction kinetics, basic concepts of reaction rate, half-life. Simple reaction rate equations. Complex reactions. Consecutive and parallel reactions. Chain Reaction. Arrhenius equation. Homogeneous and heterogeneous catalysis. Enzyme catalysis. Basic concepts of electrochemistry. Electrolytic dissociation, conductivity, Kohlrausch rule. Ostwald's dilution law. Solubility. Galvanic and electrode potentials. Electrodes. Redox potentials. Concentration elements. The forms of corrosion. Corrosion current and potential. Corrosion protection.

Required reading materials

Atkins, W., P.: Physical Chemistry

Oxford University Press, 1990.

Chang, R.: Physical Chemistry with Applications to Biological Systems

Macmillan Publishing Co. New York, 1977.

Agricultural Laboratory Centre

Subject: **ECONOMIC SCIENCES II.**

Year, Semester: 1st year/2nd semester

Lecture: **4**

Practical: **1**

Requirements

Course content: The main objective of the subject is to make the students get acquainted with the economic aspects of the agricultural entrepreneurs. They have to know the basic economic categories (production value, production cost, profit, efficiency), the economic aspects of resources and functional activities of farms and basic economic calculations of profitability, prime cost, efficiency, and the practice of future and present value calculation.

Thematic plan of course:

1. Basic economic categories. Production value
2. Production cost
3. Profit, profitability, efficiency and its categories
4. Resources of agricultural production. Capital and its characteristics, use and source of capital
5. Fixed assets, investments, use of fixed assets in agriculture
6. Land and its role and use
7. Current assets, tasks of the use of current assets in agriculture
8. Human resource in agricultural production. Territories and tasks of human resource management
9. Forms of entrepreneurs in agriculture
10. Economic aspects of innovation
11. Economic aspects of machinery in agricultural production
12. Economic aspects of fertilization
13. Economic aspects of irrigation
14. Economic aspects of plant protection
15. Economy of scales in agricultural production

Required reading materials

Ernő Pfau-András Nábrádi: Production factors and resources of the agricultural entrepreneurs (lecture notes)

Debrecen, 2007.

Ernő Pfau-László Posta: Basic economic categories (lecture notes)

Debrecen, 2007.

Ernő Pfau-Gyula Széles: Agricultural economy II.

Budapest, 2001.

E. N. Castle-M. H. Becker-A. G. Nelson: Farm business management

Budapest, 1992.

Attila Chikán: Economy of entrepreneurs
Budapest, 1992.

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

Requirements

Course content:

Major goal of the subject:

The course is the continuation of the Mathematics I. from the first semester. The main goal of the subject is that the students could be introduced to methods and definitions in linear algebra (especially matrices, determinants, solution of linear equations) which can be used in economics. On the other hand, students should get acquaintance with the derivatives and extreme values of multivariable functions with or without conditions. Probability counting is also in the center of interest as it is also essential for Statistics.

During the course of practical lessons students should gain experience in problem solving from the various topics of the subject.

Main topics:

Matrices. Determinants. Solution of linear system of equations, inversion of matrices. Derivates and extreme values of multivariable functions with or without conditions. Combinatory. Classical probability counting. Conditional probability, theorem of total probability, theorem of Bayes. Characteristics of random variables. Remarkable distributions of probability

Required reading materials

D. P. Apte: Probability and combinatorics

Excel Books, New Delhi, 2007. ISBN: 81-7446-520-0

K. Sydsater-P.I. Hammond: Essential Mathematics for Economic Analysis

Prentice-Hall, London, UK, 2008. ISBN: 978-0-273-71324-1

S.T. Tan: Applied Mathematics for Managerial, Life and Social Sciences

6. Brooks/Cole, Belmont, CA, USA, 2013. ISBN: 1-133-10894-6

Institute for Land Utilisation, Technology and Regional Development

Subject: **BASIC EQUIPMENT FOR FOOD INDUSTRIES**
Year, Semester: 1st year/2nd semester
Lecture: **2**
Practical: **1**

Requirements

Course content:

1. Conveyor systems I.

CHAPTER 10

2. Conveyor systems II.
3. Air stream transport systems
4. Grinding machines
5. Classification systems I.
6. Classification systems II.
7. Mixing equipments I.
8. Mixing equipments I.
9. Separation systems
10. Refrigerators
11. Squeezing systems
12. Distillation systems
13. Summary

Required reading materials

Szendrő Péter: Agricultural Machinery

ISBN: 9639121177

Szendrő Péter: Exercices of agricultural machinery

ISBN: 9633562066

Subject: **TECHNICAL BASICS OF AGRICULTURAL MACHINERY**

Year, Semester: 1st year/2nd semester

Lecture: **2**

Practical: **1**

Requirements

Course content:

1. Internal combustion engines I.
2. Internal combustion engines II.
3. Farm tractor I.
4. Farm tractor II.
5. Tillage machines I
6. Tillage machines II.
7. Sowing, planting machines I
8. Sowing, planting machines II.
9. Machines of irrigation I
10. Machines of irrigation II.
11. Fertilizer distributors I.
12. Fertilizer distributors I.
13. Mechanization of Plant Protection I
14. Mechanization of Plant Protection II.
15. Summary

Required reading materials

Vas Attila (szerk.): Internal combustion engines in car and tractor technology

ISBN: 9633562120

Szendrő Péter: Agricultural Machinery

ISBN: 9639121177

Szendrő Péter: Exercices of agricultural machinery ISBN: 9633562066

Institute of Agricultural Chemistry and Soil Science

Subject: **ORGANIC AND BIOCHEMISTRY**

Year, Semester: 1st year/2nd semester

Lecture: **2**

Practical: **1**

Requirements

Course content: Organic and biochemistry study the structure and constitutions of organic compounds occurring in plant and animal organisms such as intermediers, monomers and macro molecules. It discusses biological processes (metabolism processes) and their regulations, which take place in plant and animal cells. Energy balance of anabolism and catabolism, and their relationship with each other. Successful understanding of food chemistry and plant physiology is based on this subject. Our objective is to provide for students a thorough understanding in the principles of biochemistry,

Thematic plan of lectures:

1st week Hybridization of carbon: Classification of organic compounds based on their carbon skeleton and functional groups. Types of isomerization, carbon hydrogens, The most important organic chemical reactions (substitution, addition, polymerisation) dienes, polyenes (terpenes). Chemical properties of isoprenes compounds.

2nd week Classification and characterisation of alcohols. Chemical properties of alcohols. Aldehydes and ketons (classification, physical and chemical properties) Carbon hydrates. Monosaccharides: classification chemical properties and their most important representatives. Cyclic monosaccharides

3rd week Reactions of sugars. Reductive and non-reductive disaccharides. Free and reserve polysaccharides. Classification of carboxylic acids and their physical and chemical properties. Open chained saturated and unsaturated di and tricarboxylic acids. Classification and properties of esters.

4th week. Lipids. Classification, physical and chemical properties of lipids. Comparison of combined lipids, the most important lipids. Steroids, Chemical properties of substituted carboxylic acids

5th week Classification of amino acids and their chemical properties. Their zwitterion structure and their buffering capacity. Separation of them, gelelectrophoresis. Dipeptides, polypeptides. Structure and classification of proteins. Biological function of proteins

6th week Aromatic compounds. Structure of benzol., isomerization and its chemical reactions. Most important aromatic hydrocarbon groups. The conditions of aromatic nature. Aromatic alcohols, aldehydes, carboxylic acids. The phenols and quinones linkage system, their main representatives.

7th week Classification of heterocyclic compounds Five-membered heterocyclic compounds. The structure of pyrrole and imidazole, their derivatives. Structure of cyclic tetrapyrrole systems and linear tetrapyrrole, their properties and biological functions, major representatives. Six membered heterocyclic compounds. Pyridine and pyrimidine and their derivatives. Purine and its derivatives. Lactone-lactam tautomerism. Structure of nucleosides and nucleotides. The NAD⁺, NADP⁺, FAD, ATP, cyclic AMP and their biological role

8th week: primary and secondary structure of nucleic acids, Relationship between the structure and the biological function of nucleic acids. The structure of living organisms, and their supra molecular organization. Living organisms and their environment.

9th week: The role of water from the aspect of living beings. Enzymes. The nomenclature, structure and mechanism of enzymes. Factors affecting the activity of enzymes. Classification of

CHAPTER 10

enzymes. The regulation of enzyme activity

10th week Vitamins. Common feature of vitamins their classification. Fat-soluble and water-soluble vitamins and their mechanisms.

11th week: Hormones. Mechanism of hormones. Hormones of pituitary, thyroid, parathyroid, pancreas, adrenal Sexual hormones Tissue hormones. Plant hormones. Photosynthesis. Light and dark photosynthesis. Sucrose and starch synthesis

12th weeks. Breakdown of carbohydrates. Glycolysis, citric acid cycle and the terminal oxidation reaction and energy balance. The direct oxidation of glucose (pentose phosphate cycle). Fermentation processes.

13th week: Resynthesis of glucose. Glycogen metabolism (Cori cycle). The metabolism of fats. The biosynthesis of fatty acids. The breakdown of saturated , unsaturated and odd carbon fatty acids, and their energy balance.

14th week glyoxylic acid cycle. Structure of amino acids. The origin of amino acids C-frame. Protein synthesis. Stages of protein synthesis, transcription, translation. Initiation, elongation, termination.

15th week: Hydrolysis of proteins, breakdown of amino acids and their relationship with citrate-circuit . Urea cycle. Relationship between cellular energy-producing and energy consuming processes. Representation of homeostasis maintainance enhanced by examples.

Required reading materials

Ida Kincses-Andrea Balla Kovács: Applied biochemistry
2013.

Sally Solomon: Introducion to general, organic and biological chemistry
ISBN: 0070596611

Christopher K. Mathews, K.E. van Holde: Biochemistry
The Benjamin/Cummings Publishing Company, 1990. ISBN: 0805350152

Darnell, James E.: Molecular cell biology
1986. ISBN: 0716714485

Institute of Food Science

Subject: **AGRICULTURAL AND FOOD MICROBIOLOGY I.**

Year, Semester: 1st year/2nd semester

Lecture: **2**

Practical: **1**

Requirements

The purpose of this semester of Microbiology is to familiarize the student with those concepts that are basic to viruses and prokaryotic and eukaryotic cells. The basic topics in this course are: the general principles for microbial growth, evolution and classification, descriptions of different prokaryotic, eukaryotic and other life forms; the natural ecology of microorganisms; the human use of microorganisms; and how microorganisms function in disease.

In the laboratory students will learn basic microbiological techniques, to acquire basic bacteriological skills and be able to successfully use them.

Subject: **ANALYTICAL CHEMISTRY**

Year, Semester: 1st year/2nd semester

Lecture: **2**

Practical: **2**

Requirements

Course content: Introduction to analytical chemistry. History of analytics.

Basic concepts. Prefixes. Units and standards. Units of measurement. Metric system. Mass. Time.

Metrology. The errors of an analysis results.

The Fresenius's classification criteria of cations. The Fresenius's classification criteria of anions.

The general methods of quantification.

The fundamentals of quality assurance of analyses.

Classical analysis, titrimetric. The concentration of standard solutions. Acid-base titrations.

Complexometry. Celatometries titration. Precipitation titration. Redox titration.

Classical analysis, gravimetry.

The main steps of a multielemental analysis.

Required reading materials

Giinzler H. and A. Williams: Handbook of analytical techniques

Weinheim, Germany, 2001.

Ebbing, D.D., Gammon, S.D.: General Chemistry

Houghton Mifflin Company. Boston. USA., 2009.

Danzer K.: Analytical Chemistry. Theoretical and meterological fundamentals.

Springer Publish., 2007.

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

1992.

Subject: **INTRODUCTION TO FOOD SAFETY**

Year, Semester: 1st year/2nd semester

Lecture: **2**

Requirements

Course content: The aim of the course to give knowledge regarding food safety, its importance in the food policy of EU. Students get information about natural, technological toxins that can be found in food.

Thematic plan of lectures:

1. Concept of food safety. Recent principles in food safety policy.
2. Legal and organization framework and institutions of of the realization of food safety.
3. Labelling of food.
4. European trademarks and geographical indications.
5. General toxicology, rudiments
6. Plant and animal toxins. Toxic alcaloids.
7. Foodborne diseases.
8. Microbial toxins, bacterial toxins.
9. Parasites in food.
10. Mycotoxins.

11. Chemical and physical risks.
12. Food safety and the GM foods.
13. Drugs in veterinary practice, prohibited active ingredients.
14. Toxic and other micro elements. Other toxins.
15. RASFF

Required reading materials

Source-book of the department of Feed and Food Safety of the Agricultural Extension Agency
R. Beier, S. pillai, T. Phillips, r. Ziprin: Preharvest and Postharvest Food Safety.
Blackwell Publishing Ltd., 2004.

Institute of Water and Environmental Management

Subject: **ENVIRONMENTAL MANAGEMENT, ENVIRONMENTAL TECHNOLOGY**

Year, Semester: 1st year/2nd semester

Lecture: **2**

Requirements

Course content: The course gives an introduction about the possible utilizations of the renewable energy sources. Provides an overview of the technologies related to air purity protection and protection against noise. Understanding the input and output methods of pollution reduction and the basic coherences of technological interventions. The role and novelty of the focused subject. The conferences organized by the United Nations. Giving history of Hungarian environmental protection. The law of LIII (1995). The process of air pollution in detailed. Types (local, regional and global scaled) and sources of air pollution and their characterization. The transmission process. Decrease in harmful effect of garbage. The re-cycling of wastes for raw materials or energy sources. Way leading to make harmless the non re-usable wastes. Water a revolving prime mover under continuous circulation. Emissions mostly from human activities that are responsible for the damages caused on soils and not soil surfaces. Organization of processes that could declines the damages. Frames of the law.

Required reading materials

Hanaki, K.: Urban Environmental Management and technology

1st.. Springer Publish., 2008. ISBN: 9784431783978

Jorgensen, S. E.: Studies in Environmental Science Principles of environmental science and technology

14th.2011. ISBN: 9780080874739

Marinova, D.-Annandale, D.-Phillimore, J.: The International Handbook on Environmental Technology Management

Massachusetts, 2006. ISBN: 9781840646870

Krishnamoorthy, B.: PHI Learning Pvt. Ltd. Environmental Management

New Delhi, 2005. ISBN: 9781840646870

Juhász, Cs.-Szöllösi, N.: Environmental and quality management elektronikus tananyag.2011.

Agricultural Laboratory Centre

Subject: **BUSINESS STUDIES AND SKILLS IN ENGLISH I.**

Year, Semester: 2nd year/1st semester

Lecture: **2**

Requirements

Course content: The aim of the subject is to provide the students with essential skills, concepts, processes and phenomena of the world of business and employment and at the same time improve the level of their language competencies. The following topics with case studies offer the context for the development of employment and language skills: sectors of the economy, management (functions, company structures, motivation, cultural diversity at work), employment market demands and trends, job applications (advertisements, CVs, cover and motivation letters, job interviews), promotion seeking, telephoning.

Required reading materials

Ian MacKenzie: English for Business Studies

Cambridge University Press, 2010.

Leo Jones-Richard Alexander: New International Business English

Cambridge University Press, 2010.

Simon Sweeney: English for Business Communication

Cambridge University Press, 2006.

Subject: **ELECTROTECHNICS**

Year, Semester: 2nd year/1st semester

Lecture: **2**

Practical: **2**

Requirements

Thematic plan of lectures:

1. Electricity and the electrostatic field associated with it. The voltage. Potential and potential function. Electrostatic Gauss thesis.
2. Conductivity and dielectric. Calculation of electrostatic fields. Thesis of superposition.
3. The capacity. The condensers serial and parallel contact. Conductivity systems' capacity.
4. The flux and it's electrostatic field. The amperage. Flux density. Space of flow and it's calculation.
5. Reluctance and it's serial and parallel contact. Effect and effect density. Potential and flux generator.
6. Kirschoff's laws and its utilizations.
7. The flux and it's magnetic component. Magnetic induction. The flux. The round flux's energy. The law of excitation.
8. Ferromagnetic and non-ferromagnetic media. Boit-Savart laws. Calculation of magnetic fields.
9. Electromagnetic field. The sedent induction. Alternating currents' magnetic field. Self-inducted potential.
10. Roll and attached rolls. The serial and parallel contact of rolls. Inducted electric gradient.

CHAPTER 10

11. Capacitive flux. Continuity equation. Generalised excitation law. The unit of electromagnetic fields.
12. The electromagnetic energy and force. Electrostatic force. Energy of the system made up of charges. Electrostatic fields' energy density.
13. Flux system's energy. The magnetic fields' energy density. Magnetic force effect.
14. Electric networks. Definitions of electric circuits and their classifications.
15. Network topologies basic principles. Some simple networks.

Required reading materials

László Kerékgyártó: Electrical Engineering

István Gergely: Electrical Engineering

Dr. Fodor György: Theoretical Electrical Engineering

D. Fink-A. McKenzie: Standard Handbook of Electronic Engineering

Subject: **INTRODUCTION TO INTERCULTURAL COMMUNICATION I.**

Year, Semester: 2nd year/1st semester

Lecture: **2**

Requirements

Course content: The learning objectives for this class are:

Intercultural Knowledge and Awareness

Learn what culture is and how it affects and is affected by the communication process. Know how context, history, family, media, and other institutions influence culture and communication. Learn how demography and globalization shape cultural identity and intercultural relations. Identify issues of inequality—racism, sexism, and systems of privilege—and how to address them.

Understanding

Develop and refine an understanding of yourself and others through knowledge, listening, patience, and dialogue. Become more thoughtful of the complexity of intercultural interactions. Become a more willing, self-reflective, flexible, and open communicator. Know how power, stereotypes, and prejudice are manifested in cross-cultural communication.

Intrapersonal, Interpersonal, and Group Communication Skills

Improve your ability to think about intercultural communication issues and your own cultural identity, including your perceptions, strengths and limitations. Improve communication skills with others one-on-one and in small groups. Develop verbal, non-verbal, critical listening, and conflict management skills.

Critical-Thinking Skills

Learn how to examine yourself, others, situations, and texts. Learn to look at and understand issues in different ways, including those that may differ from your own.

Thematic plan:

1-2. Recognizing/recalling and defining specified terms of cultural analysis.

3-4. Describing own cultural heritage/identities (using concepts learned in the course) and how these influence communication.

5-6 Describing in depth the distinctiveness of one national culture via a cultural metaphor.

7-8 Interpreting behaviors of another culture within that culture's own framework of meaning.

9-10 Applying intercultural communication concepts/theories to personal experiences, social interactions/observations, and media representations of interactions involving members of different cultures.

- 11-12 Identifying cross-cultural ethical principles.
 13-14 Applying ethical standards to intercultural communication cases.
 15 Assessing own competence and character in relating with culturally different others.

Required reading materials

Judith N. Martin and Thomas K. Nakayama: Intercultural Communication in Contexts
 4th. Boston McGraw-Hill, 2007.
David Anderson and Brent Zuercher: Letters Across the Divide: Two Friends Explore Racism, Friendship and Faith
 Grand Rapids, MI: Baker, 2001.

Subject: **PROFESSIONAL LANGUAGE SKILLS I.**

Year, Semester: 2nd year/1st semester

Practical: 2

Requirements

Course content: The goal of this course is to develop and to hone professional oral business communication skills, i.e. public speaking skills and competencies, on a sound basis of theoretical and practical knowledge. Students are also introduced through logical problem-based learning modules to the fundamentals of intercultural persuasion and negotiation tactics. Students will learn how to give three key types of professional presentations used in everyday business activities.

Thematic plan:

1. Public Speaking I (definitions, levels, fundamentals of rhetorics)
2. Public Speaking I (professional introductions of self, companies and activities)
3. Constructing a logical presentation, methods of focusing on an audience
4. The SPAM method, 1st student oral presentation exercise
5. 1st student oral presentation exercise
6. Critique, Introduction to the 2nd student oral presentation exercise: product and marketing presentations
7. Workshop
8. 2nd student oral presentation exercise
9. 2nd student oral presentation exercise
10. Critique, Introduction to the 3rd student oral presentation exercise: persuasion – changing minds and opinions on processes and services
11. Using a logical matrix and SWAT analysis in presentations. Problems with PowerPoint
12. Workshop
13. 3rd student oral presentation exercise
14. 3rd student oral presentation exercise
15. Critique and review

Required reading materials

Rodgers, Drew: English for International Negotiations
 St. Martins, 1997.
Wiwczarowski, Troy B.: Writing and Professional Communication
 Debrecen, 2007.

Faculty of Economics and Business

Subject: **ECONOMIC SCIENCES III.**

Year, Semester: 2nd year/1st semester

Lecture: 4

Requirements

Course content: The most important aim is students possess those basic knowledge which are in strong connection with organization and logistics, business economic and marketing, extension areas of specialty.

Thematic plan of lectures:

1. Organization and logistics – Operational strategy
2. Organization and logistics – Products and services
3. Organization and logistics – Processions and technologies
4. Management – The concept of management, its evolution and development
5. Management – Organizational forms and group-management
6. Management – Communication and information management
7. Management – Decision and decision making
8. Marketing – Introduction, segmentation
9. Marketing – Consumer and organizational attitude
10. Marketing – Product and price policy
11. Marketing – Distribution and promotion
12. Extension – The extension system
13. Extension – The extension register system
14. Extension – Changing the extension system

Required reading materials

Roóz J.: Vezetésmódszertan

Perfekt Kiadó, budapest, 2006.

Bakacsi Gy.: Szevezeti magatartás, vezetés

Aula Kiadó, 2007.

Bauer A.-Berács J.: Bevezetés a marketingbe

2006.

Hajós-Pakurár-Berde: Szervezés és logisztika notes

2007.

Szegedi-Prezenszki: Logisztika-menedszment

Kossuth Könyvkiadó, 2003.

Dr. Kozári József: Szaktanácsadás a mezőgazdaságban

Dinasztia Kiadó, 2000.

Alan w. van den Ban-H. S. Hawkins: Mezőgazdasági szaktanácsadás

Mezőgazda Kiadó, Bp., 1996.

Institute of Agricultural Chemistry and Soil Science

Subject: **FOOD CHEMISTRY**

Year, Semester: 2nd year/1st semester

Lecture: **2**

Requirements

Course content: 1st week. Water. The linkage of water in foods. Critical water activity value. Transport of water in foods.

2nd week: Classification of minerals. Their physiological role. 3rd week Carbohydrates in foods, their classification. Maillard reactions. 4th week: Carbohydrate-based flavorings and additives. 5th week Food proteins. Functional properties of proteins. Denaturation of proteins in foodstuffs changes in food properties due to it. 6th week: Protein based flavorings and additives. Additives increasing nutritional value. 7th week Lipids in foods. Indicator values for fat and oil quality. Problem of rancidity. 8th week: The essential amino acids and fatty acids, the possibilities for their intake. 9th Seven: Vitamins. The change in the amount of vitamins during storage. Their importance. 10th Week: Natural - and artificial dyes. 11th Week: Taste and flavoring. 12th week: Preservation. Preservatives. 13th week: Eggs and egg products, milk and milk products, their chemical composition and its changes during processing and storage. 14th week: The chemical composition of meat and meat products, the changes taking place in them during storage and processing. 15th week: Products of plant origin (corn products, fruit and vegetable preparations), their chemical composition, and their role in our nutrition.

Required reading materials

Belitz D., Grosch W., Schieberle P.: Food Chemistry
Springer Publish., 2004.

John M. de Man: Principles of Food Chemistry
Springer, 1995.

Institute of Animal Science, Biotechnology and Nature Conservation

Subject: **FOOD HYGIENE**

Year, Semester: 2nd year/1st semester

Lecture: **1**

Practical: **1**

Requirements

Course content: In this subject students will learn about handling, preparation, and storage of food in ways that prevent foodborne illness. This includes a number of routines that should be followed to avoid potentially severe health hazards.

Thematic plan of lectures:

1. Terminology. History of food safety.
2. Relationships between food- safety, food- hygiene and quality- control. Food- safety and its' controlling institutions.

CHAPTER 10

3. Basics of food- safety controlling. HACCP.
4. Terms of establishing different works in food industry.
5. General food- hygiene terms, regulations in food industry.
6. Contents, features and production of milk.
7. Milking, handling of milk in farms.
8. Controlling milk production.
9. Hygiene of milk processing.
10. Meat. Terms, features.
11. Meat- inspection.
12. Technological hygiene of meat production (porcine, cattle slaughtering)
13. Meat inspection of mammals.
14. Septic infections, abnormalities of meat.
15. Meat inspection of poultry and others. Technological hygiene (poultry, rabbit, wild animals).

Thematic plan of practices:

1. Proliferation of microbes in food. Foodborne illnesses.
2. Food- poisoning and its' prevention. Basics of chemical food- safety.
3. Food wrecking.
4. Canning foods.
5. gyakorlat A húskészítmények előállításának technológiai higiénája, és a forgalmazás feltételei. Technological hygiene of producing meat- products, and the conditions of distributing.
6. Official food- controlling.

Discussion.

Required reading materials

Hayes, P. R., Forsythe, S. J.: Food hygiene, Microbiology and HACCP
Springer, 2010. ISBN: 1441951962

Hubbert, W.T., Hagstad, H.V., Spangler, E., Hinton, M.H., Hughes, K. L.: Food Safety and Quality Assurance-Foods of Animal Origin
Wiley-Blackwell, 1996. ISBN: 10081380714

Institute of Food Science

Subject: **AGRICULTURAL AND FOOD MICROBIOLOGY II.**

Year, Semester: 2nd year/1st semester

Lecture: **2**

Practical: **1**

Requirements

Course content: The purpose of this subject is to familiarize the student with the scope of food microbiology, microorganisms and food material, factors affecting the growth and survival of microorganisms in foods, microbiology of food preservation and primary food commodities, furthermore fermented and microbial foods.

In the laboratory students will learn microbiological techniques which are used during the microbiological examination of foods.

Required reading materials

Adams M. R, Moss M. O. : Food Microbiology

RSC Publishing, Cambridge, 2008. ISBN: 9780854042845

Jay, J. M.-Loessner, M. J.-Golden, D. A.: Modern Food Microbiology

Springer Publish., 2005. ISBN: 0-387-23180-3

Lightfoot, N., F.; Maier, E. A. : Microbiological analysis of food and water: guidelines for quality for assurance.

Elsevier Science Inc, New York, 1998. ISBN: 0444829113

Subject: **PROFESSIONAL PRACTICE**

Year, Semester: 2nd year/1st semester

Practical: **80**

Subject: **UNIT OPERATIONS IN FOOD PROCESSING I.**

Year, Semester: 2nd year/1st semester

Lecture: **2**

Practical: **2**

Requirements

Course content:

Lectures:

Unit operations

Units, Quantities and Dimensions,

The SI System

Conversion of Units

Basic Material and Energy balances

Flow of Fluids

Viscosity

Transporting of Fluids

Pumps

Size reduction

Mixing

Physical Separation Processes

Filtration

Sieving

Gravity Separation

Centrifugation

Seminars:

Application of fundamental laws and equations

Required reading materials

Romeo L. Toledo: Fundamentals of Food Process Engineering

Springer Media,

Zeki Berk: Food Process Engineering and Technology

Elsevier Publishing,

Agricultural Laboratory Centre

Subject: **BUSINESS STUDIES AND SKILLS IN ENGLISH II.**

Year, Semester: 2nd year/2nd semester

Lecture: **2**

Requirements

Course content: The subject aims to familiarize the students with important and useful skills, concepts, processes and phenomena of marketing and production furthermore enhance their language proficiency. The subjects and case studies below provide the context for business and language skill (presentation, arguing, discussion, comparison, convincing, explaining and describing operations, etc) improvement.

Production, Logistics, Supply chain work flow, Quality, Product and brand management, Market research and analysis, Promotion

Required reading materials

Ian MacKenzie: English for Business Studies

Cambridge University Press, 2010.

Leo Jones-Richard Alexander: New International Business English

Cambridge University Press, 2010.

Philip Kotler: Marketing Management

Prentice-Hall, London, UK, 1991.

J. Chilver: English for Business. A functional approach.

DP Publications, 1996.

Maggie-Jo St. John: Advertising and the Promotion Industry

Prentice-Hall, 1994.

Subject: **GRANT PROPOSAL WRITING IN THE TARGET LANGUAGE**

Year, Semester: 2nd year/2nd semester

Practical: **2**

Requirements

Course content: This course introduces students to the problems and issues of writing grant applications in English, especially as pertains to the European Union and the related questions of the European dimension and administrative linguistic expectations and stylistics. On the basis of real-life documents, students will learn to assess and analyze calls for applications and to create their own grant application documents.

Thematic plan:

1. Introduction to Grant Proposal Writing
2. Elements of Style I - writing for clarity
3. Elements of Style II – using active vocabulary for an international readership

4. Layers of Culture and Identity: The European Dimension in grant application writing
5. Using a logical matrix
6. What is the difference between a thought and an idea: transforming thought into success
7. Partners and networks
8. Formal errors and their avoidance
9. The vocabulary of grant writing I
10. The vocabulary of grant writing II
11. Executive summary writing
12. Presenting analyses of problems for solution I
13. Presenting analyses of problems for solution II
14. Written examination preparation
15. Written Final Examination

Required reading materials

Barbato, Joseph&Daniella S. Furlich: Writing for a Good Cause Fireside
2000.

How to Write Knockout Proposals: What you must know (and say) to win funding every time.
Emerson&Church, 2004.

Margolin, Judith, Ed. : Grantseeker's Guide to winning Proposals.
the Foundation Center, 2008.

Subject: **PROFESSIONAL LANGUAGE SKILLS II.**

Year, Semester: 2nd year/2nd semester

Practical: 2

Requirements

Course content: Course goals: This course focuses on training students to command the basics of where written and oral communication intersect in the business world, i.e. designing, writing and presenting HR-related materials, e.g. advertisements for positions, CVs and cover letters, as well as business reports, case studies, public administration documents and PR-type activities. Using real life business documents as guides, students will complete tasks in all these areas and learn to rigorously use self-critique and professional tools to create professional HR, PR and other business documents.

Thematic plan:

Company Image (professional communication applications)

2. PR events I (PR-related communication activities)

3. PR events II (public speaking in PR in specific situations)

4. CVs: Cultural differences, EUROPASS, Anglo-Saxon cultures

5. Motivation letter writing I

6. Motivation letter writing II

7. Business correspondence I

8. Business correspondence II

9. The job interview

10. Business communication methods I

11. Business communication methods II

12. Public administration documents I

13. Public administration documents I

14. Student public speaking practice

15. Student public speaking practice and critique

Required reading materials

Rodgers, Drew: English for International Negotiations

St. Martins, 1997.

Wiwczaroski, Troy B.: Writing and Professional Communication

Debrecen, 2007.

Institute of Food Science

Subject: **COLLOID CHEMISTRY**

Year, Semester: 2nd year/2nd semester

Lecture: **2**

Requirements

Course content: The science of colloid, historical overview, the concept of the colloidal state, the classification and general characterization of colloidal systems.

The grouping of material systems, classifications of colloidal systems, grouping on the basis of the dispersed nature and the interactions between the particles.

Factors determining properties of colloidal systems, the shape of a disperse system, the size of the dispersed parts, general characterization of the major systems, incoherent systems.

Aero disperse systems, liquid medium disperse systems, gas dispersions, foams. Suspensions, emulsions, solid medium disperse systems, macromolecular colloidal solutions, association colloids.

Coherent systems, gels, liquid medium concentrated disperse systems

Dry powder agglomerations, solid foams, solid macromolecules, kinetic regularities.

General descriptions of the most important laws. Brownian motion, diffusion, osmosis, sedimentation, stability of disperse systems.

Coagulation, stability and coagulation of suspensions, stability of foams, status changes of gels.

Rheological properties, rheological basic concepts, deformations, elastic deformations, flows.

The concepts of strength and consistency, behavior of non-Newtonian liquids, rheology of colloidal systems, viscosity of disperse systems, flow of suspensions.

Viscosity of solutions of yarn shaped polymer molecules, viscosity of emulsions, structural viscosity of disperse systems, main food colloidal systems, food suspensions, food emulsions, food gels.

Protein gels, polysaccharide gels, food foams.

Food complex colloidal systems, food dual systems, other colloidal stabilizers.

Required reading materials

Cosgrove T.: Colloid Science, Principles, Methods and Applications

Bristol, UK., Blackwell Publishing Ltd., 2005.

Belitz D., Grosch W., Schieberle P.: Food Chemistry

Springer Publish., 2004.

Fennema O.: Food Chemistry

Marcel Dekker, 1996.

Mohsenin N. N.: Physical properties of plant and animal materials

Gordon and Breach Science Publisher, New York, 1986.

Ludger O. Figura, arthur A. Teixeira: Food Physics Springer Publish. Heidelberg., 2007.

Subject: **MEASUREMENT AND CONTROL**

Year, Semester: 2nd year/2nd semester

Lecture: **2**

Practical: **2**

Requirements

Course content: This subject aims to introduce to the basics of measurement and control processes used in the food industry. Automation and process control systems, sensors and transducers are included. The detailed topics are:

- Definitions of measurement. Units of measure, the SI system. Measurement errors.
- Transducers, signal converters (mechanic, thermodynamic, electric)
- Possibilities for the measurement of water content, water activity, distance, speed, acceleration, mass, force, pressure, flow, temperature, viscosity and other physical parameters.

Fundamentals, definitions of automation and control and regulation. Boole algebra. Process control loops. Electronic control systems (reeds, TTL, PLC, computer based systems). Control chains.

Required reading materials

T. A. Hughes: Measurement and Control Basics

Instrumentation Systems&Automation Society, 2002.

M. Bhuyan: Measurement and Control in Food Processing

CRC Press, 2007.

Subject: **PRINCIPLES OF FOOD TECHNOLOGY I.**

Year, Semester: 2nd year/2nd semester

Lecture: **2**

Practical: **2**

Requirements

Course content: The aim of this course is to introduce students to the processing technologies of plant originated products and byproducts. The students are familiarized with the quality and quality control of the main raw materials of food production, the operations used in the technologies and their effects on the properties of products, storage and processes occur during storage and its effects on the usability.

The detailed topics are

- quality and processing of wheat (storage, milling, baking and pasta industry)
- corn (complex processing)
- potato
- oilseeds
- soybean
- starch – properties and production
- sugarbeet
- malting and brewing industrytobacco

Required reading materials

Brennan, J.G.: Food Processing Handbook

Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, 2006. ISBN: 3-527-30719-2

Smith, J.S., Hui, Y.H.: Food processing: Principles and Applications.

John Wiley & Sons, 2008. ISBN: 9-780-470-28997-6

Subject: **UNIT OPERATIONS IN FOOD PROCESSING II.**

Year, Semester: 2nd year/2nd semester

Lecture: **2**

Practical: **2**

Requirements

Lectures:

Energy balances

Energy Terms, Entalphy Changes

Poperties of Saturated and Superheated Sytems

Heat transfer

Mechanisms of heat transfer

Heat exchange equipements

Thermal process calculations

Radiation heat transfer

Microwave and dielectric heating

Refrigeration, chilling and freezing and their equipment and methods

Required reading materials

Romeo L. Toledo: Fundamentals of Food Process Engineering

Springer Media,

Zeki Berk: Food Process Engineering and Technology

Elsevier Publishing,

P.G. Smith: Introduction to Food Process

Springer Media,

Agricultural Laboratory Centre

Subject: **BUSINESS STUDIES AND SKILLS IN ENGLISH III.**

Year, Semester: 3rd year/1st semester

Lecture: **2**

Requirements

Course content: The subject introduces the following business themes: types of business organizations, sales, international trade, money matters (invoicing, payment methods, banking services, financial statements), business trips, visitors. These topics with relevant case studies allow for the study and/or improvement of business skills like: answering and making enquiries, making offers, placing and acknowledging orders, dealing with problems and complaints, looking after visitors, negotiating and bargaining, calculations.

Required reading materials

Ian MacKenzie: English for Business Studies

Cambridge University Press, 2010.

Leo Jones-Richard Alexander: New International Business English

Cambridge University Press, 2010.

J. Chilver: English for Business. A functional approach.

DP Publications, 1996.

Markham Collins-Rebecca A. Collins: About Finances not only for Financial Experts

Ernst&Young, 1994.

Subject: **LEGAL ENGLISH I.**

Year, Semester: 3rd year/1st semester

Practical: **2**

Requirements

Course content: This special purpose language classroom wishes to offer a working knowledge of EU specific legal language vocabulary and phraseology from one of the most relevant EU documents. The certified Hungarian translation gives our communicator students opportunities to study various practical translation skills and techniques, to develop a body of EU terminology, which they can actively use in the employment market and in working communication.

The relevant list of EU related web site addresses provides assistance to use databases and on-line vocabularies, as well as offers a broader outlook on the topic.

Required reading materials

Anna Trebits: EU English

Klett Kiadó Kft., 2009. ISBN: 978-963-9641-64-8

Subject: **PROFESSIONAL LANGUAGE SKILLS III.**

Year, Semester: 3rd year/1st semester

Practical: **2**

Requirements

Course content: Applied Negotiation Skills

This course involves the study of verbal and nonverbal communication techniques, as well as business communicative skills building, to assist students in communicating clearly and directly towards achieving business objectives in negotiations. Students will learn the consequences of poor communication and how to avoid it through open communication and fixing communication breakdowns. A study of active listening, tailoring one's discussion to a target audience, and becoming aware of one's body language, will help the student to learn how to engage effectively with others. Students will also learn to understand how to set clear expectations and to manage language and cultural barriers with teams working through case studies containing real life business situations.

This course furthermore delves into the intricacies of negotiation. Students learn how to plan their negotiations as individuals, as well as by being parts of negotiation teams. They become familiar

CHAPTER 10

with best practices and typical negotiation mistakes, and must learn to develop strategies to counter dirty tricks and bad faith negotiations, negotiating "no" with their counterparts, and managing team negotiations. Thereby, the students learn strategies that will help them to get past impasses and deadlocks.

The featured role-playing exercises allow the student to practice applying the skills gained in the previous modules of the professional communication course.

Thematic plan:

1. What is negotiation?
2. Verbal and non-verbal communication in a negotiation
3. Channels of communication: protocol
4. The functions of communicating wants and needs
5. Tyoes of negotiation
6. Using one's strengths
7. Cooperation vs. hostility
8. Conditions of negotiating: BATNA
9. Preparing for formal negotiation
10. Establishing an agenda and sticking to strategies
11. Building and Leading a negotiating team
12. Negotiation Workshop I
13. Negotiation Workshop II
14. Negotiation Workshop III
15. Negotiation Workshop IV

Required reading materials

Cohen, Steven: Negotiating Skills for Managers
McGraw-Hill, 2002.

Rodgers, Drew: English for International Negotiations
St. Martins, 1997.

Faculty of Economics and Business

Subject: **STATISTICS**

Year, Semester: 3rd year/1st semester

Lecture: **1**

Practical: **1**

Requirements

Thematic plan of lectures:

1. The aim and role of Statistics, basic concepts. Probability, independence, criterion, population, sample.
2. Random sampling, systematic error, parameter. Randomising. Collecting data, sampling methods
3. Organizing data into a database, database management systems, characteristics of data, levels of measurement. Data transformation procedures: sort cases, select cases, aggregate data, merge files.
4. Determining the characteristic values of data belonging to different levels of measurement. Mean, variance, standard deviation.

5. Median, range, geometric mean, harmonic mean, variation coefficient. Standard error of mean. Confidence intervals. Reports, pivot diagrams, Data portrayal, graphs and other diagrams.
6. Normal distribution as a model. Cumulative probability and density function. Standard values and regularities of normal distribution. Tests of normal distribution.
7. Standard distribution, t- distribution,
8. F- distribution, Chi-square distribution.
9. Hypothesis analyses. Compare means: u-test, one sample t-test, independent-samples t-test, paired-samples t-test, one-way ANOVA.
10. General linear models (GLM) 1. Concept. One-way models
11. General linear models (GLM) 2. Multifactorial (two and three factors) models
12. Post hoc multiple comparisons for observed means.
13. Correlation analyses. Bivariate correlations. Applicability conditions.
14. Regression analysis, concept, bivariate linear regression. Multiple linear regression, technics of initiating independent variables. Multicollinearity diagnostics, problem.

Required reading materials

Chris Spatz: Basic Statistics: Tales of Distributions

10th. Cengage Advantage Books , 2010. ISBN: 9780495808916

Charles Henry Brase and Corinne Pellillo Brase : Understanding Basic Statistics

5. Cengage Advantage Books, 2008. ISBN: 9780547132495

Rachad antonius: Interpreting quantitative data with SPSS,

Sage Publications Inc., 2003. ISBN: 0761973982

Andy Field: Discovering Statistics Using SPSS

Sage Publications Inc., 2009. ISBN: 9781847879066

Institute of Food Science

Subject: **BASIC OF QUALITY ASSURANCE**

Year, Semester: 3rd year/1st semester

Lecture: **2**

Requirements

Course content: The purpose of this subject is to familiarize the student with the concepts and basics of quality and quality assurance, demand satisfaction process, national quality control system, good practices, HACCP, ISO standards (9000, 9001, 9004, 14001, 22000), TQM, quality awards, furthermore accreditation and certification.

Required reading materials

Inteaz Ali: Food Quality Assurance

CRC Press., 2004.

Steve Crossley-Yamine Motarjemi: Food safety management tools

ILSI EUROPE, 2011.

M. van Schothorst: A simple guide to understanding and applying the HACCP concepts

ILSI EUROPE, 2004.

Subject: **FOOD INDUSTRY TECHNOLOGIES AND QUALITY ASSURANCE**

Year, Semester: 3rd year/1st semester

Lecture: **2**

Practical: **1**

Requirements

Thematic plan of lectures:

1. Hygienic conditions of food production (178/2002/EK regulation)
2. Food hygiene (852/2004/EC; 853/2004/EC regulations)
3. Quality assurance for cereal processing plants and their products milling and baking industry
4. Quality assurance for dry pasta and vegetable oils industry
5. Quality assurance for beer and wine production
6. Quality assurance of confectionery
7. Quality assurance of crystallized sugar production
8. Quality assurance of meat industry and products
9. Quality assurance of dairy industry
10. Quality assurance of mineral water production
11. Canning and freezing industry
12. Quality management in public catering and hotel trade
13. Quality of Hungarian traditional products 1.
14. Quality of Hungarian traditional products 2.

Required reading materials

FAO-WHO: Assuring Food safety And Quality: Guidelines For strengthening National Food Control Systems

A. Vasconcellos: Quality Assurance for the Food Industry: A Practical Approach
CRC Press, 2004.

Hubbert, W.T., Hagstad, H.V., Spangler, E., Hinton, M.H., Hughes, K. L.: Food Safety and Quality Assurance-Foods of Animal Origin
Wiley-Blackwell, 1996. ISBN: 10081380714

M. Chute: Food Industry Quality Control Systems
CRC Press, 2008.

Subject: **INSTRUMENTAL ANALYTICS**

Year, Semester: 3rd year/1st semester

Lecture: **2**

Practical: **2**

Requirements

Topics of lectures

Lecture 1: Introduction, history of analytical chemistry.

Lecture 2: Basic concepts in analytical chemistry, the process of analysis, the accuracy and forms of the results, basic statistical concepts, validation of measurement methods.

Lecture 3: Classical methods of qualitative analysis, typical reactions, flame colouring and other methods.

Lecture 4: Basic physical measurements in analytical chemistry. Mass, volume, density,

conductivity and pH.

Lecture 5: Classical analytical measurement methods. Precipitation based on classical analytical methods, gravimetry. Titrations.

Lecture 6: The volumetric methods of analysis and their groups. Acid-base titrations. Complexometric titrations. Redox titrations.

Lecture 7: The UV/VIS photometry. Apparatuses, methods and applications. Infrared spectroscopy.

Lecture 8: Flame photometry (FES). Flame atomic absorption spectrometry (AAS). Graphite furnace atomic absorption spectrometry (GF-AAS).

Lecture 9: Inductively coupled plasma optical emission spectrometry (ICP-OES).

Lecture 10: Chromatographic methods principles, classification, fields of application.

Lecture 11: GC and HPLC methods, apparatuses, fields of application.

Lecture 12: Mass spectrometry, mass spectrometry coupled systems (GC-MS, HPLC-MS, ICP-MS)

Lecture 13: Comparing of analytical methods.

Lecture 14: Sample preparation methods.

Topics of laboratory practices

Lecture 1: Information of fire-protection and laboratory accident. Training of laboratory safety, system of laboratory and the description of practices. Knowledge test.

Lecture 2: Simple statistical calculations for the results of an analysis. Standard deviation, reliability, distribution test. Concentration units, and their conversion. Fits of calibration.

Lecture 3: Calculations for making of solutions. Arrangement of a redox equation.

Lecture 4: Calculations of results of a gravimetric measurement. Simple stoichiometry. Calculations of results of an acid-base titration.

Lecture 5: Quiz I. of calculations. Discussion of the midterm essay (the tasks and the problems).

Lecture 6: Repeat of the quiz I. of calculations. Sampling, sample preparation, moreover determination of mass, volume and density.

Lecture 7: Determination of nitrate in water samples and food ingredients.

Lecture 8: Classical analytical procedures based on precipitation and volumetric analyses in food and food ingredients.

Lecture 9: Classical analytical procedures based on acid-base and complexometric titration in food and food ingredients.

Lecture 10: Application of FAAS for determination of calcium and sodium contents in food and food ingredients.

Lecture 11: Analysis of organic components with an HPLC and an amino acid analyzer equipments in food and food ingredients.

Lecture 12: Analysis of inorganic components with an ICP-OES and an ICP-MS equipments in food and food ingredients, moreover introduction of sample preparation.

Lecture 13: Set-up of an automatic pipette, and checking of their accuracy and calibration.

Lecture 14: Quiz II. of calculations. pH measurement. pH-metric titration and their application for food analysis.

Required reading materials

Boss, C. B. & Fredeen, K. J. : Concepts, instrumentation, and techniques in inductively coupled plasma optical emission spectrometry

Perkin Elmer, USA, 1997.

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

The Royal Society of Chemistry. Cambridge, 1994.

Montaser, A.: Inductively coupled plasmas mass spectrometry

VCH Publishers. New York., 1998.

Montaser, A.&Golightly, D. W.: Inductively coupled plasmas in analytical atomic spectrometry

CHAPTER 10

VCH Publishers. New York., 1987.

Pare J.R.J. and J.M.R. Belanger: Instrumental methods in food analysis.

Environment Canada, Environment Technology Center, Ottawa, Ontario, Canada, Elsevier, Amsterdam, Lausanne, New York-Oxford-Shannon-Tokyo,

Heftmann, E.: Chromatography, fundamentals and applications of chromatography and related differential migration methods. Part A: fundamentals and techniques.

Elsevier, Amsterdam-Oxford-New York-Tokyo, 1992.

Subject: **PROFESSIONAL PRACTICE**

Year, Semester: 3rd year/1st semester

Practical: **80**

Subject: **THESIS PROJECT**

Year, Semester: 3rd year/1st semester

Practical: **2**

Subject: **UNIT OPERATIONS IN FOOD PROCESSING III.**

Year, Semester: 3rd year/1st semester

Lecture: **2**

Practical: **2**

Requirements

Course content:

Lectures:

mass transfer

theory of diffusion and mass transfer

extraction

types of extraction processes

solid-liquid extraction (leaching)

supercritical fluid extraction

membrane processes

adsorption and ion-exchange

distillation

crystallization and dissolution

evaporation

dehydration

freeze drying (lyophilization)

Seminars:

Application of fundamental laws and equations

Required reading materials

Romeo L. Toledo: Fundamentals of Food Process Engineering

Springer Media,

Zeki Berk: Food Process Engineering and Technology

Elsevier Publishing,

P.G. Smith: Introduction to Food Process Springer Media,

Agricultural Laboratory Centre

Subject: **ENGLISH FOR ENVIRONMENTAL MANAGEMENT AND POLITICS**

Year, Semester: 3rd year/2nd semester

Lecture: **2**

Requirements

Course content: The aim of the subject is to provide the students with the basic concepts, the most important phenomena and processes in environmental protection, management and politics with the help of English language texts, articles and exam tasks. The following topics to be discussed allow for the improvement of reading, speaking and skills:

What is environmental science?,

What do environmental scientists do?

Energy resources, renewables Air, water and soil pollution

Environmentally friendly agriculture

Waste management, recycling Biodiversity

Sustainability

Required reading materials

Richard Lee: English for Environmental Science in Higher education Studies

Garnet Education,

What on Earth? környezetvédelmi szaknyelvi jegyzet (középfok)

Zöld Út Nyelvvizsgaközpont, Szent István Egyetem, 2003.

Feladatgyűjtemény az angol írásbeli vizsgához (agrár- és környezettudomány, középfok)

Zöld Út Nyelvvizsgaközpont, Szent István Egyetem, 2008.

Subject: **FOOD INDUSTRY ECONOMICS**

Year, Semester: 3rd year/2nd semester

Requirements

Course content:

The students have to familiarize with the system of processing, storage and conservation of agricultural products in the given economic environment. Organisation and public administration of the food industry and the selected sub-branch. Presentation of some important food-chains from several sub-branches. The privatisation of food industry and its effects on Hungarian agribusiness. The key issues of EU joining. The situation, regulation and competitiveness of the EU food industry. The connections of market regulation and the subsidy system. The basis of food-industry marketing.

Thematic plan of lectures:

1. The importance and the role of food economy, its position in the national economy
2. The evolution of food processing industry, characteristics. The social role of food economy
3. The economic environment of food economy, food politics. Economic aspects in processing.
4. The evolution of Hungarian food-industry till change of regime.
5. The evolution of Hungarian food-industry after the change of regime
6. The structure of food sector and its branches, the main economic indicators

CHAPTER 10

7. The strategy of food industry enterprises, strategic types.
8. The planning of food industry enterprises
9. The structure of business plan of food industry enterprises
10. Vertical and horizontal integration in the food industry sector. The characteristics of production systems.
11. The situation and regulation of food industry in EU. The effects of EU joining on food economy.
12. Food industry logistics, Innovation trends in food industry.
13. The characteristics and situation of food trade sector.
14. Trends and the characteristics of food consumption. Actual trends in world food economy.
15. The criteria of integrated production (examples), the mechanism of integrated production.

Required reading materials

J. H. M. Wijnands-B.M.J. van der Meulen-K. J. Poppe: Competitiveness of the European Food Industry.

Landbouw Economic Institute. The Hague., 2007.

Wierenga B. Grunert K, Steenkamp JBEM, Wedel M, van Tilbur: Agricultural marketing and Consumer Behaviour in a Changing World.

Kluwer Academic Press, ISBN: 978-079239-856-1

W. B. Trail-E. Pitts: Competitiveness in the Food Industry.

Blackie Academic&Professional. London., 1997. ISBN: 0751404314

W. B. Trail-K.G. Grunert: Product and process Innovation in the Food Industry

Blackie Academic&Professional. London., 1997. ISBN: 0751404241

M. D. Ranken R. C. Kill, C. G. J. Baker: Food Industries Manual.

Subject: **INTERCULTURAL COMMUNICATION**

Year, Semester: 3rd year/2nd semester

Practical: **2**

Requirements

Course content: This course introduces students to the problems of culture and interculturality, as well as cultural and ethnic conflict areas and stereotypes to be avoided, when conducting professional business activities. Additionally, there is the question of identity and the problem of national identity vs. otherness. Other areas of study include globalization, non-verbal communication and business etiquette.

Thematic plan:

1. Introduction to Intercultural Communication
2. Definitions of Culture
3. Culture Shock
4. Layers of Culture and Identity: Cultural autobiography
5. Written Examination I
6. Otherness: Taboos, indiscretions, interpreting metacommunication
7. Cultural dimensions: Business communication between cultures
8. Stereotypes and business cultures
9. Written examination II
10. Art and Culture. Mythology and Legends. Historical Impacts of Symbols.
11. Globalization and World English. Spanish and Chinese.
12. Media, Film and the Internet I: World Culture, Pop Culture and Reactions

- 13. Media, Film and the Internet II: Language and Culture
- 14. Language and Culture: dialects, accents and discrimination
- 15. Written Final Examination

Required reading materials

James Neuliep: Intercultural Communication: A Contextual Approach
Sage Publications Inc., 2007.

Milton J. Bennett: Basic Concepts of Intercultural Communication: Selected Readings
Intercultural Press, 1998.

Bridging the Cultural Gap: A Practical Guide to International Business Communication
Penny Carté and Chris J. Fox, Kogan Page, 2004.

William B. Gudykunst and Young Yun Kim: Communicating with Strangers: Approach to Intercultural Business Communication
2nd. McGraw Hill, 1992.

Lillian H. Chaney and Jeanette S. Martin: Intercultural Communication: A Reader
9th. Prentice Hall, 2000.

Linda Beamer and Iris Varner: Intercultural Communication in the Global Workplace
McGraw Hill Irwin, 2000.

Subject: **LEGAL ENGLISH II.**

Year, Semester: 3rd year/2nd semester

Practical: **2**

Requirements

Course content: The course will focus on the following body of knowledge: Contract types (Buy-sell, loan, employment, study agreement, consultancy agreement, processing agreement etc., as requested), special legal cases, e.g. business civil rights, crime environment, immigration labor, personal injury politics product liability, supreme court, traffic etc.

Required reading materials

Marietta Pókay & Judit Ormai: English for Law Students 1.

Subject: **PROJECT WORK**

Year, Semester: 3rd year/2nd semester

Practical: **3**

Requirements

Course content: This course represents the research thesis project for the professional language communication course module. This component is in preparation for the final examination, and will take the form of a case study (minimum length 25 pages), presented in a standardized business report format, as outlined below:

1. Title page 7. Generation and evaluation of alternative solutions
2. Letter of transmittal 8. Recommendation(s)
3. Table of contents 9. Implementation

CHAPTER 10

4. Executive summary 10. Appendices (if any)
5. Problem identification & analysis 11. Endnotes
6. Statement of major problems 12. Bibliography

Subject: **REGULATION AND ADMINISTRATION OF AGRICULTURE**

Year, Semester: 3rd year/2nd semester

Lecture: **2**

Practical: **1**

Requirements

Thematic plan of lectures:

1. Prelude, basic concepts of law, hierarchy of the legal system, legislators.
2. Fundamentals of Civil Law and Civil Procedure Law, subjectives of the legal action, the hungairan judicial system, orders, the lawsuit process.
3. European Union Law, treaties, legislatures, supremacy, internal market and free movement, Common Agricultural Policy.
4. The history of the development of agricultural law in Hungary.
5. Fundamental of substantive law I.; property, protection of property, asset, immovable estate.
6. Fundamental of substantive law II., original and derivative feature of ways of acquisition, overbuilt, use.
7. The Structure of Hungarian Soil Use, regulation, delimitation of acquisition of soil.
8. Special Rules of Acquisition, in the sylviculture, water management.
9. Regulation of Soil Use, contracts of soil use.
10. Agricultural Register, history, development, operative rules.
11. Regulation of Farmers' co-operation.
12. Regulation of the Food Chain.
13. Supports of Agriculture.
14. Public Body in the Agricultural and Rural Development.
15. Fundamentals of Labour Law.

Required reading materials

László Fodor-Zoltán Mikó: Agricultural Law

Bíbor Publisher, 2000.

Robert P. Achenbach, Jr.: Agricultural Law

Matthew Bender publisher, ISBN: 9780820513034

Csilla Csák-Zoltán Nagy-István Olajos-Gábor Orosz-Ágnes Szabó-János Ede Szilágyi-Géza Török: Agricultural Law. The Development of Agricultural Law in the EU

Novotni Publisher, 2010. ISBN: 9789639360532

Blackstone's EU Treaties&Legislation 2012-2013: Blackstone's EU Treaties&Legislation 2012-2013

Institute of Food Science

Subject: **FOOD ANALYTICS**

Year, Semester: 3rd year/2nd semester

Lecture: **3**

Practical: **2**

Requirements

Course content:

1. In the frame of the course students get theoretical knowledge about different macro and micro components of food and are able to study the methods for their determination in practice.
2. Food components. Steps of food analysis. Sampling, cleaning.
3. The role of the water in food .Determination of moisture content/dry matter content, methods and equipments.
4. Determination of ash and mineral content.
5. The rules of sampling for the baking quality of wheat. Baking quality of wheat: mixture, moisture content, test weight, grinding, crude protein, gluten content, gluten index.
6. Baking quality of wheat: farinograph,, valorigraph, alveograph, extenzograph, falling number, amilograph, Zeleny idex, test loaf.
7. The role and importance of food proteins in the human nutrition. Structure and quantity of proteins, determination. Measurement of total N content using Dumas method.
8. Measurement of total N content by Kjeldahl . Determination of amino acids.
9. Chemical features of natural fats and oils. Biochemical changing of lipids.
10. Gravimetric determination of crude fat content. Determination of acidic number and peroxide number, correlations. Fatty acids and determination.
11. Nitrogen-free components of food and feed. Methods for the measurement of carbohydrate content. HPLC determination of sugars.
12. Methods for the measurement of starch. Crude fibre, determination. Dietetic fibre, determination.
13. Enzymes. Parameters that influence the enzyme activity.
14. Application of enzymes on the food processing. Determination of the activity of α –amylase enzyme.
15. Organic acids in food., determinations. Vitamins in food, determinations. Organoleptic tests.

Required reading materials

Manz, A.-Pamme, N.-Iosifidis, D.: Bioanalytical Chemsitry

Imperial College Press, London, 2004.

J. Csapó-Cs. Albert Zs. K. Csapóné: Food Analytics

Cluj-Napoca, 2008. ISBN: 9789737953940

Subject: **PRINCIPLES OF FOOD TECHNOLOGY II.**

Year, Semester: 3rd year/2nd semester

Lecture: **2**

Practical: **2**

CHAPTER 10

Subject: **PRINCIPLES OF FOOD TECHNOLOGY III.**

Year, Semester: 3rd year/2nd semester

Lecture: **2**

Practical: **2**

Requirements

Course content:

The course aims to introduce students the quality, rating, storage and processing of fruits and vegetables, the properties and requirements of main product groups and the factors influencing their quality. The detailed topics are

1. quality of fruits and vegetables; chemical and physical parameters
2. maturation – physiology, methods to determine the maturity stage
3. storage – the processes during storage and storage losses. Factors influencing storage. Storage methods
4. general operations of food and vegetable processing
5. cooled and frozen products
6. dried products
7. concentrated products
8. preservation using heat treatment
9. fermented fruits and vegetables
10. chemical and combined preservation novel methods

Required reading materials

Y.H.Hui, J. Barta, M. P. Cano, T. W. Gusek, J. S. Sidhu, N. K. Sinha: Handbook of Fruits and Fruit Processing

Wiley-Blackwell, 2006.

Y.H.Hui, S. Ghazala, D.M. Graham, K.D. Murrell, W Nip: Handbook of Vegetable Preservation and Processing

Maecel Dekker INC., 2004.

D. M. Barrett, L. Somogyi, H. S. Ramaswamy: Processing Fruits: Science and Technology
CRC Press, 2004.

Subject: **THESIS PROJECT**

Year, Semester: 3rd year/2nd semester

Practical: **2**