

**PROPOSAL OF UNDERGRADUATE STUDY PROGRAMME  
OF THE FACULTY OF FOOD TECHNOLOGY**

**(Introduction and general part)**

**1. INTRODUCTION**

**a) Reasons for launching the study**

Food industry is one of the leading economy branches in the Republic of Croatia due to many favorable conditions. Namely, the development strategy of certain economic branches, such as agriculture and tourism, clearly show that in the future food industry will hold even a more prominent position in the Croatian economy. As Croatia is approaching European integrations, food manufacturers will be faced with an increasing competition and new challenges regarding the product quality, safety and price. Therefore, it will be of utmost importance to have experts who will be able to provide safe and high quality food that is competitive in all aspects at a very demanding global market. The Faculty of Food Technology proposes such study programmes that are related to educating experts for all jobs connected with food production and processing, development of new food products, quality control of raw materials and end products and nutrition planning. The study, that the Faculty of Food Technology proposes, provides also knowledge essential for other related branches of industry (chemical, pharmaceutical etc.).

The Faculty of Food Technology proposes one undergraduate and three graduate studies. The undergraduate study of *Food Technology* encompasses food-process engineering, food chemistry and biochemistry and nutrition, being the result of inter-disciplinary activity of the basic natural and technical sciences, especially chemistry, biochemistry, mathematics, physics and the basic process-engineering disciplines.

Both the undergraduate study of *Food Technology* and the graduate study, proposed by the Faculty of Food Technology, are comparable with many studies of food technology in the EU countries (e.g. Faculty of Food Technology and Biotechnology in Prag, Szent Istvan University and Faculty of Food Science in Budapest, BOKU in Wien). The Faculty of Food Technology and the above mentioned universities propose courses mostly from the fundamental sciences (mathematics, biology, chemistry and physics) in the first and second year of the undergraduate study as these courses provide students with the knowledge necessary for the chosen study. More professional knowledge from the food-process engineering, microbiology, food chemistry and biochemistry, nutrition etc. is acquired partially in the second and in the third study year. This knowledge enables students to either continue the graduate studies or to find a job and start working. During the graduate studies, students have compulsory courses and they choose specific groups of elective courses, which determine their study profile.

**b) Former experiences of the proponent**

The Faculty of Food Technology was founded 30 years ago and has been very successful since then in educating the experts in the field of food technology and process engineering as well as in organizing and performing scientific and research work in food technology, process engineering, chemistry, physics, biology and other natural sciences. The study of Food Technology of the Osijek University was started in 1971/72 at the Agricultural- Food Technology Faculty. Until the academic year 1994/95 engineers of food technology educated at the Faculty received the BSc degree, but since 1994/95 this has changed and engineers of food technology and process engineering have been educated in the three study profiles: food engineering, food science and process engineering. So far 769 students received their BSc degrees at the Faculty of Food Technology. Since 1998 postgraduate studies of food engineering have been started at the Faculty of Food Technology leading to the MSc degree. Since 2002 the study leading to the PhD degree has been set up in the area of bio-technical sciences, in the scientific field of food technology. There are 20 students now who are involved in the postgraduate studies to obtain the MSc degree and 5 students to receive the PhD degree.

### **c) Partners outside higher education**

The Faculty of Food Technology is an institution that has been educating experts in the field of food technology for 30 years. Engineers who have graduated at this Faculty (769) have been employed in food and chemical industry in Croatia and abroad. Besides, many of them work in state institutions, institutes, schools, inspection agencies, at the faculties etc. Some of the former students have continued their education at other universities in the EU countries. We are convinced that the entire food and chemical industry of our region, as well as other institutions, are interested in further students' education at the undergraduate, graduate and postgraduate studies at this Faculty.

### **d) Openness of the study towards students' mobility**

The graduate studies that the Faculty of Food Technology proposes will be open to students from several bio-technical and technical faculties in Croatia and to students from related faculties from other parts of the world (primarily from the EU countries).

Students who either finish the undergraduate study at this Faculty or the Faculty of Food Technology and Biotechnology of the Zagreb University (profile food technology and nutrition) can be directly enrolled at the graduate studies at the Faculty of Food Technology (profiles **Food Engineering, Food Science and Nutrition, and Process Engineering**). Students who finish undergraduate studies at the Faculty of Chemical Engineering and Technology, Chemical-Technological Faculty, Pharmaceutical-Biochemical Faculty, Agronomical Faculty in Zagreb, Agricultural Faculty in Osijek can be enrolled at some of the graduate studies at the Faculty of Food Technology provided they pass some additional exams.

Precise conditions of enrollment will be defined after comparing undergraduate studies, which will be done by the committee, appointed by the Faculty staff.

## **2. GENERAL PART**

### **2.1. Title of the study**

#### **Undergraduate study**

Study of Food Technology

### **2.2. Study holder**

Faculty of Food Technology of the J.J.Strossmayer University in Osijek

### **2.3. Study Duration**

#### **Undergraduate study**

3 years (6 semesters)

### **2.4. Conditions for admission**

To be admitted to the Faculty of Food Technology students are expected to have finished a four-year secondary school and to pass the entrance exam that includes the points obtained from the testing in chemistry and mathematics and the points that are assigned on the basis of secondary school success. The applicants who had excellent marks in the secondary school can achieve sufficient points to be exempted from taking the tests in mathematics and chemistry.

## **2.5. Competences acquired by study completion**

By completing the undergraduate study of ***Food Technology*** at the Faculty of Food Technology in Osijek one is awarded the academic title of the **First Degree of Food Technology (Baccalaureus/Baccalaurea)**. In addition to acquiring the knowledge from the basic natural sciences during the undergraduate study, students also acquire sufficient professional knowledge, which enables them to successfully perform all jobs in their profession in food or related industries (enhancement of product quality, process supervision etc.) .

## **2.8. Professional or academic title awarded by study completion**

By completing the undergraduate study at the Faculty of Food Technology one is awarded the academic title of **the First Degree of Food Technology (Baccalaureus/Baccalaurea)**.

### 3. PROGRAMME DESCRIPTION

#### 3. 1. LIST OF COMPULSORY AND ELECTIVE COURSES AND/OR MODULES WITH TEACHING HOURS NECESSARY FOR IMPLEMENTATION AND ECTS CREDITS

##### I. study year UNDERGRADUATE STUDY *Food Technology*

Semester	Course code	Course title	L	S	La	ECTS
I	FT111	General and Inorganic Chem.	4	2	2	10
I	FT112	Mathematics I	3		2	6
I	FT113	Technical Physics	3	1	1	6
I	FT114	Biology	3		2	6
I	FT115	Foreign Language	1		1	2
I	FT116	Physical Training and Health Education			2	
SUBTOTAL			14	3	10-2	30,0
TOTAL			25			

\* L=Lectures, S=Seminars, La=Labs

Semester	Course code	Course title	L	S	La	ECTS
II	FT121	Organic Chemistry	3	1	3	8
II	FT122	Mathematics II	2		2	5
II	FT123	Engineering Thermodynamics	3		2	6
II	FT124	Machine Elements	3		2	6
II	FT125	Informatics	2		1	3
II	FT115	Foreign Language	1		1	2
II	FT116	Physical Training and Health Education			2	
SUBTOTAL			14	1	13-2	30,0
TOTAL			26			

##### II. study year

Semester	Course code	Course title	L	S	La	ECTS
III	FT211	Physical Chemistry	3		2	5,5
III	FT212	General Microbiology	3		2	5,5
III	FT213	Transfer Phenomena	4		2	7
III	FT214	Biochemistry	4		2	7
III	FT215	Ecology	2		1	3
III	FT216	Foreign Language	1		1	2
III	FT217	Physical Training and Health Education			2	
SUBTOTAL			17		12-2	30,0
TOTAL			27			

Semester	Course code	Course title	L	S	La	ECTS
IV	FT221	Food Science	3			4,5
IV	FT222	Food Microbiology	3		2	5,5
IV	FT223	Food Quality Control	3		3	6
IV	FT224	Package and Food Packaging	2		1	3,5
IV	FT225	Raw Materials of Animal Origin	2		1	3,5
IV	FT226	Raw Plant Materials	3		1	5
IV	FT216	Foreign Language	1		1	2
IV	FT217	Physical Training and Health Education			2	
SUBTOTAL			17		11-2	30,0
TOTAL			26			

### III. study year

Semester	Course code	Course title	L	S	La	ECTS
V	FT311	Processes in Food Industry	3	1	2	7
V	FT312	Water Technology and Wastewater Treatment	3		1	5
V	FT313	Food Chemistry	3		1	5
V	FT314	Process Measurements and Control	3		1	5
V	FT315	Economics of Food Processing Industry	3			5
V		Practical Training			6	3
SUBTOTAL			15	1	11	
<b>TOTAL</b>			<b>27</b>			<b>30,0</b>

Semester	Course code	Course title	L	S	La	ECTS
VI	FT321	Technology of Plant-Based Raw Materials I	3		2	6
VI	FT322	Technology of Plant-Based Raw Materilas II	3		2	6
VI	FT323	Technology of Animal-Based Raw Materials	3		2	6
VI	FT324	Hygiene and Sanitation	2		2	4
VI		Elective Course I	2		2	min 8
VI		Elective Course II	2	(1)	(1)	
SUBTOTAL			15	1	11	
<b>TOTAL</b>			<b>27</b>			<b>30,0</b>

### Elective courses

	Course code	Course title	L	S	La	ECTS
VI	FT331	Instrumental Methods of Analysis	2		2	4
VI	FT332	Construction Materials in Food Industry	2		2	4
VI	FT333	Sensory Analysis	2		2	4
VI	FT334	Food Toxicology	2		2	4
VI	FS231	Functional Foods and Supplements	2	1	1	4

\* One of elective courses student can choose from any undergraduate study at University

## ECTS CREDIT CALCULATION METHOD

- To determine the objective and unique method of assessing and calculating the total students' workload (TSW) coefficient during semester, the total teaching load for every course was calculated according to the following formula:

$$\text{Hours TSW} = L \times 3 + S \times 2 + La \times 1$$

where: L=lectures; S=seminars;La=Labs

It is considered that students must take notes during the lecture and use these notes and other recommended reading materials for exam preparation. On the other hand, students can do part of their assignments and obligatory work during the seminar and continue the work at home, based on received instructions, and consequently present the seminar work orally. For every laboratory hour students must write a report containing work description, necessary calculations and table or graph result display.

With regard to the above explanations, the coefficient three was used for lecture hours, coefficient two for seminars and coefficient one for labs. The obtained values present the total students' workload for respective programmes.

- As the available ECTS credits for every semester is 30, to obtain the ECTS credits for each course, the total available credits in semester were divided by the total student's workload (TSW) in semester, as follows:

$$30 : 56 = 0.5357143$$

The obtained coefficient value presents the number of hours of the total student's workload necessary for one ECTS credit. Due to the variety of the total student's workload, this value differs for each semester.

- The total student's workload for each course was multiplied by the obtained coefficient and the ECTS credits were calculated for each respective course. To avoid complications in the calculation, the figures were given as whole numbers whenever possible. This facilitates the process of combining the elective courses within the prescribed ECTS credits. The exception was made with courses with identical total student's workload when the courses were given the odd number of ECTS credits and the figures were, therefore, reduced to half a credit.
- The diploma thesis was given 20 ECTS credits.

Example:

Lectures L	Seminars S	Labs La	Total students' workload/hours	ECTS credits	ECTS credits per hour of total students' workload
4	2	2	18	9.6→10	
3		2	11	5.9→6	
3	1	1	12	6.4→6	
3		2	11	5.9→6	
1		1	4	2.1→2	
TOTAL:	<b>14</b>	<b>3</b>	<b>56</b>	<b>30.0</b>	<b>0,5357143</b>

\*Physical training and health education were not given ECTS credits.

### 3. 2. MONITORING METHOD OF THE QUALITY AND IMPLEMENTATION EXCELLENCE OF EVERY COURSE AND/OR MODULE

At the end of each semester students will be asked to fill in a questionnaire anonymously. Analyses of students' success at exam taking will be done. The Teaching Board, Faculty Council, and Management Board will monitor curriculum implementation.

<b>Course title</b>	<b>General And Analytical Chemistry</b>		
<b>Course code</b>	FT111	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I		
<b>Course lecturer</b>	Milan Čačić, PhD, assistant professor		
<b>Course associates</b>	M. Kuleš, PhD, associate professor		
<b>Course content</b>	<p><u>Lectures:</u> Measurements in chemistry, units of measure. Mixtures, chemical compounds and elements. Electronic and quantum structure of atoms. Chemical bonding and structures of molecules. The states of the matter (gases, liquids and solids). Homogenous and heterogenous chemical equilibrium. Chemical kinetics. Solutions. Buffer, hydrolysis and ion-product constant. Ionic equilibrium in water solutions of complex ions. Solubility product. Protolytic reactions and titrimetric methods. Theory of oxidation/reduction reactions. Instrumental analytical methods.</p> <p><u>Labs:</u> Basic laboratory operations and equipment. Measurements of mass, volume and density. Separations of heterogeneous and homogeneous mixtures. Determination of molar volume and relative molar masses of gases. Preparation of standard solutions. Gravimetric determination of nickel. Determination of chloride by Mohr method. Neutralization titration: determination of sodium hydroxide. Complexometric titration of zinc. Determination of iron by Zimmermann-Reinhardt. Iodometric determination of copper. Potentiometric determination of acetylsalicylic acid. Colorimetric determination of copper.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Student preparation for science courses as well as specific courses on general and analytical chemistry. Except for theoretical knowledge a student comes to master chemistry calculations, and through laboratory practice acquires autonomy and skill within laboratory frame work.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	4	2	2
<b>(total)</b>	60	30	30
<b>Examination method</b>	There is both written and/or oral examination upon the completion of the lecture period: after 20 classes of lectures (3*); after 15 classes of seminars (2*) and after 15 classes of laboratory practice (2*).		
<b>Credits</b>	10	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. I. Filipović, S. Lipanović, Opća i anorganska kemija, Školska knjiga, Zagreb, 1991.</li> <li>2. M. Sikirica, Stehiometrija, Školska knjiga, Zagreb, 1991.</li> <li>3. B. Mayer, B. Bach-Dragutinović, Vježbe iz opće i anorganske kemije, Školska knjiga, Zagreb, 1988.</li> <li>4. D. A. Skoog, D.M. West, F.J. Holler, Osnove analitičke kemije, Školska knjiga, Zagreb, 1999.</li> <li>5. Z. Šoljić, Računanje u analitičkoj kemiji, FKIT, Zagreb, 1998.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. F. A. Cotton, G. Wilkinson, Basic Inorganic Chemistry, A Wiley-Interscience Publ. New York, 2000.</li> <li>2. R. Kellner, J.M. Mermet, M. Otto, M. Valcarcel, Analytical Chemistry, John Wiley &amp; Sons. Inc., New York, 2004.</li> </ol>		

<b>Course title</b>	<b>Mathematics I</b>		
<b>Course code</b>	FT112	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I		
<b>Course lecturer</b>	Dragan Jukić, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Introduction: Sets. Natural and integers numbers. The principle of mathematical induction. Rational and real numbers. Supremum and infimum of a set. Absolute value function. Complex numbers.</p> <p>Functions: Definition of function, representation and basic properties of function. Composition of functions and inverse function. Elementary functions. Definition of sequence and concept of limit of sequence. Some special sequences. Limit of function. Continuous functions.</p> <p>Differential calculus: Derivative of function. Differentiation rules and derivatives of elementary functions. Differentiation of an implicit function. Higher derivatives. Differentials. Theorems on derivative. L'Hospital's rule. Applications of the derivatives (tangent and normal, increase and decrease of a function, local extrema, convexity and concavity of a graph, points of inflection, sketching the graph of a function, curvature of a curve). Partial derivatives. Local extrema of function of several variables.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Introduce students to the basic ideas and methods of differential calculus which serves as a basis for other courses. The basic items will be dealt with in an informal way and their usage and application will be illustrated. The practical work will enable students to master suitable techniques and to solve concrete problems.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Both lectures and labs are compulsory. The exam consists of written and oral exam and it is taken after the lectures and labs are finished. During the course tests will be given that can replace written and oral exam.		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. D. Jukić, R. Scitovski, Matematika I, Prehrambeno tehnološki fakultet, Odjel za matematiku, Osijek 2000.</li> <li>2. B. P. Demidović, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1986.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. M. Crnjac, D. Jukić, R. Scitovski, Matematika, Osijek, 1994.</li> <li>2. J. Pečarić i dr., Matematika za tehnološke fakultete, Zagreb, 1994.</li> <li>3. S. Kurepa, Matematička analiza 1 i 2, Tehnička knjiga, Zagreb, 1972.</li> <li>4. V. Devide i dr., Riješeni zadaci iz više matematike, Školska knjiga, Zagreb, 1979.</li> </ol>		

<b>Course title</b>	<b>Technical physics</b>		
<b>Course code</b>	FT113	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I		
<b>Course lecturer</b>	Josip Brana, PhD, assistant professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Introduction and system of units. Vectors. Motion in one dimension. Motion in two dimensions. Newton`s law of motion. Applications of Newton`s laws of physics. Newton`s law of universal gravitation. Work, energy and power. Conservation of energy. Momentum and the motion of systems. Momentum conservation law. Collisions. Static equilibrium of a rigid body. Torque about fixed axis. Rotation and translation. Rotational kinetic energy. Moment of inertia. Angular momentum. Rotational dynamics. Rotational work for a rigid object. Conservation of angular momentum. Oscillations. Solids and fluids. Temperature and heat transfer. Kinetic theory of gases. First and second law of thermodynamics. Coulomb`s law and electric field. Gauss law. Electric potential. Capacitance. Properties of insulators. Current and resistance. Energy and current. Batteries and currents in electrolytes. Magnetic field. Sources of magnetic fields. Faraday`s law and induction. Magnetic fields in matter. Electromagnetic oscillations and AC circuits. Waves. Sound. Electromagnetic waves. Geometrical optics. Wave optics, interference, diffraction and polarization. Basic elements of relativity. Quantization of electromagnetic radiation and interaction with matter (photo effect). Elements of quantum physics of atoms and molecules. Lasers. New types of microscopes, atomic force microscope (AFM), scanning probe microscope (SPM). Some information in the field of new materials.</p> <p><u>Labs:</u>  General laboratory procedures. Experimental errors and data analysis. Measurements of length and time, mass, volume and density. Simple harmonic motion, mathematical pendulum, physical pendulum. Rotation of a rigid body about a fixed axis, moment of inertia. Mechanics of fluids, determination of surface tension, viscosity measurement with the falling-ball. Sound waves, determination of the velocity of sound using Kundt`s tube. Heat and thermodynamics, determination of specific heat capacity of solids, heat capacity of gases. Determination of resistance of different conductors by Wheatstone bridge circuit, determination of the temperature coefficient of resistance. Geometric optics, determination of focus length of lenses. Physical optics, diffraction of light at a diffraction grating, measurement of wavelengths of light. Introduction to quantum physics, photoelectric effect.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Fundamental knowledge in physics connected with classical technologies.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3	1	1
<b>(total)</b>	45	15	15
<b>Examination method</b>	written and oral exam		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	Nikola Cindro; FIZIKA I, II, „Školska knjiga“, Zagreb, 2000.		
<b>Recommended reading</b>	Frederick J. Keller, Edward W. Gettys, Malcolm J. Scove, PHYSICS, Mc Graw Hill		

<b>Course title</b>	<b>Biology</b>		
<b>Course code</b>	FT114	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I		
<b>Course lecturer</b>	Mirjana Sabo, PhD, assistant professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Origin and evolution of life, live and lifeless systems, common features of plants and animals. Taxonomy, mutual relationships of organisms, chemical composition of living matter. Physical qualities of living matter, diffusion osmosis, turgor, plasmolysis, pinocytosis. Prokaryotes and their metabolic diversity Structure of cell. Reproduction and ontogenesis of cell. Reproduction and evolution of organisms. Heredity and variability. Gene interactions, mutations, genetics in plant and animal production. Anatomy of plants: leading and basic tissues. Vegetative and generative organs of plants. Histology if animals: epithelial, binding, supporting tissues. Histology of animals: muscular, nervous tissues. Animal information and regulation systems: endocrine, nervous, immune. Metabolic and transport systems: digestive, respiratory, circulatory, reproduction, excretion, skeletal, muscular, dermal. Basis of ecology and environmental science from biological point of view.</p> <p>Microscope structure and microscoping technics. Prokaryote and eukaryote cell organisation. Ergastic formation in cell of plants. Physiological reactions in the cell. Anatomy of plants tissues and organs. Histological structure of animals tissues. Structure of animals information, regulation, metabolic and transport systems.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	<p>Origin and evolution of life from atom to macromolecules, their structure, functions, their relation to surroundings and rules of their impact on single physiological processes and their impact through these processes on single organs, actually on the systems in whole. The aim of the course is for students to understand natural processes, especially the ones that can be controlled or changed, and the ones that influence plant and animal performances. To find new and better approach, actually methods that can be successfully used in food production or in prediction of ambient impact on changes in population.</p>		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Oral exam or 4 written exams during the term.		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. T. Bačić: Morfologija i anatomija bilja. Pedagoški fakultet, Osijek 2003.</li> <li>2. T. Bašić-Zaninović i N. Perić: Biologija –putovanje kroz život.Zagreb Kugler, 2004. Udžbenici sveučilišta u Zagrebu.</li> <li>3. M..W. Berns: Stanica, Školska knjiga, Zagreb 1991.</li> <li>4. L.C. Yunqueira, J. Carneiro, R.O. Kelley. Osnove histologije. Školska knjiga, Zagreb, 1999.</li> <li>5. M. Sabo Biologija. (skripta) Prehrambeno tehnološki fakultet Osijek 2002.</li> <li>6. B. Durst-Živković. Praktikum histologije. Školska knjiga, Zagreb, 1998.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. D. Denffer, H. Ziegler: Botanika morfologija i fiziologija. Školska knjiga Zagreb 1991.</li> <li>2. K. Dubravec : Botanika. Agronomski fakultet Zagreb 1996.</li> <li>3. S. Jelaska: Kultura biljnih stanica i tkiva. Školska knjiga , Zagreb 1995.</li> <li>4. T. Švob i sur.: Osnove opće i humane genetike. Školska knjiga, Zagreb 1991.</li> <li>5. O. Springar: Čovjek i zdravlje. PMF Zagreb 1995..</li> </ol>		

<b>Course title</b>	<b>English Language</b>		
<b>Course code</b>	FT115	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I + II		
<b>Course lecturer</b>	Lidija Obad ,MA, senior lecturer		
<b>Course associates</b>			
<b>Course content</b>	Students are gradually introduced to less complicated texts and specific lexis in the field of food technology related with their professional courses. The topics they deal with include: the atomic structure, physical and chemical changes, solutions and acids, equipment in a chemical laboratory, risks and protection in a lab, organic chemistry, ecology and green house effect. Students are trained to look for primary and secondary information and rhetorical functions of utterances, key words and topic sentences. The most frequent grammatical structures represented in professional texts are dealt with: tenses, passive voice, if clauses, modal verbs, word order.		
<b>General and specific knowledge acquired in course (objective)</b>	The course objective is to further develop all four language skills with a special focus on reading techniques so as to facilitate reading of professional journals. Communication skill is to be developed in pair and group work and specialized vocabulary is gradually introduced.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	1+1		1+1
<b>(total)</b>	30		30
<b>Examination method</b>	The exam is both written and oral taken at the end of the first and second semester, along with several tests throughout the year.		
<b>Credits</b>	1+1	<b>Language</b>	English
<b>Compulsory reading</b>	1. L.Obad: <i>An English Language Workbook for Students of Food Technology</i> . Prehrambeno tehnološki fakultet, Osijek, 1997. 2. Ž.Bujas: <i>Veliki englesko-hrvatski rječnik</i> , Globus, Zagreb, 1999.		
<b>Recommended reading</b>	1. R.Murphy: <i>English Grammar in Use</i> , Cambridge University Press, 1985. 2. S.Greenal: <i>Reward Intermediate</i> , Heineman, 1995. 3. Ž.Bujas: <i>Veliki hrvatsko-engleski rječnik</i> , Globus, Zagreb, 1999.		

<b>Course title</b>	<b>German Language</b>		
<b>Course code</b>	FT115	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I + II		
<b>Course lecturer</b>	Spasenija Moro, BA, lecturer		
<b>Course associates</b>			
<b>Course content</b>	Students are introduced to texts from the fields of chemistry, ecology and nutrition (Laboratory, Production and Ecology, Atom Structure, Water, Elements and Compounds, Oxidation, Carbohydrates, Active Components). Students are taught to develop reading techniques, specialized lexis. They practise verb tenses, word formation. Students learn to comprehend and interpret the specialized text at various levels. They are introduced to specific features of German language via professional texts. Students are actively involved in exercises where they apply their skills and knowledge.		
<b>General and specific knowledge acquired in course (objective)</b>	The course objective is to master the basic vocabulary and specific grammatical structures to facilitate comprehension of a specialized text. Reading and writing skills are developed to enable text interpretation.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	1+1		1+1
<b>(total)</b>	30		30
<b>Examination method</b>	Written exam twice in semester and after the second semester both written and oral exams.		
<b>Credits</b>	1+1	<b>Language</b>	Croatian, German
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. S.Moro: <i>Deutsch in der Lebensmitteltechnologie</i>, PTF, Osijek, 1998.</li> <li>2. I.Medić: <i>Kleine deutsche Grammatik</i>, Školska knjiga, Zagreb, 1999.</li> <li>3. T.Marčetić: <i>Deutsche Grammatik im Ueberblick</i>, Školska knjiga, Zagreb, 1999.</li> <li>4. M.Uroić, A.Hurm: <i>Njemačko-hrvatski rječnik</i>, Školska knjiga, Zagreb, 1999.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. Z.Glovacki-Bernardi: <i>Osnove njemačke gramatike</i>, Školska knjiga, Zagreb, 1999.</li> <li>2. B.Jakić, A.Hurm: <i>Hrvatsko-njemački rječnik</i>, Školska knjiga, Zagreb, 1991.</li> </ol>		

<b>Course title</b>	<b>Physical training and health education</b>		
<b>Course code</b>	FT116	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I and II		
<b>Course lecturer</b>	Juraj Jurković, BSc, senior lecturer		
<b>Course associates</b>			
<b>Course content</b>	<p>Students are divided in groups of 30 to 40. We divide them according to the number of enrolled students in two female groups and one male group. In each semester students attend 30 classes, which is altogether 60 classes throughout the whole academic year. The classes take place in the sports hall of Medical School during the winter and summer semester up to the 1st of May. Then we move to the rowing club «Iktus» court and run along the coast of Drava. Students are active in sports in the 1st Croatian league are exempt from the classes after bringing the certificate of membership. In the sports hall classes are based on volleyball, basketball and indoor football. Everyone who wants, can also go to the swimming pool, visits are organized 3-4 times in a semester. Our aim is to train non-swimmers (if there are any), and then exercise swimming techniques.</p>		
	Month		Period
	X.	- general physical preparations (Swedish ladder and benches, running) -running(short sections),stretching, forming and strengthening exercises -running (short sections 10-15 m), forming, strengthening and stretching exercises,sport game volleyball, elements of «hammer» technique and serving	4 2 2
	XI.	- running(short sections to 20 m), forming, stretching and strengthening exercise, volleyball serving and smatching - running in intervals 10x15 m, stretching, volleyball (game of 2 sets), male group: football tournament	4 4
	XII.	- «catch the ball» game, stretching and strengthening(Swedish ladder) - volleyball(game of 2 sets), male group: basketball of indoor football - table tennis for those who dont play volleyball - strengthening exercises whit skipping rope	6
	I.	- specific physical preparation for volleyball - running in intervals 10x20 m, stretching and strengthening on banches - volleyball(game of 2 sets), football for the male group, table tennis and skipping ropes	2 6
	III.	- general physical preparation, catch the ball,running(mixed) - catch the ball,stretching, forming exercises, strengthening of arms, legs and the shoulder area - volleyball tournament, male group indoor football and basketball	2 6
	IV.	- running-intervals, forming, strengthning and stretching exercise - volleyball tournament - male group: choice between basketball, volleyball and indoor football - table tennis, single and pairs	8
	V.	-rowing club «Iktus» court: running along the coast of Drava - running in place whit leaps and stretching - running in intervals 1500 m, - volleyball in female group - indoor football, male group	8
	VI.	- running(long sections) 2,5 km, stretching - indoor football for man, game 2x20 minutes	6

<b>Course title</b>	<b>Physical training and health education</b>		
<b>Course code</b>	FT116	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	I and II		
<b>Course lecturer</b>	Juraj Jurković, BSc, senior lecturer		
<b>Course associates</b>			
<b>Course content</b>	<p>Students are divided in groups of 30 to 40. We divide them according to the number of enrolled students in two female groups and one male group. In each semester students attend 30 classes, which is altogether 60 classes throughout the whole academic year. The classes take place in the sports hall of Medical School during the winter and summer semester up to the 1st of May. Then we move to the rowing club «Iktus» court and run along the coast of Drava. Students are active in sports in the 1st Croatian league are exempt from the classes after bringing the certificate of membership. In the sports hall classes are based on volleyball, basketball and indoor football. Everyone who wants, can also go to the swimming pool, visits are organized 3-4 times in a semester. Our aim is to train non-swimmers (if there are any), and then exercise swimming techniques.</p>		
	Month		Period
	X.	- general physical preparations (Swedish ladder and benches, running) -running(short sections),stretching, forming and strengthening exercises -running (short sections 10-15 m), forming, strengthening and stretching exercises,sport game volleyball, elements of «hammer» technique and serving	4 2 2
	XI.	- running(short sections to 20 m), forming, stretching and strengthening exercise, volleyball serving and smatching - running in intervals 10x15 m, stretching, volleyball (game of 2 sets), male group: football tournament	4 4
	XII.	- «catch the ball» game, stretching and strengthening(Swedish ladder) - volleyball(game of 2 sets), male group: basketball of indoor football - table tennis for those who dont play volleyball - strengthening exercises whit skipping rope	6
	I.	- specific physical preparation for volleyball - running in intervals 10x20 m, stretching and strengthening on banches - volleyball(game of 2 sets), football for the male group, table tennis and skipping ropes	2 6
	III.	- general physical preparation, catch the ball,running(mixed) - catch the ball,stretching, forming exercises, strengthening of arms, legs and the shoulder area - volleyball tournament, male group indoor football and basketball	2 6
	IV.	- running-intervals, forming, strengthning and stretching exercise - volleyball tournament - male group: choice between basketball, volleyball and indoor football - table tennis, single and pairs	8
	V.	-rowing club «Iktus» court: running along the coast of Drava - running in place whit leaps and stretching - running in intervals 1500 m, - volleyball in female group - indoor football, male group	8
	VI.	- running(long sections) 2,5 km, stretching - indoor football for man, game 2x20 minutes	6

<b>Course title</b>	<b>Organic Chemistry</b>		
<b>Course code</b>	FT 121	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	II		
<b>Course lecturer</b>	Spomenka Kovač, PhD, assistant professor		
<b>Course associates</b>			
<b>Course content</b>	<p><u>Lectures:</u> Introduction. Stereochemistry of carbonil compounds. Alkanes. Alkenes. Alkynes. Benzene and reactions of arenes. Alkyl halides. Alcohols. Ethers. Carboxylic acids and carboxylic acid derivatives. Aldehydes and ketones. Amines. Phenols. Terpenes. Carbohydrates. Heterocyclic compounds. Polyfunctional carboxylic acids (dicarboxylic, oxy-, oxo-, amino-). Lipids.</p> <p><u>Seminars:</u> Nomenclature, stereochemistry and stoichiometric examples of organic compounds</p> <p><u>Labs:</u> Introduction exercises (melting point, steam destilation, extraction with indifferent and reactive solvent, crystallization). Synthesis (esterification, reduction). Natural products isolation (isolation of pigments and chromatography, lactose, oleic acid, piperine).</p>		
<b>General and specific knowledge acquired in course (objective)</b>	During this course student gets basic knowledge about the structure and reactivity of organic molecules, especially about mechanism of the reactions and the stereochemistry. He also learns about organic compounds common to living systems and food.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3	1	3
<b>(total)</b>	45	15	45
<b>Examination method</b>	Final exam is written and oral. During course student has 3 written tests that substitute a final exam.		
<b>Credits</b>	8	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. S. H. Pine: <i>Organska kemija</i>, Školska knjiga, Zagreb, 1994.</li> <li>2. V. Rapić: <i>Postupci priprave i izolacije prirodnih spojeva</i>, Školska knjiga, Zagreb, 1994.</li> <li>3. <i>Vodič kroz IUPAC-ovu nomenkalturu organskih spojeva</i>, preveli: Bregovec, Horvat, Majerski, Rapić, Školska knjiga, Zagreb, 2002.</li> <li>4. V. Rapić: <i>Nomenklatura organskih spojeva</i>, Školska knjiga, Zagreb, 2004.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. J. Clayden, N. Greeves, S. Warren and P. Wothers: <i>Organic Chemistry</i>, Oxford University Press, 2001.</li> <li>2. F. A. Carey: <i>Organic Chemistry</i>, Mc Graw Hill 2000.</li> <li>3. T. W. G. Solomons, C. B. Fryhle: <i>Organic Chemistry</i>, John Wiley &amp; Sons, New York, 2000.</li> <li>4. D. E. Lewis: <i>Organic Chemistry a Modern Perspective</i>, Brown Publishers USA 1996.</li> </ol>		

<b>Course title</b>	<b>Mathematics II</b>		
<b>Course code</b>	FT122	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food technology (Undergraduate study)		
<b>Semester</b>	II		
<b>Course lecturer</b>	Dragan Jukić, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Integral calculus: Definition and basic properties of the definite integral. Mean value theorem of integral calculus. Newton – Leibniz formula. The indefinite integral. Methods of integration (integration by parts, integration by substitution). Basic techniques of integration. Applications of integral calculus (area, solid of rotation, rectification, technical). Improper integrals.</p> <p>Ordinary differential equations: General and particular solution. First-order differential equations (variables-separable, homogeneous, first-order linear, Bernoulli and Riccati differential equation). Linear differential equations of the second order.</p> <p>Linear algebra: Vectors and vector algebra. Vector spaces. Linear dependence/independence of vectors. Basis. Decomposition of vector into components. Scalar product. Vector product of two vector. Scalar triple product. Matrices. Operations with matrices. Rank of matrices. Regular and inverse matrix. Determinants. Systems of linear equations. Gaussian algorithm. Solvability of systems of equations. Cramer's rule.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Introduce students to the basic ideas and methods of integral calculus, theories of differential equation and linear algebra which serve as a basis for other courses. Their basic terms will be dealt with during lectures in an informal way and their usage and application will be illustrated. During the practical work students will master certain techniques and they will be enabled to solve concrete problems.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		2
<b>(total)</b>	30		30
<b>Examination method</b>	Both lectures and labs are compulsory. The exam consists of written and oral exam and it is taken after the lectures and labs are finished. During the course tests will be given that can replace written and oral exam.		
<b>Credits</b>	5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. D. Jukić, R. Scitovski, Matematika I, Prehrambeno tehnološki fakultet, Odjel za matematiku, Osijek 2000.</li> <li>2. B. P. Demidović, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1986.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. M. Crnjac, D. Jukić, R. Scitovski, Matematika, Osijek, 1994.</li> <li>2. J. Pečarić i dr., Matematika za tehnološke fakultete, Zagreb, 1994.</li> <li>3. S. Kurepa, Matematička analiza 1 i 2, Tehnička knjiga, Zagreb, 1972.</li> <li>4. S. Kurepa, Uvod u linearnu algebru, Vektori – matrice – grupe, Školska knjiga, Zagreb, 1978.</li> <li>5. V. Devide i dr., Riješeni zadaci iz više matematike, Školska knjiga, Zagreb, 1979.</li> </ol>		

<b>Course title</b>	<b>Engineering Thermodynamics</b>		
<b>Course code</b>	FT123	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	II		
<b>Course lecturer</b>	Bernarda Šeruga, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Basic concepts of thermodynamics and definitions. Thermodynamic and energy properties of state. Ideal gas. Ideal gas laws. The first law of thermodynamics. Investigation of basic thermodynamic processes. The isochoric process, the isobaric process, the isothermal process, the adiabatic process and the polytrophic process. Thermodynamic properties of real gasses and liquids. Compression and expansion processes. The Second law of Thermodynamics. Cycles. Concept of thermal efficiency. Cycle of internal and external combustion engines. Cycle of steam power plants. Cycles of refrigerating units. Cycles of liquefaction of gasses Thermodynamic properties of humid air.</p> <p>Labs: Analyse of numerical examples, which are compatibility with theoretical programme. Engineering calculation of processes, appliances and production facilities.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The course Engineering Thermodynamics of the undergraduate study covers the fundamentals of the general thermodynamics principles and their engineering application. The aim is to offer the students a wide knowledge of the fundamental principles coordinated with their application what will be helpful to them in further study as well as in their work.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Written and/or oral exam. Written completion proof at least two times per semester.		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. R. Budin, A. Mihelić – Bogdanić: <i>Osnove tehničke termodinamike</i>. Školska knjiga, Zagreb, 1990.</li> <li>2. I. Galović: <i>Termodinamika I i II dio</i>. Školska knjiga, Zagreb, 2003.</li> <li>3. E. Hnatko: <i>Osnove termodinamike i termotehnike</i>. Strojarski fakultet, Slavonski Brod, 1995.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. F. Bošnjaković: <i>Nauka o toplini I i II dio</i>. Tehnička termodinamika, Zagreb, 1990.</li> <li>2. A.Y. Cengel, M.A. Boles: <i>Thermodynamics: An Engineering Approach</i>. McGraw-Hill, Inc., 1998.</li> </ol>		

<b>Course title</b>	<b>Machine Elements</b>		
<b>Course code</b>	FT124	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>			
<b>Course lecturer</b>	Tomislav Mrčela, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	Material structure, material forms and choices, characteristics, Materials mechanic form, plastics, creeping, exertion, fracture, toil. Heating and surface processing, calcinations, cementation process, nitration, chemical erosion, welding, forms and procedures, Machine elements, bolts, nuts, wedges, springs, shafts, spindles, bearings, coupling, transmitting mechanism of power, belted, chain transmitting, gearing. Analyse, dimensioning and principles of plaints, cylinder walls, cylinders, pipes, pipe-arc, flanges, gland, compression pots and, pillar Transports devices , pipelines, armatures, pumps, fan, compressors, batching, transporters and elevators, Heating plans.		
<b>General and specific knowledge acquired in course (objective)</b>	During the course students acquire general knowledge of machine elements systems, until the special knowledge of norms and standards is used in designing technological operations in food industry.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Course is successfully resolved trough two preliminary exams during presentations or in the end of presentation by written and oral exam		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	K.H.Decker, Elementi strojeva, Tehnička knjiga, Zagreb 2003.		
<b>Recommended reading</b>	Tehnička enciklopedija: HLZ-Zagreb, Zagreb 1993.		

<b>Course title</b>	<b>Informatics</b>		
<b>Course code</b>	FT125	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>			
<b>Course lecturer</b>	Ninoslav Novak, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	Information technology and digital society. Computing system. Data and information. Hardware. Software. People. Organization. Communication. Algorithm and computer programming. Model of computing system. Working memory. Equipment or data storing. Data structure. Physical and logical data organization. Operational systems. Communication and computer network. Role and tasks of information systems. Management of information systems. Data mining and storing. Internet and e-business.		
<b>General and specific knowledge acquired in course (objective)</b>	To offer students basic knowledge of information technology and to master the basic skills in using computers with an aim of acquiring specialized knowledge necessary for management of business information. Specific competencies are developed through seminar papers and special assignments according to students' interests.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		1
<b>(total)</b>	30		15
<b>Examination method</b>	oral exam		
<b>Credits</b>	3	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	K.H.Decker, Elementi strojeva, Tehnička knjiga, Zagreb 2003.		
<b>Recommended reading</b>	Tehnička enciklopedija: HLZ-Zagreb, Zagreb 1993.		

<b>Course title</b>	<b>Physical Chemistry</b>		
<b>Course code</b>	FT211	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate Study)		
<b>Semester</b>	III		
<b>Course lecturer</b>	Marijan Šeruga, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p><u>Lectures:</u> Perfect and real gases. Basic concepts of chemical thermodynamics (internal energy, enthalpy, entropy, free internal energy, free enthalpy, chemical potential). Basic laws of chemical thermodynamics (the zeroth, the first, the second and the third law of thermodynamics). Phase equilibriums and phase transitions. Colligative properties of solutions. The depression of freezing point, the elevation of boiling point, osmosis. Phase boundary equilibriums. Adsorption. The kinetics of physical processes. Viscosity. Electrolyte solutions and their properties. Kinetics and mechanisms of chemical reactions. Colloid systems. Gels, emulsions, foams. Structure and stability of colloid systems. Food-colloid systems and their properties.</p> <p><u>Labs:</u> Distillation. Adsorption. Viscosity. Chemical kinetics. Conductometry. Potentiometry. Colorimetry. Preparation, precipitation and properties of colloid solutions.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Basic knowledge from the field of chemical thermodynamics and regarding processes which take place in solutions, colloid systems and on the phase boundary. The mentioned concepts represent the basis needed for further comprehension and study of the courses of food technology, food engineering and process engineering.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Oral or two written exams during the semester.		
<b>Credits</b>	5,5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. R. Brdička: <i>Osnove fizikalne kemije</i>. Školska knjiga, Zagreb, 1969.</li> <li>2. P.W. Atkins, J. de Paula: <i>Atkins's Physical Chemistry, Seventh Edition</i>. Oxford University Press, Oxford, 2002.</li> <li>3. P.W. Atkins, C.A. Trapp, M.P. Cady, C.J. Giunta: <i>Student's solutions manual to accompany Atkins's Physical Chemistry, Seventh Edition</i>. Oxford University Press, Oxford, 2002.</li> <li>4. M. Šeruga: <i>Laboratorijske vježbe iz fizikalne kemije</i>. Osijek, 1988.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. I. Mekjavić: <i>Fizikalna kemija 1</i>. Školska knjiga, Zagreb, 1996.</li> <li>2. I. Mekjavić: <i>Fizikalna kemija 2</i>. Golden marketing, Zagreb, 1999.</li> </ol>		

<b>Course title</b>	<b>General Microbiology</b>		
<b>Course code</b>	FT212	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	III		
<b>Course lecturer</b>	Marija Halt, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Fundamental microbiology concepts. Shapes, morphology and microbial reproduction. Life functions of microorganisms. Nutrition and microbial specialization of food selection. Energy supplies of microbial cell. Biosynthesis and microbial cell growth. Metabolic pathways of carbohydrates, lipids and proteins. Microbial cell products in aerobic and anaerobic conditions. Environmental influence on microbial growth and reproduction. Microbial classification.</p> <p><u>Labs:</u>  Laboratory accessories and microscope. Sterilization and sterilization equipment. Nutrition media and cultivation of microorganisms. General characteristic and representatives of molds, yeasts and actinomycetes. Isolating pure cultures of microorganisms. Determination of bacteria, yeasts and moulds.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The course introduces students to morphology, ecology, microbial metabolism, classification, and microbial cell products in aerobic and anaerobic conditions.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	oral plus two written (mid-term and final ) exams		
<b>Credits</b>	5,5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. S. Duraković: <i>Opća mikrobiologija</i>. Prehrambeno tehnološki inženjering, Zagreb, 1996.</li> <li>2. S. Duraković, S. Redžepović: <i>Uvod u opću mikrobiologiju</i>, knjiga prva. Kugler, Zagreb, 2002.</li> <li>3. S. Duraković, L. Duraković: <i>Priručnik za rad u mikrobiološkom laboratoriju</i>, I. dio- knjiga prva. Durieux, Zagreb, 1997.</li> <li>4. S. Duraković, L. Duraković: <i>Priručnik za rad u mikrobiološkom laboratoriju</i>, I. dio- knjiga druga. Durieux, Zagreb, 1997.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. S. Duraković, L. Duraković: <i>Specijalna mikrobiologija</i> Durieux, Zagreb, 2000</li> <li>2. S. Duraković: <i>Primjenjena mikrobiologija</i>. Prehrambeno tehnološki inženjering, Zagreb, 1996.</li> </ol>		

<b>Course title</b>	<b>Transport Phenomena</b>		
<b>Course code</b>	FT213	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	III		
<b>Course lecturer</b>	Srećko Tomas, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Physical basis. Newton's law of viscosity. General conservation law. Mass and energy transport mechanisms. Momentum transfer. Continuity equation. Bernoulli equation. Flow pattern and Reynolds number. Mechanical energy loss. Motion of fluid around the body. Flow in the mixing tank. Flow through the packed beds. Transport of liquids. Transport of gases. Transport of solids. Heat transfer. Heat transfer by conduction. Heat transfer by convection. Application the boundary layer theory for convection heat transfer analysis. Heat transfer in the mixer. Overall heat transfer. Heat transfer by radiation. Heat transfer equipment. Mass transfer. Mass transfer by diffusion. Mass transfer by convection (turbulent mass transfer). Application the boundary layer theory for convection mass transfer analysis. Analogy of momentum, heat and mass transfer.</p> <p><u>Labs:</u> Audio-practices – solution of the problems that related with transport phenomena; laboratory and industrial</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Transport phenomena are concerned with the study of momentum, heat and mass transfer with a unified approach to the transfer process. Knowledge of transfer process is fundamental for the understanding of process engineering and applied sciences.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	4		2
<b>(total)</b>	60		30
<b>Examination method</b>	Written, and oral if necessary. Parts of exam will be held during the semester. Each part of exam contains two teaching units.		
<b>Credits</b>	7	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. E. Sokele: <i>Transport fluida</i>. Interna skripta, Osijek, 1999.</li> <li>2. E. Sokele: <i>Prijenos topline</i>. Interna skripta, Osijek, 1998.</li> <li>3. S. Tomas: <i>Formule, dijagrami i tablice – Prijenos tvari i energije</i>. Interna skripta, Osijek, 1998.</li> <li>4. S. Tomas, M. Planinić: <i>Prijenos tvari i energije - Mapa uređaja</i>. Interna skripta, Osijek, 1999.</li> <li>5. S. Tomas, M. Planinić: <i>Prijenos tvari</i>. Interna skripta, Osijek, 2000.</li> <li>6. K. Ražnjević: <i>Termodinamičke tablice</i>. Svjetlost, Sarajevo, 1989.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. R. S. Brodkey, H. C. Hershey: <i>Transport Phenomena</i>. McGraw-Hill, New York, 1988.</li> <li>2. J. M. Coulson, et al.: <i>Chemical Engineering I, III, IV</i>. Pergamon Press, Oxford. 1999.</li> <li>3. R. H. Perry, D. W. Green: <i>Perry's Chemical Engineer's Handbook</i>. 7<sup>nd</sup> Ed, McGraw-Hill, New York, 1997.</li> <li>4. A. F. Mills: <i>Basic Heat &amp; Mass Transfer</i>. 2nd ed., Prentice Hall, Upper Saddle River, New Jersey, 1999.</li> <li>5. J. Welti-Chanes, J.F. Velez-Ruiz, G.V. Barbosa-Canovas: <i>Transport Phenomena in Food Processing</i>. CRC Press LLC, Boca Raton, London, New York, Washington D.C., 2003.</li> </ol>		

<b>Course title</b>	<b>Biochemistry</b>		
<b>Course code</b>	FT214	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	III		
<b>Course lecturer</b>	Vladimir Mrša, PhD, full professor		
<b>Course associates</b>	Irena Landeka, PhD, assistant professor		
<b>Course content</b>	<p><u>Lectures:</u> Introduction to biochemistry. Amino acids. Proteins: structure and function. Enzymes: active site. Kinetics. Inhibitors. Nucleotides. Nucleic acids: structure of DNA and RNA. DNA duplication. Transcription. Protein biosynthesis. Polysaccharides: structure and role. Lipids: structure and role. Cell membranes. Energetics of cellular reactions. Metabolism. Glycolysis. Citric acid cycle. Respiration. ATP synthesis. Gluconeogenesis. Pentose-phosphate cycle. Glycogen metabolism. Degradation and synthesis of fatty acids. Photosynthesis and Calvin cycle. Urea cycle.</p> <p>Seminars: Problems and calculations on: ionisation of amino acids and proteins, enzyme kinetics, protein biosynthesis.</p> <p><u>Labs:</u> Protein assay. Enzyme activity and kinetics. Protein purification. Protein electrophoresis. Computer simulation of the protein purification process.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Basic knowledge required for understanding microbiology, food science and food technologies. Basic skills in working with proteins and enzymes in a standard biochemical laboratory.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	4		2
<b>(total)</b>	60		30
<b>Examination method</b>	Written and oral, with two partial exams during the semester.		
<b>Credits</b>	7	<b>Language</b>	English
<b>Compulsory reading</b>	Stryer L.: Biokemija, II ed. (Croatian translation), Školska knjiga (1991)		
<b>Recommended reading</b>	Mathews, CK and Van Holde, K.E.: Biochemistry, 2. ed., Benjamin/Cummings Publishing (1996)		
	Voet D.D. and Voet J.G.: Biochemistry, John Wiley & Sons (1995).		

<b>Course title</b>	<b>Ecology</b>		
<b>Course code</b>	FT215	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food technology (Undergraduate study)		
<b>Semester</b>	III		
<b>Course lecturer</b>	Mirko Kuleš, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Basic terms of pollution and environmental protection. Basic ecological terms. Human population and food. Genetic modified organisms. Energy and environment. Ecology efficiency. Raw materials and solid waste. Chemicals and the biosphere. Air protection from pollution. Air pollution from stationary sources. Air pollution from mobile sources. Water pollution by urban wastewater. Noise as environmental pollution. Radioactive contamination and decontamination of living environmental. Paper and cardboard recycling. Organic waste recycling. Metallic waste recycling. Rubber and plastic recycling. International and national regulative in environmental protection. Development and environment.</p> <p>Determination of basic parameters of ecosystem on the field. Visit to solid waste dump. Visit to water-supply company. Visit to industrial plants for wastewater purification. Visit to paper recycling plant. Visit to plastic packing recycling plant.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Familiarizing with composition and ecological processes in atmosphere, lithosphere and hydrosphere. Understanding the effect of different types of polluting the environment and human health. Familiarizing with processes in environment protection. Environmental protection and legislative.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		1
<b>(total)</b>	30		15
<b>Examination method</b>	Oral examination. Two written completion proof through semester		
<b>Credits</b>	3	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. H.F.Lund,: <i>Industrial Pollution Control Handbook</i>, McGraw-Hill, New York.1971.</li> <li>2. R.Klepac: <i>Osnove ekologije</i>, JUMENA, Zagreb, 1988.</li> <li>3. V. Glavač,: <i>Uvod u globalnu ekologiju</i>, MZOPU, Zagreb, 1999.</li> <li>4. <i>Zakon o zaštiti okoliša</i>, Službeni list RH 82/94, NN.</li> <li>5. D. Tuhtar: <i>Zagađenje zraka i vode</i>, Svjetlost, Sarajevo, 1990.</li> </ol>		
<b>Recommended reading</b>	1. M.L.Davis, D.A. Cornwell, <i>Introduction to Environmental Engineering</i> , McGraw Hill, New York, 1998.		

<b>Course title</b>	<b>English Language</b>		
<b>Course code</b>	FT216	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	III + IV		
<b>Course lecturer</b>	Lidija Obad, MA, senior lecturer		
<b>Course associates</b>			
<b>Course content</b>	In the course of the second year students deal with more complex texts related to their professional courses. The topics are the following: microbiology, microbes, structure and function of bacteria, microbes in food industry, viruses, biochemistry, proteins and carbohydrates, food quality control, influence of packaging on food, food analysis. Students are also taught to selectively search for information in various scientific discourses so as to orally and individually expose certain topics which serve as an extension to already covered topics. The focus is on summary writing of specialized texts using all means for achieving text cohesion and coherence.		
<b>General and specific knowledge acquired in course (objective)</b>	The course objective is to continue developing all four language skills but the emphasis is on writing skills, comprehension and interpretation of more complex professional texts, detection of topic sentences and cohesive devices and expansion of specialized vocabulary .		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	1+1		1+1
<b>(total)</b>	30		30
<b>Examination method</b>	The exam is both oral and written taken at the end of the third and fourth semester along with several tests during the academic year..		
<b>Credits</b>	1+1	<b>Language</b>	English
<b>Compulsory reading</b>	1. L.Obad: <i>Radni materijali iz engleskog jezika za studente druge godine</i> , PTF, Osijek, 1997. 2. Ž.Bujas: <i>Veliki englesko-hrvatski rječnik</i> , Globus Zagreb, 1999.		
<b>Recommended reading</b>	1. S.Greenal: <i>Reward Upper-Intermediate</i> , Heinemann, 1997. 2. R.Murphy: <i>English Grammar in Use</i> , CUP, 1985. 3. Ž.Bujas: <i>Veliki hrvatsko-engleski rječnik</i> , Globus, 1999.		

<b>Course title</b>	<b>German Language</b>		
<b>Course code</b>	FT216	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	III + IV		
<b>Course lecturer</b>	Spasenija Moro, BA, lecturer		
<b>Course associates</b>			
<b>Course content</b>	Students are introduced to more complex texts in the fields of chemistry, ecology and diet to upgrade the specialized lexis (Diet habits, Milk, Food analysis, Environment preservation, Chemical processes and Waste waters, Water in industry, Organic chemistry, Proteins, Fats and carbohydrates). More grammatical structures are dealt with such as dependent clauses, passive voice that is practised in summary writing. Students are taught to use different reading techniques in text comprehension and interpretation, to select primary information, to pose questions at the sentence and text level.		
<b>General and specific knowledge acquired in course (objective)</b>	The course objective is to enable students to comprehend more complex texts in the fields of specialization due to reading techniques, to develop writing skills in summary writing as a form of text interpretation.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	1+1		1+1
<b>(total)</b>	30		30
<b>Examination method</b>	Written exam twice in semester and after the second semester both written and oral exams.		
<b>Credits</b>	1+1	<b>Language</b>	Croatian, German
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. S. Moro: <i>Radni materijali iz njemačkog jezika II</i> (zbirka tekstova s razrađenim vježbama i rječnikom), PTF, Osijek, 2004.</li> <li>2. I. Medić: <i>Kleine deutsche Grammatik</i>, Školska knjiga, Zagreb, 1999.</li> <li>3. T. Marčetić: <i>Deutsche Grammatik im Ueberblick</i>, Školska knjiga, Zagreb, 1999.</li> <li>4. M. Uroić, A. Hurm: <i>Njemačko-hrvatski rječnik</i>, Školska knjiga, Zagreb, 1999.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. Z. Glovacki-Bernardi: <i>Osnove njemačke gramatike</i>, Školska knjiga, Zagreb, 1999.</li> <li>2. B. Jakić, A. Hurm: <i>Hrvatsko-njemački rječnik</i>, Školska knjiga, Zagreb, 1991.</li> </ol>		

<b>Course title</b>	<b>Physical Training and Health Education</b>		
<b>Course code</b>	FT217	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	III and IV		
<b>Course lecturer</b>	Juraj Jurković, BSc, lecturer		
<b>Course associates</b>			
<b>Course content</b>	Students are divided in two groups, male and female. The classes are held at the Students Center Gym, winter and summer semester 2x30 classes. As in the first academic year, non obligatory visits to the swimming pool (3-4 times) are organized, and with the students of the second year 2-3 visits to the town skating-ring.		
	-warming-up activity, running in place, leaps, squatting, work in pairs, forming, stretching exercises, whit background music(aerobic)		
	Working out at the Gym: -getting familiar whit each device, way of using, setting up, porpose and all the accidents that might happen - working on the device using 20% of the body weight, whit frequency of performance 10-30 x - working on the device using 30% of the body weight, whit frequency 15x, and pause 10-15 min (two series) - working on the device using 20% of the body weight, frequency 15x, on 18 work positions - working on the device using 20% of the body weight whit time limitation of 20-30 sec - individual work according to own wishes and needs		
	-in the summer semester, when the weather is nice, we spend last 15-20 minutes running longer sections( 1000-1500 m ), at the High School playground		
<b>General and specific knowledge acquired in course (objective)</b>	Students of the faculty are involved in sport competitions at the University level in the following disciplines: indoor football, volleyball (man and women), basketball (man), swimming (single and relay race, man and women), shooting (man and women), cross and for next year we are planning to start with rowing – the racing eight.		
	The gathering of students – sportsman is organized by The community of students – sportsman F.I.S.E.C. ( Food industry students european council Osijek), which involves the leaders of individual sections in such a way that students also take part in the organisation. F.I.S.E.C. is also for the most part a place at the faculty where students meet, where thay have their own computer room (phone: 031/224-352, fax 031/207-115, e-mail : <a href="mailto:crofisec@ptfos.hr">crofisec@ptfos.hr</a> ). Every year at the end of May or the beginning of July, so called «Tehnologijada» take place competitions among students of Faculty of Food Technology of the Republic of Croatia. We regulary take part in these competiitions, which include: indoor football (man and women), basketball (man and women), volleyball, shooting, running 100 and 1000 m , swimming 50 m, and the scientific part.		
	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>			2
<b>(total)</b>			30

<b>Course title</b>	<b>Nutritional Science</b>		
<b>Course code</b>	FT221	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Milena Mandić, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	Essentials of gastrointestinal tract, food digestion, absorption and metabolism Energy requirements (basal metabolic needs, food intake effect, physical activity needs, age, climate) Nutrients (proteins, lipids, carbohydrates, vitamins, minerals, water) Foodstuffs of plant origin (cereals, fruits, vegetable) and animal origin (meat, fish, milk and eggs) Genetically modified foods Essentials of functional foods Essentials of meal planning Food-borne toxicants (biological, chemical and radioactive components) Nutrition quality and the state of nourishment		
<b>General and specific knowledge acquired in course (objective)</b>	Nutrition has progressed from the prevention of dietary deficiency to the promotion of a state of well-being and health and the reduction of the risk of disease. The Nutrition Science has to accept this challenge and through the education of nutritionists, food technologists, other experts, and even nation has to influence public health, and prevention of chronic, non-communicable diseases.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		
<b>(total)</b>	45		
<b>Examination method</b>	During the semester the students will be included in course through discussion and making seminars (the result of this work will influence in the final mark), and the exam will be oral.		
<b>Credits</b>	4,5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	M.L. Mandić: <i>Znanost o prehrani</i> , Prehrambeno tehnološki fakultet, Osijek, 2003.		
<b>Recommended reading</b>	S. Rodwell Williams: <i>Essentials of Nutrition and Diet Therapy</i> , Mosby, St.Louis, 1999.		

<b>Course title</b>	<b>Food Microbiology</b>		
<b>Course code</b>	FT222	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Marija Halt, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Application of microbial cultures in food industry and elsewhere. Food contamination during manufacturing process. Spoilage microorganisms of cereals, flour, bread and pasta, vegetables and fruit, milk and dairy products, meat and meat products, fish and fish products, heat preserved meat products, fruit and vegetables etc. in hermetically sealed packing.</p> <p>Microorganisms in spices and other additives used in food industry.</p> <p>Microorganisms in air and water. Food contamination of pathogenic microorganisms. Hazard analysis and critical control points. Prevention of growth and destruction of microorganisms in food. Regulations on microbial food safety.</p> <p><u>Labs:</u> Microbiological control of some food, air and water. Isolation and identification of some pathogenic microorganisms. Hygiene control of food industry processing units.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The course introduces students to food contamination during manufacturing process, prevention of growth and destruction of microorganisms found in food, and application of microbial cultures in food industry and elsewhere.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	oral, plus two written ( mid. term and final ) exams		
<b>Credits</b>	5,5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. S. Duraković, F. Delaš, B. Stilinović, L. Duraković: <i>Moderna mikrobiologija namirnica</i>-knjiga prva. Kugler, Zagreb, 2002.</li> <li>2. S. Duraković, F. Delaš, L. Duraković: <i>Moderna mikrobiologija namirnica</i> namirnica-knjiga druga. Kugler, Zagreb, 2002.</li> <li>3. S. Duraković: <i>Primjenjena mikrobiologija</i>. Prehrambeno-tehnološki inženjering, Zagreb, 1996.</li> <li>4. S. Kalenić, E. Mlinarić-Missoni: <i>Medicinska bakteriologija i mikologija</i>. Prehrambeno tehnološki inženjering, Zagreb, 1995.</li> <li>5. G.J. Banwart: <i>Basic Food Microbiology</i>. New York, 1989.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. S. Duraković, L. Duraković: <i>Mikrobiologija namirnica osnove i dostignuća</i>-knjiga prva. Kugler, Zagreb, 2001.</li> <li>2. S. Duraković, L. Duraković: <i>Mikrobiologija namirnica osnove i dostignuća</i>-knjiga druga. Kugler, Zagreb, 2001.</li> </ol>		

<b>Course title</b>	<b>Food Quality Control</b>		
<b>Course code</b>	FT223	<b>Status Coursea</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Ljiljana Primorac, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Food legislation, safety and quality aspects. Statistical quality control: statistical process control, control charts, sampling procedures. Introduction to food analysis. Croatian regulations and international standards related to food analysis. Evaluation of analytical data. Sampling and sampling preparation. Moisture and total solids analysis. Ash analysis. Fat analysis. Protein analysis. Carbohydrate analysis. Vitamin analysis. Mineral analysis. Fat Characterization. Protein separation and characterization. Application of enzymes in food analysis. Immunoassays. Sensory analysis.</p> <p><u>Labs:</u>  Determination of moisture and total solids. Determination of ash content. Volumetric determination of sugars by cuper reduction. Determination of sugars by HPLC. Determination of fat by the Soxhlet method. Determination of starch (Ewers). Determination of nitrogen and protein by the Kjeldahl method using the Kjeltex instrument. Determination of alcohol in beverages by gas chromatography (GC). Determination of ascorbic acid in fruit and vegetables by titration (DCP).</p>		
<b>General and specific knowledge acquired in course (objective)</b>	<p>The course introduces student to legislative bases of control of food safety and quality, as well as to statistical and analytical methods used to this effect.</p> <p>Students will learn to analyse and evaluate composition of food product and apply food regulations.</p>		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		3
<b>(total)</b>	45		45
<b>Examination method</b>	Oral and written exam with two written exams over the course of semester. Final colloquium is needed.		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. M. L. Mandić, Lj. Primorac, T. Klačec: <i>Nadzor kakvoće u prehrambenoj industriji</i>. Prehrambeno tehnološki fakultet, Osijek, 1997.</li> <li>2. J. Trajković, M. Mirić, J. Baras, S. Šiler: <i>Analize životnih namirnica</i>. Tehnološko- metalurški fakultet. Beograd, 1983.</li> <li>3. Standards, regulations,</li> </ol>		
<b>Recommended reading</b>	1. S. S. Nielsen: <i>Food Analysis</i> .Kluwer Academic/Plenum Publishers, New York, Boston, Dordrecht, London, Moscow, 2003.		

<b>Course title</b>	<b>Package And Food Packaging</b>		
<b>Course code</b>	FT224	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Marijan Šeruga, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p><u>Lectures:</u> The role and importance of a package. Systematisation and function of packages. The elements important for creating of a package. Packaging materials: metals (tin-plate, aluminium, chromium coated steel, steel), glass, plastic packaging materials, laminated food packaging materials, paper, cardboard and paperboard, wood, textile. Biodegradable packaging materials. Possible shapes of a package. Packaging systems for a particular type of foodstuff. Interactions in a food-package-environment systems. Permeation and migration processes. New features in a packaging technology of food products. Active and intelligent packaging. Modified atmosphere packaging. Food packaging and environment. Ecologically acceptable package. Recycling of food packaging. Safety and legislative regulations related to the usage and application of a package in a food industry.</p> <p><u>Labs:</u> determination of pH value of a paper package, mass of a tin coating by gravimetric method (Clark's method), porosity of laque on a metal package by a non-destructive method (method by Ettinger), resistance of glass to acids and base, global migration from a packaging material.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The aim of this study is to familiarize the students with packaging materials that are used in food industry together with packaging technology. Also students will learn about interactions in food-package-environment systems.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		1
<b>(total)</b>	30		15
<b>Examination method</b>	Written exam and/or 2 written exams during the semester.		
<b>Credits</b>	3,5	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. G. L. Robertson: <i>Food Packaging-Principles and practice</i>. Marcel Dekker, New York, 1993.</li> <li>2. P. Ackerman, M. Jägerstad, T. Ohlsson: <i>Foods and Packaging Materials-Chemical Interactions</i>. The Royal Society of Chemistry, Cambridge, 1997.</li> <li>3. R. Coles, D. McDowel, M. J. Kirwan: <i>Food Packaging Technology</i>. Blackwell Publishing, CRC Press, New York, 2003.</li> <li>4. R. Ahvenainen: <i>Novel Food Packaging Techniques</i>. Woodhead Publishing, Cambridge, 2003.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. N. Stričević: <i>Suvremena ambalaža 1</i>. Školska knjiga, Zagreb, 1982.</li> <li>2. N. Stričević: <i>Suvremena ambalaža 2</i>. Školska knjiga, Zagreb, 1983.</li> </ol>		

<b>Course title</b>	<b>Raw Materials of Animal Origin</b>		
<b>Course code</b>	FT225	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Jovica Hardi, PhD, associate professor		
<b>Course associates</b>	Dragan Kovačević, PhD, associate professor		
<b>Course content</b>	<p><u>Lectures:</u>  Situation and perspective in food industry production of raw materials of animal origin in Croatia and EU. Milk: production of milk, factors influencing the composition and quantity of milk. Milking and transport to the processing. Composition of milk, basic ingredients and importance of composition to processing. Nutritive value of milk. Eggs: chemical composition, classes, quality, usage in food industry. Honey: physical-chemical properties, species, usage in food industry. Raw materials for production of meat and fish products (meat, fish, spices, additives, supplements). Anatomy and chemical composition, nutritional and protective characteristics of meat and fish. Types and breeds of cattle, poultry and game. Transport of animals to the slaughter house. Market classification and characterization of meat. Fish systematisation. Cattle, poultry, game and fish diseases.</p> <p><u>Labs:</u>  Physical-chemical methods of analysis of milk. Evaluation of freshness and hygienic quality of milk. Meat industry exercises. Writing a seminar paper - technological production calculation of specific meat or fish products.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Knowledge of anatomy, chemical composition and nutritional characteristics of raw materials of animal origin is essential for choosing adequate of technological operations, conserving, packaging and preservation methods. Insight in area of animal diseases, especially zoonoses, current legislation and current concepts of veterinary-sanitary inspection in the meat, dairy and fish processing industries in connection with consumer protection and the precondition for export to the EU.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		1
<b>(total)</b>	30		15
<b>Examination method</b>	Accepted exercises, reports Oral exam		
<b>Credits</b>	3,5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. S. Miletić: <i>Mlijeko i mliječni proizvodi</i>. Hrvatsko mljekarsko društvo, Zagreb, 1994.</li> <li>2. J. Havranek, V. Rupić: <i>Mlijeko od farme do mljekare</i>. Hrvatska mljekarska udruga, Zagreb, 2003.</li> <li>3. Kovačević, D. (2005): <i>Sirovine prehrambene industrije - meso i riba</i>, Prehrambeno tehnološki fakultet, Osijek (university textbook).</li> <li>4. Treer, T., Safner, R., Aničić, I., Lovrinov, M. (1995): <i>Ribarstvo</i>, NZ Globus, Zagreb.</li> <li>5. Uremović, Z., Uremović, M., Pavić, V., Mioč, B., Mužić, S., Janječić, Z. (2002): <i>Stočarstvo</i>, Agronomski fakultet Sveučilišta u Zagrebu, Zagreb.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. Lj. Tratnik: <i>Mlijeko – tehnologija, biokemija i mikrobiologija</i>. Hrvatska mljekarska udruga, Zagreb, 1998.</li> <li>2. D. Sabadoš: <i>Kontrola i ocjenjivanje kakvoće mlijeka i mliječnih proizvoda</i>. Hrvatsko mljekarsko društvo, Zagreb, 1996.</li> <li>3. S. Duraković: <i>Prehrambena mikrobiologija</i>. Medicinska naklada, Zagreb, 1991.</li> <li>4. Kovačević, D. (2001): <i>Kemija i tehnologija mesa i ribe</i>, Prehrambeno tehnološki fakultet, Osijek (university textbook).</li> <li>5. Pierson, M. D., Corlett, D. A. (1992): <i>HACCP - Principles and Applications</i>, Van Nostrand Reinhold, New York .</li> </ol>		

<b>Course title</b>	<b>Raw Plant Materials</b>		
<b>Course code</b>	FT226	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate Study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Vlasta Piližota, PhD, full professor		
<b>Course associates</b>	Žaneta Ugarčić-Hardi, PhD, full professor Drago Šubarić, PhD, assistant professor		
<b>Course content</b>	Physical and chemical properties of plant-based raw materials (fruit, vegetables, cereals, leguminoses, plants for oil extraction, sugar beet, sugar cane, kakao), with emphasis on parameters influencing final food product quality. Harvesting and basic storage conditions for consuming or/and processing. Most important species and cultivars. Morphology and structure, chemical composition and significance of particular components in evaluation of technological quality. Selected laboratory analysis (experiments). Physical and chemical analytical methods for evaluation of grain, fruits and vegetables, sugar beet process quality.		
<b>General and specific knowledge acquired in course (objective)</b>	Chemical composition of plant-based raw materials with emphasize on most important factors for certain production and products.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		1
<b>(total)</b>	45		15
<b>Examination method</b>	Written or oral exam at the end of lectures or 3 oral exams during lectures		
<b>Credits</b>	5	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	1. Ž. Ugarčić-Hardi: <i>Poznavanje sirovina u prehrambenoj industriji. Biljni dio: Žitarice, mahunarke, uljarice.</i> (interna skripta). Faculty of Food Technology University of Josip Juraj Strossmayer in Osijek, 2001.		
<b>Recommended reading</b>	1. R. Lásztity: <i>Cereal Chemistry.</i> Akadémiai Kiadó, Budapest, 1999.		

<b>Course title</b>	<b>Processes In Food Industry</b>		
<b>Course code</b>	FT311	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	V		
<b>Course lecturer</b>	Andrija Pozderović, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Terms definition of: food technology, food science, food engineering, unit processes and technological processes. Physical and thermophysical properties of food, different systems density, specific heat, latent heat, enthalpy, heat conduct, heat diffusion, dielectric properties, viscosity properties, rheology principles. Fundamentals of food preservation processes; food deteriorations, principles of food preservation: pasteurization, blanching, thermic sterilization, cooling preservation and in controlled atmosphere, freezing, preservation, preservation by additives, biological preservation, ionizing radiation preservation, nonthermal methods of preservation, principles of liquid foods concentration processes, concentration by evaporation, freezing concentration. Theoretical basics of dehydration processes of food, process phases, water forms in food, water activity, isotherms sorption, changes during dehydration, stability of dehydrated food, ability of rehydration. Principles of membrane processes, reverse osmosis, nanofiltration, ultrafiltration and microfiltration. Extrusion fundamentals.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The course is designed to give the basic knowledge of physical and thermophysical properties of food. The course also provides the general knowledge of food deterioration reasons, principles of food preservation and basic of membrane separation processes.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3	1	2
<b>(total)</b>	45	15	30
<b>Examination method</b>	Written and oral examination of the whole subject matter at the end of semester or in the form of two written exams during semester and oral at the end of semester		
<b>Credits</b>	7	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. T. Lovrić: Processes in food industry with fundamentals of food engineering, Hinus, Zagreb 2003.</li> <li>2. D. R. Heldman, R. W. Hartel: Principles of Food Processing, Chapman and Hall, 1998.</li> <li>3. J. G. Brennan, J. R. Butters, N. D. Cowell and A. E. V. Lilley: Food Engineering Operations, Third edition, Elsevier applied science, 1990.</li> <li>4. D. R. Heldman: Food Process Engineering, Westport, Connecticut, 1975.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. G. V. Barbosa-Canovas, U. R. Pothakamury, E. Palon, B. G. Swanson: Nonthermal Preservation of Foods, Marcel Dekker, INC. 1998.</li> <li>2. C. P. Mallett: Frozen Food Technology, Blackie Academic &amp; Professional, 1992.</li> <li>3. N. D. Frame: Technology of Extrusion Cooking, Blackie Academic &amp; Professional, 1993.</li> <li>4. M. Mulder: Basic Principles of Membrane Technology, Kluwer Academic Publishers, 1996.</li> <li>5. R. P. Borwankar, C. F. Shoemaker: Rheology of Foods, Elsevier Applied Science, 1992.</li> </ol>		

<b>Course title</b>	<b>Water Technology And Wastewater Treatment</b>		
<b>Course code</b>	FT312	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	V		
<b>Course lecturer</b>	Mirko Kuleš, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Water quality. Physical indicators of water quality: temperature, odor and taste, color, turbidity, suspended solids, conductivity. Chemical indicators of water quality: total dissolved matters, acidity, alkalinity, water hardness, dissolved gases, organic matter, nutrients, metals, other chemical indicators. Biological indicators of water quality. Water classification. Technological water treatment: filtration, flocculation, iron and manganese removal, water disinfection. Ion exchange. Membrane processes. Technological shames: drinking water technology, food industrial water technology, cooling water, water boiler plant.</p> <p>Sources of water contamination: households, industry, rainfalls, cooling water. Pretreatment and primary treatment: sifting, fragmentation, equalization, precipitation. Secondary treatment: activated sludge, trickling filters, lagoons, anaerobic digestion. Tertiary treatment: physical, chemical, biological treatment.</p> <p><u>Labs:</u> Water analysis: pH value, conductivity, alkalinity, hardness, dissolved oxygen, chemical oxygen demand, biochemical oxygen demand, nitrogenous compounds, chlorides, sulfates, iron, arsenic. Hardness and carbon removal from water. Flocculation by JAR test.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Make the students familiar with physical-chemical properties of natural waters, water quality for particular purposes, regulations as well as with contamination of water and wastewater treatment.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		1
<b>(total)</b>	45		15
<b>Examination method</b>	Two written completion proof through semester, Written and oral examination.		
<b>Credits</b>	5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. AWWA: <i>Water Quality and treatment</i>, A Handbook of Community Water supplies; Fifth Edition by The American Water Works Association, 1999.</li> <li>2. S.Tedeschi, <i>Zaštita voda</i>, Hrvatsko društvo građevinskih inženjera, Zagreb, 1997.</li> <li>3. I.Gulić: <i>Kondicioniranje vode</i>, Hrvatski savez građevinskih inženjera, Zagreb, 2003.</li> <li>4. <i>Standard Methods for the Examination of Water and Wastewater</i>, 20th Edition, American Public Health Association, 1999.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. <i>Pravilnik o zdravstvenoj ispravnosti vode za piće</i>, Narodne novine br. 182/2004 .</li> <li>2. M.Kuleš, M.Habuda-Stanić, <i>Analiza vode</i>, PTF, Osijek, 2000.</li> </ol>		

<b>Course title</b>	<b>Food Chemistry</b>		
<b>Course code</b>	FT313	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	V		
<b>Course lecturer</b>	Vlasta Piližota, PhD, full professor		
<b>Course associates</b>	Spomenka Kovač, PhD, assistant professor		
<b>Course content</b>	What is food chemistry? Approach to the study of food chemistry. Chemical and biochemical reactions that can lead to alteration of food quality and safety. Food as dispersed system. Food components: Carbohydrates (Nonenzymic browning), Lipids, Amino acids, Peptides and Proteins, Vitamins, Elements, Pigments, Flavour compounds, Enzymes, in relation to their roles as parts of complex biochemical systems and as modified by handling, processing and environmental factors. Shelf life of foods.		
<b>General and specific knowledge acquired in course (objective)</b>	Analytical approach to the food chemistry, food formulation, processing and storage stability. Composition and properties of food. Determination of chemical and biochemical reactions that occur in food during handling, processing and storage.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		1
<b>(total)</b>	45		15
<b>Examination method</b>	Written reports during courses (semester) and at the end of courses oral exam.		
<b>Credits</b>	5	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. O.R. Fennema, Food Chemistry, 3<sup>rd</sup> ed., by Marcel Dekker, Inc, N.Y., 1996.</li> <li>2. Norman N. Potter, Joseph H. Hotchkiss, <i>Food Science</i> (3<sup>th</sup> ed.), Chapman&amp;Hall, New York, 1995.</li> <li>3. W. Baltes, <i>Lebensmittelchemie</i> (Dritte Auflage), Springer-Verlag Berlin, Heidelberg, 1992.</li> <li>4. H.-D. Belitz, W. Grosch; <i>Lehrbuch der Lebensmittelchemie</i> (4. Auflag), Springer-Verlag, Berlin, Heidelberg, 1992.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. A. L. Nelson, High – Fiber Ingredients, Eagan Press Handbook Series, 2003.</li> <li>2. F. J. Francis, Colorants, Eagan Press Handbook Series, 3003.</li> <li>3. P. R. Mathewson, Enzymes, Eagan Press Handbook Series.</li> <li>4. C. E. Stauffer, Fats and Oils, Eagan Press Handbook Series, 2003.</li> <li>5. Journals</li> </ol>		

<b>Course title</b>	<b>Process Measurements And Control</b>		
<b>Course code</b>	FT314	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	V		
<b>Course lecturer</b>	Josip Tomac, MS, senior lecturer		
<b>Course associates</b>			
<b>Course content</b>	<p>Measuring and its purpose. Process variable measurements and sensors. Instrumentation overview: industrial, process and laboratory. Measurements of mechanical (path, level, thickness, density, contraction, force, tension, angle, velocity, rotational speed, torque, power, flow, viscosity), thermic (temperature, quantity of heat, humidity), optical (photoelectrical, lightness) and other process quantities. Types and sources of noise. Practical examples.</p> <p>Automatic control and its purpose. Basic structure and elements of the control loop. Implementation of control system. Properties of controlled systems. Linearisation of characteristic curve. Dynamic behaviour of the systems and its mathematical description. Description of linear, continuous and time invariant systems in time and frequency domain. Laplace transform and transfer function. Bode diagram. Basic dynamic elements. Control loop and its characteristics. Control loop stability and methods of stability analysis. Performance indexes in time and frequency domain. Basic controller types. Control loop synthesis. Classic methods of synthesis of linear continuous control systems. Empirical rules for setting the controller parameters. Practical examples. Principles of digital implementation of control systems.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	<p>This course of study gives the basics of process measurements, description of system dynamic behaviour, structural presentation of the basic elements and systems of automatic control, and feedback system stability analysis. Additionally, the students acquire basic knowledge about control algorithm design and how to evaluate achieved control quality.</p> <p>In the laboratory exercises they gain skills in work with process measuring equipment, in using basic software tools for control system analysis and synthesis (Matlab), and learn about a methodology of practical control system implementation.</p>		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		
<b>(total)</b>	30		
<b>Examination method</b>	Final examination consists of the written and the oral examination, or of oral examination only for those students who have successfully solved written tests during semester.		
<b>Credits</b>	5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	Tomac, J.: Osnove automatske regulacije - predavanja, Fakultetska skripta, ETF, Osijek, 2004.		
<b>Recommended reading</b>	Šurina, T.: Automatska regulacija, Školska knjiga, Zagreb, 1991. Šantić, A.: Elektronička instrumentacija, Školska knjiga, Zagreb, 1988.		

<b>Course title</b>	<b>Economics Of Food Processing Industry</b>		
<b>Course code</b>	FT315	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food technology		
<b>Semester</b>	V		
<b>Course lecturer</b>	Dragan Kovačević, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	Basic economic definitions. Market economic and globalization. Macroeconomic and basic macroeconomic indicators in Croatia. Role of the government in modern economics. Food industry situation and perspective in Croatia and EU. Microeconomics: supply, demand and market. Market for food products in Croatia. Business in agriculture and food processing (legislation, state subsidies, institutions and non-government organizations). Management in food processing industry. Business ethics. Marketing in food industry. Market research. Investing and new products. Global trends influence on consumer behaviour (organic and functional food, ecological agriculture, food safety, increase in standards and purchasing power, etc.).		
<b>General and specific knowledge acquired in course (objective)</b>	Global trends (especially market liberalization), changes in consumer philosophy and standard of living, demand for better food quality and safety - determinants for development of food industry and new products. In the food industry, food technology engineers often work like managers, so fundamental knowledge in marketing, management and economic trends are very important for making quality business decisions. Also, it must be taken into account that a certain number of engineers will start their own business after graduation.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		
<b>(total)</b>	45		
<b>Examination method</b>	Oral and/or written exam; Continuous examination throughout semester – minimum 2 written exams		
<b>Credits</b>	5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. Samuelson, P. A., Nordhaus, W. D. (2000): Ekonomija, Mate d.o.o. Zagreb, Zagreb (XV. edition).</li> <li>2. Tracy, M. (2000): Hrana i poljoprivreda u tržišnom gospodarstvu, Mate d.o.o. Zagreb, Zagreb.</li> <li>3. Kotler, P. (2001): Upravljanje marketingom, Mate d.o.o. Zagreb, Zagreb.</li> <li>4. Weihrich, H., Koontz, H. (1998): Menedžment, Mate d.o.o. Zagreb, Zagreb.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. Thurow, L. C. (1997): Budućnost Kapitalizma, Mate d.o.o. Zagreb, Zagreb.</li> <li>2. Kolega, A. (1994): Tržišтво poljodjelskih proizvoda, NZ Globus, Zagreb.</li> </ol>		

<b>Course title</b>	<b>Technology Of Plant-Based Raw Materials I</b>		
<b>Course code</b>	FT321	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Žaneta Ugarčić-Hardi, PhD, full professor		
<b>Course associates</b>	Drago Šubarić, PhD, associate professor		
<b>Course content</b>	<p>The basics of cereal processing technologies. Flour production. Wheat milling procedures. Technological procedures of bread and other bakery products production. Bakery products. Quality evaluation, transport, packaging and storage of bakery products. Raw materials, operations and processes of pasta production and biscuit and wafer production technology. Extruding process and products.</p> <p>The basics of starch technology. Cornstarch production technology. Starch hydrolysates production and application. Modified starches production. By-products of corn starch industry. Potato and wheat starch industry production. Sugar properties. Sugar production from sugar beet. By-product of sugar industry. The basics of confectionery and related products technology.</p> <p><u>Labs:</u> Physical and chemical analytical methods for evaluation of flour, flour dough and final products properties. Industrial practice exercises in plants: silo, mill, bakery, pasta and biscuit factories. Analysis of sugar quality. Modified starches production. Industry practice.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	<p>Students acquire basic knowledge of milling and bakery industry, as well as pasta and biscuits production bases.</p> <p>Additionally, the course is designed to provide basic concepts of starch technology, starch hydrolysates and modified starches, basics of sucrose production from sugar beet, as well as basics of confectionery products technology.</p>		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Oral or written examination of the whole subject matter at the end of semester or in the form of two oral exams during semester.		
<b>Credits</b>	6	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. Ž. Ugarčić-Hardi: <i>Tehnologija proizvodnje i prerade brašna</i> (interna skripta). Faculty of Food Technology University of Josip Juraj Strossmayer in Osijek, 2002.</li> <li>2. S. Kljusurić: <i>Uvod u tehnologiju mljevenja pšenice</i>. Faculty of Food Technology University of Josip Juraj Strossmayer in Osijek, 2000.</li> <li>3. Y. Pomeranz: <i>Wheat: Chemistry and Technology</i>. Volumen I i II. American Association of Cereal Chemists, St. Paul, Minnesota, 1988.</li> <li>4. P. W. Van der Poel, H. Schiweck, T. Schwartz: <i>Sugar Technology</i>. Verlag Dr. Albert Bartens KG-Berlin, 1998.</li> <li>5. R. L. Whistler, J. N. BeMiller, E. F. Paschall (1984): <i>Starch, Chemistry and technology</i>.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. Y. Pomeranz: <i>Advances in Cereal Science and Technology</i>. Volumen I i II. American Association of Cereal Chemists, St. Paul, Minnesota, 1978.</li> <li>2. E. J. Pyler: <i>Baking Science and Tehnology</i>. Volumen I i II. Sosland Publishing Company, Marriam, Kansas, 1988.</li> <li>3. A. Hirsekorn, W. Nehr Korn, K. Miekley: <i>Grundprozesse der Backwarenherstellung und Feinbackwaren</i>. VEB Fachbuchverlag Leipzig, 1986.</li> <li>4. R.H. Walter: <i>Polysaccharide association structures in food</i>, Marcel Dekker, INC, New York, Basel, Hong Kong, 1998.</li> </ol>		

<b>Course title</b>	<b>Technology Of Plant-Based Raw Materials II</b>		
<b>Course code</b>	FT322	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Undergraduate Study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Vlasta Piližota, PhD, full professor		
<b>Course associates</b>	Andrija Pozderović, PhD, associate profesor		
<b>Course content</b>	<p>Physical and chemical properties and behaviour of plant-based raw materials (fruits, vegetables, grains, sugar beet, kakao), with emphasis on plant-based ingredients in certain food products. Quality factors of raw material important for food formulation and its quality.</p> <p>Individual laboratory experimentation. Selected analysis important for raw material and final product.</p> <p>Grape wine origin and botanical properties, mechanical and chemical composition of grape, grape sorts for wine production, must chemical composition. Must and wine sulphuring, SO<sub>2</sub> role in wine production. Fundamentals of white and red wine technology processes. Fruit wines and technology basics of fruit wine production. Wine categorization according to Regulation of wine production.</p> <p>Technology fundamentals of oils. Classification of oilseeds (seeds and olive). Oilseeds preparation for processing. Production of vegetable oils. Oil extraction by pressing. Solvent extraction. Rafining (chemical, physical). Storage, stability and transport of oils. By-products of oil industry. Basics of product technology on the vegetable oils base.</p> <p>Labs: Examination methods of oils quality. Properties determination methods of oils identification. Oils oxidation degree. Deterioration and sustainability of oils. Industry practice.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	<p>This course gives the student knowledge in the field of quality and properties of raw plant-based material of importance for the final product quality with an emphasize on important parameters influence final product quality as well as parameters in principal preservation methods.</p> <p>Basics knowledge of wine and wine production.</p> <p>Technology basic of oil production from vegetable raw materials, rafination, quality properties and oil products.</p>		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	3		2
<b>(total)</b>	45		30
<b>Examination method</b>	Written reports during semester and/or final written exam at the end of courses and oral examination at the end of courses.		
<b>Credits</b>	6	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. A. A. Kader, Postharvest technology of Horticultural Crops, Sec.Ed., 1992, Univ.of California, Division of Agriculture and Natural Resources Publication 3311.</li> <li>2. T. Lovrić i V. Piližota 1994, Tehnologija konzerviranja i prerade voća i povrća, ur. akademik Milan Maceljki, Nakladni zavod, GLOBUS, Zagreb.</li> </ol>		
<b>Recommended reading</b>	Different journals and articles.		

<b>Course title</b>	<b>Technology Of Animal-Based Raw Materials</b>		
<b>Course code</b>	FT225	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food technology (Graduate study)		
<b>Semester</b>	IV		
<b>Course lecturer</b>	Dragan Kovačević, PhD, associate professor		
<b>Course associates</b>	Jovica Hardi, PhD, associate professor		
<b>Course content</b>	<p><u>Lectures:</u> Anatomy and chemical composition of meat, fish and milk. Nutritional, protective and technological characteristics of meat and fish and their products. Post-mortem changes and maturation of the meat and fish. Market classification and characterization of meat. Meat and fish products systematisation. Technological processes and machines for production and conserving meat, fish and dairy products. Processes of milk treatment. Fermentation and coagulation of milk. Starter cultures which are used in dairy industry. Health-veterinary inspection in the meat, fish and milk processing industries. Achievements in meat, fish, and dairy products packaging.</p> <p><u>Labs:</u> Meat and dairy industry, or fish processing industry exercises. Making technological schemes with normative and technological calculation for certain meat, fish and dairy products. Laboratory exercises – determination of physical, chemical and sensory characteristics of meat and fish and dairy products.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Today consumers are educated and conscious about healthy living and healthy diets. They are prepared to pay more for foods that are organically produced and minimally processed. This demands knowledge of anatomy, chemical composition, nutritional characteristics and especially new technologies and conserving methods for meat, fish and dairy products. Choosing adequate conserving methods enables longer preserving periods and conservation of valuable nutritional characteristics in meat, fish and dairy products.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		1
<b>(total)</b>	30		15
<b>Examination method</b>	Accepted exercises, reports Oral exam		
<b>Credits</b>	3,5	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. Kovačević, D. (2001): Kemija i tehnologija mesa i ribe, PTF - Osijek, Osijek (sveučilišni udžbenik).</li> <li>2. Kerry, J., Kerry J., Ledward, D. (2002): Meat Processing: Improving Quality, C.H.I.P.S., Weimar, Texas.</li> <li>3. Hall G.M. (1997): Fish Processing technology, 2th ed., C.H.I.P.S., Texas.</li> <li>4. Lj. Tratnik: <i>Mlijeko – tehnologija, biokemija i mikrobiologija</i>. Hrvatska mljekarska udruga, Zagreb, 1998.</li> <li>5. S. Miletić: <i>Mlijeko i mliječni proizvodi</i>. Hrvatsko mljekarsko društvo, Zagreb, 1994.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. Kovačević, D. (2004): Sirovine prehrambene industrije (meso i riba), PTF-Osijek, Osijek (sveučilišni udžbenik).</li> <li>2. Živković, J. (2001): Higijena i tehnologija mesa (I. Dio), (II. dopunjeno izdanje), Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb.</li> <li>3. Varnam, A. H., Sutherland, J. P. (1995): Meat and Meat Products. Technology, chemistry and microbiology, Chapman &amp; Hall, London - Glasgow - Weinheim - New York-Tokyo - Melbourne - Madras.</li> <li>4. D. Sabadoš: <i>Kontrola i ocjenjivanje kakvoće mlijeka i mliječnih proizvoda</i>. Hrvatsko mljekarsko društvo, Zagreb, 1996.</li> <li>5. Lj. Kršev: <i>Mikrobiološke kulture u proizvodnji mliječnih proizvoda</i>. Udruženje mljekarskih radnika Hrvatske, Zagreb, 1989.</li> </ol>		

<b>Course title</b>	<b>Hygiene And Sanitation</b>		
<b>Course code</b>	FT324	<b>Course status</b>	Compulsory
<b>Study programme</b>	Food Technology (Graduate study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Drago Šubarić, PhD, associate professor		
<b>Course associates</b>			
<b>Course content</b>	<p>The basic principles of hygiene and sanitation in the food industry. Microorganisms. Sources of food and food plant contamination. Personal hygiene. Food poisoning types and causes. Cleaning compounds and sanitizers in a food plant, equipment cleaning protocol. Chemically food contaminants. Sanitation methods. Cleaning and sanitation systems. Waste disposal. Pest control (insects, rodents, birds). HACCP system (hazard analysis and critical control point). Good manufacturing practice, good hygiene practice, good laboratory practice. Law and regulations.</p> <p><u>Labs:</u> Field work will be related to specific industries: plant designing demands related to hygiene and sanitation, major pathogens microorganisms, cleaning and sanitation compounds and equipment. HACCP system integration.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The course is designed to give basic concepts of hygiene and sanitation in food production. This course also provides students with knowledge to produce safety food, taking into account: prevention of microbiological food contamination, appropriate cleaning principles together with proper use of cleaners, good manufacturing practice, cleaning process facilities, personal hygiene, sanitary food handling and HACCP system.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		2
<b>(total)</b>	30		30
<b>Examination method</b>	Oral or written examination of whole subject matter at the end of semester or in form of two oral exams during semester.		
<b>Credits</b>	4	<b>Language</b>	Croatian
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. N. G. Marriott: Essentials of food sanitation., International Thomson Publishing, 1997.</li> <li>2. C. De W. Blackburn, P. J. McClure: Foodborne pathogens. Hazards, risk analysis and control. CRC Press, Boston, New York, Washington, 2002.</li> <li>3. V. Turčić: HACCP i higijena namirnica. Zagreb, 2000.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. S. Duraković: Primijenjena mikrobiologija. PTI Zagreb, 1996.</li> <li>2. S. Duraković: Prehrambena mikrobiologija. Medicinska naklada Zagreb, 1991.</li> <li>3. S. Duraković, L. Duraković: Mikrobiologija namirnica. Kugler Zagreb, 2001.</li> </ol>		

<b>Course title</b>	<b>Instrumental Methods Of Analysis</b>		
<b>Course code</b>	FT331	<b>Course status</b>	Elective
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Marijan Šeruga, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p><u>Lectures:</u> Review of instrumental methods of analysis. Criteria for selecting instrumental methods of analysis. Electroanalytical methods. Conductometry. Potentiometry. Voltammetry. Cyclic voltammetry (CV). Differential-pulse voltammetry (DPV). Square-wave voltammetry (SQV). Chromatographic methods of analysis. Gas-liquid chromatography (GLC). High-performance liquid chromatography (HPLC). Ion chromatography (IC). Spectrometric methods of analysis. Visible (Vis), ultraviolet (UV) and infrared (IR, FTIR) spectrometry. Atomic absorption spectrometry (AAS). Mass spectrometry (MS). Nuclear magnetic resonance spectroscopy (NMR). Coupled systems of analysis (e.g. GLC-MS, HPLC-MS, HPLC-FTIR, etc).</p> <p><u>Labs:</u> Examples of application of particular instrumental methods in food analysis. Conductometry. Potentiometry. Voltammetric determination of metals and some organic compounds (e.g. additives and vitamins). Analysis of compounds and specific ingredients in foods by the use of UV/VIS, FTIR, GLC and HPLC. Determination of heavy metals and metaloides in foods by AAS.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The aim of this study is to bring the students the basic knowledge about instrumental methods that are used in food analysis. Through practical work students will learn about criteria for selecting instrumental techniques as well as about their work principle.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		2
<b>(total)</b>	30		30
<b>Examination method</b>	Oral exam and/or 2 written exams during the semester		
<b>Credits</b>	4	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. J. R. J. Pare, J. M. R. Belanger: <i>Instrumental Methods in Food Analysis</i>. Elsevier Science, Amsterdam, 1997.</li> <li>2. D. A. Skog, F. J. Holler, T. A. Nieman: <i>Principles of Instrumental Analysis</i>. Saunders College Publishing, Harcourt Brace College Publishers, Philadelphia, 1998.</li> <li>3. K. A. Rubinson, J. F. Rubinson: <i>Contemporary Instrumental Analysis</i>. Prentice Hall, New Jersey, 2000.</li> <li>4. I. Piljac: <i>Elektroanalitičke metode</i>. RMC, Zagreb 1995.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. D. A. Skoog, D. M. West, F. J. Holler: <i>Osnove analitičke kemije</i>. Školska knjiga, Zagreb, 1999.</li> <li>2. M. R. Smith, J. G. Vos (Eds.): Analytical Voltammetry. In <i>Comprehensive Analytical Chemistry (vol XXVII)</i>, Elsevier, Amsterdam, 1992.</li> </ol>		

<b>Course title</b>	<b>Construction Materials In Food Industry</b>		
<b>Course code</b>	FT332	<b>Course status</b>	Elective
<b>Study programme</b>	Food Technology (Undergraduate Study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Marijan Šeruga, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p><u>Lectures:</u>  Construction materials in food industry – types and characteristics. Types and specific qualities of corrosion and other damages of construction materials in food industry. Thermodynamic prerequisites, mechanisms and kinetics of corrosion process. Biological and microbiological corrosion. Dependence of corrosion rate on internal and external factors in food industry plants. Changes in corrosion medium caused by interactions between construction material and corrosion mediums in food industry. Metallic construction materials in food industry. Other construction materials important for food industry. Specific qualities of different food industries in a viewpoint of a selection and maintaining of construction materials. Economic and ecological aspects of materials protection in food industry.</p> <p><u>Labs:</u>  Corrosion of metals in food industry, methods for corrosion monitoring. Non-toxic inhibitors, inhibitor efficiency. Tour of the food industry plants, presentation of characteristic examples in particular food technologies. Designing a project of construction materials protection for assigned food industry plant.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Course objective is to get students acquainted with types and corrosion properties of construction materials in food industry. Explanation of corrosion processes with special emphasis on interactions between construction material and corrosion medium in food industry. Understanding the factors which influence selection of construction materials in food industry. Elaboration of procedures for protection system designing. Evaluation of durability and harmlessness of measures for protection of construction materials in food industry.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		2
<b>(total)</b>	30		30
<b>Examination method</b>	oral or two written exams during the semester		
<b>Credits</b>	4	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>1. D.R. Askeland: <i>The Science and Engineering of Materials</i>. Chapman &amp; Hall, London, 1996.</li> <li>2. P. Marcus, J. Oudar (Eds.): <i>Corrosion Mechanisms in Theory and Practice</i>. Marcel Dekker, New York, Basel, Hong Kong, 1995.</li> <li>3. R.J. Landrum: <i>Fundamentals of Designing for Corrosion Control</i>. NACE, Houston, 1992.</li> <li>4. I. Esih, Z. Dugi: <i>Tehnologija zaštite od korozije</i>. Školska knjiga, Zagreb, 1990.</li> <li>5. H. H Uhlig, R.W. Revie: <i>Corrosion and Corrosion Control</i>. John Wiley &amp; Sons, New York, Chichester, Brisbane, Toronto, Singapore, 1985.</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>1. I. Esih: <i>Osnove površinske zaštite</i>, Fakultet strojarstva i brodogradnje, Zagreb, 2003.</li> <li>2. Inženjerski priručnik IP4, Proizvodno strojarstvo, prvi svezak: <i>Materijali</i>. Školska knjiga, Zagreb, 1998.</li> <li>3. D.A. Jones: <i>Principles and Prevention of Corrosion</i>. Prentice Hall, New Jersey, 1996.</li> <li>4. M.G. Fontana: <i>Corrosion Engineering</i>. McGraw-Hill, New York, 1985.</li> <li>5. F.L. Laque, H.R. Copson: <i>Otpornost metala i legura na koroziju</i>. Naučna knjiga, Beograd, 1975.</li> </ol>		

<b>Course title</b>	<b>Sensory Analysis</b>		
<b>Course code</b>	FT333	<b>Status Coursea</b>	Elective
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Antonija Perl, PhD, assistant professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Introduction to sensory analysis (definition, hystorical background and applications); Physiological and psychological factors of sensory analysis; Sensory attributes (taste, odor/aroma, appearance, texture and noise); The trigeminal senses and sensory interactions; Organization and operation of a sensory evaluation program (selection and training of panel member, performance monitoring and motivation, test room for sensory evaluation); Sensory evaluation in quality control; Test methods (analytical and testing of consumers); Difference tests; Descriptive analysis techniques; Sensory evaluation by scoring; Affective tests (the subjects-sampling and source of test subjects, choice of test location, qualitative and quantitative affective tests, preference tests, acceptance tests).</p> <p><u>Labs:</u> Tests for selection and training of panel members; Application of selected discriminative and descriptive tests to food products; Scoring of selected food products.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Over the course of lectures and lab work, students are introduced to physiological bases, sensory attributes and methodologies of sensory evaluation.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		2
<b>(total)</b>	30		30
<b>Examination method</b>	Oral. Prerequisites: completed laboratory classes and taken written colloquium. Written examination twice in semester.		
<b>Credits</b>	4	<b>Jezik</b>	Croatian
<b>Compulsory reading</b>	1. M.L. Mandić, Lj. Primorac, T. Klapac, A. Perl, D. Kenjeric: <i>Senzorske analize</i> . Interna skripta, Prehrambeno tehnološki fakultet, Osijek, 2002.		
<b>Recommended reading</b>	1. M. Meilgaard, G.V. Civille, B.T. Carr: <i>Sensory Evaluation Techniques</i> . CRC Press, London, 1991. 2. H. Stone, J.L. Sidel: <i>Sensory Evaluation Practices</i> . Academic Press, London, 1993. 3. R.L. McBride, H.J. MacFie: <i>Psychological Basis of Sensory Evaluation</i> . Elsevier, London, 1990. 4. H.T. Lawless, H. Heymann: <i>Sensory Evaluation of Food, Principles and Practices</i> . Chapman & Hall, New York, 1998. 5. D.H. Lyon Ed.: <i>Guidelines for Sensory Analysis in Food Product Development and Quality Control</i> . Chapman & Hall, New York, 1992.		

<b>Course title</b>	<b>Food Toxicology</b>		
<b>Course code</b>	FT334	<b>Course status</b>	Elective
<b>Study programme</b>	Food Technology (Undergraduate study)		
<b>Semester</b>	VI		
<b>Course lecturer</b>	Klapec Tomislav, PhD, assistant professor		
<b>Course associates</b>			
<b>Course content</b>	<p><u>Lectures:</u>          -absorption, distribution, excretion and metabolism of toxicants          -mechanism of action of toxicants          -toxic effects in the organism          -toxicants in food          -determination of toxicants in food          -risk assessment of toxicants          -regulation of exposure to toxic substances</p> <p><u>Labs:</u>          -determination of deoxynivalenol in grains by HPLC          -determination of fumonisins in corn by HPLC          -HPLC determination of polycyclic aromatic hydrocarbons in instant coffee          -spectrofluorimetric determination of aluminium in water          -spectrofluorimetric determination of histamine in fish</p>		
<b>General and specific knowledge acquired in course (objective)</b>	Following introductory basic principles of interaction between body and toxic substances, this course familiarizes student with occurrence, mechanism of action, detrimental effects, methods of determination and means of prevention of food contamination with toxicants.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2		2
<b>(total)</b>	30		30
<b>Examination method</b>	oral plus two written (mid-term and final) exams		
<b>Credits</b>	4	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	1. T. Klapec: <i>Osnove toksikologije s toksikologijom hrane</i> , Interna skripta, Prehrambeno tehnološki fakultet, Osijek, 2002.		
<b>Recommended reading</b>	1. T. Shibamoto, L.F. Bjeldanes: <i>Introduction to Food Toxicology</i> , Academic Press, San Diego, 1993. 2. A. Wallace Hayes (ur.): <i>Principles and Methods of Toxicology</i> , Taylor & Francis, Philadelphia, 2001. 3. B.G. Katzung (ur.): <i>Basic and Clinical Pharmacology</i> , McGraw-Hill, London, 2004. 4. C.D. Klaassen, M.O. Amdur, J. Doull: <i>Toxicology, A Basic Science of Poisons</i> , Macmillan Publishing Company, New York, 1986.		

<b>Course title</b>	<b>Functional Foods And Supplements</b>		
<b>Course code</b>	FS231	<b>Course status</b>	Elective
<b>Study programme</b>	Food Science and Nutrition (Graduate study)		
<b>Semester</b>			
<b>Course lecturer</b>	Milena L. Mandić, PhD, full professor		
<b>Course associates</b>			
<b>Course content</b>	<p>Defining functional foods, functional foods legislation (EU, US, Japan etc.), labelling</p> <p>Functional foods and health: functional health claims, markers; colonic functional foods, functional foods and coronary heart disease, functional foods anti-tumour properties, functional foods and acute infections</p> <p>Developing functional food products: maximising the functional benefits of plant foods (macronutrient and micronutrient enhancing), developing functional ingredients, functional fats and spreads, functional confectionery, probiotic and prebiotic functional foods, dietary fibre functional products</p> <p>The role and position of supplements in human health</p> <p>To disseminate course content, the students according the favour, elect particular content, independently elaborate, present and discuss.</p> <p>Practices: The students have to practice preparation of scientific project proposal; Gain experience with using computers for literature searching; Determination of buffering capacity of functional foods. Determination of inhibitory effect of fermented functional foods by probiotic.</p>		
<b>General and specific knowledge acquired in course (objective)</b>	The course is focusing on human well-being, the influence of functional components on metabolism, the cardiovascular system and intestinal physiology. In view of these facts, it is necessary to assess and evaluate the developments in food production in terms of their effect on the individual consumer and the society at large.		
<b>Teaching method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Labs</b>
<b>(hrs/week)</b>	2	1	1
<b>(total)</b>	30	15	15
<b>Examination method</b>	During the semester the students will be included in course through discussion and making seminars (the result of this work will influence in the final mark), and the exam will be oral		
<b>Credits</b>	6	<b>Language</b>	Croatian, English
<b>Compulsory reading</b>	<ol style="list-style-type: none"> <li>Gibson, M.W.Williams: <i>Functional foods</i>. CRC Press, Woodhead Publishing Limited, Boca Raton, Boston, New York, Washington, DC, 2000.</li> <li>written material will be prepared</li> </ol>		
<b>Recommended reading</b>	<ol style="list-style-type: none"> <li>Chadwick, S.Henson, B.Moseley, G.Koenen, M.Liakopoulos, C.Midden, A.Palou, G. Rechkemmer, D.Schröder, A.von Wright: <i>Functional Foods</i>. Springer, Berlin, 2003.</li> </ol>		