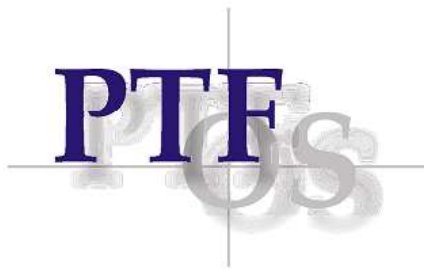


JOSIP JURAJ STROSSMAYERA UNIVERSITY OF OSIJEKU
FACULTY OF FOOD TECHNOLOGY OSIJEK

**EFFECTIVE CURRICULUM
FOR THE ACADEMIC YEAR 2024/2025**



UNIVERSITY GRADUATE STUDY
FOOD SCIENCE AND NUTRITION

Osijek, June 2024

1st year of studies, academic year 2024/2025

SEMESTER	COURSE CODE	COURSE TITLE	L	S	LA	ECTS	COURSE LECTURER	COURSE ASSOCIATES
I	62325	Nutrition Throughout the Life Cycle	2	1		5	D. Čačić Kenjerić, PhD, full prof.	
I	135769	Nutritional Biochemistry	3	1		5	T. Klačec, PhD, full prof. I. Strelec, PhD, full prof.	
I	43774	Physiology of Digestion	2	1		4	T. Klačec, PhD, full prof. I. Banjari, PhD, full prof.	
I	79485	Instrumental Methods I	2	1	2	4,5	I. Flanjak, PhD, full prof.	Blanka Bilić Rajs, PhD, assist. prof.
I	43776	Statistics	2	1	1	4,5	N. Šuvak, PhD, assoc. prof.	
I	62326	Dietary Assessment and Nutritional Epidemiology	2	1		5	D. Čačić Kenjerić, PhD, full prof.	
I	43751	Introduction to Scientific and Research Work	2	1		4	Đ. Ačkar, PhD, full prof. S. Jokić, PhD, full prof.	
SUBTOTAL:			15	7	3			
TOTAL:			25			32		

SEMESTER	COURSE CODE	COURSE TITLE	L	S	LA	ECTS	COURSE LECTURER	COURSE ASSOCIATES
II	43761	Foodborne Hazards	2		2	4	T. Klačec, PhD, full prof. T. Marček, PhD, assoc. prof.	
II	43777	Instrumental Methods II	2		3	5	L. Jakobek Barron, PhD, full prof. I. Tomac, PhD, assist. prof.	P. Matić, PhD
II	43778	Sensory Analysis	2		3	5	I. Flanjak, PhD, full prof. A. Perl Pirički, PhD, full prof.	Blanka Bilić Rajs, PhD, assist. prof.
II	43762	Company Management	2			3	B. Miličević, PhD, full prof. J. Babić, PhD, full prof. A. Jozinović, PhD, assoc. prof. M. Panjičko, PhD, assist. prof.	
II	177794	English language	2			2	A. Šarić, PhD, assoc. prof.	
II	177796	German language	2			2	L. Budić, MSc A. Šarić, PhD, assoc. prof.	
II	2982	Elective Course A-I	2		2	min 10		
II		Elective Course A-I	2		2			
SUBTOTAL:			14	0	12			
TOTAL:			26			29		

2nd year of studies, academic year 2024/2025

SEMESTER	COURSE CODE	COURSE TITLE	L	S	LA	ECTS	COURSE LECTURER	COURSE ASSOCIATES
III	62327	Diet Therapy	2		2	5	I. Banjari, PhD, full prof.	M. Cvijetić Stokanović, MSc
III	43750	New Food Products Development	2	1		4	M. Kopjar, PhD, full prof.	
III	43779	Food Quality and Safety Management	2			3	I. Flanjak, PhD, full prof.	
III	88288	Laboratory Quality Management	1		1	2	I. Flanjak, PhD, assoc. prof.	B. Bilić Rajs, PhD, assist. prof.
III	5752 15908	Elective Course B-I	2		2	min 15		
III		Elective Course B-II	2		2			
III		Elective Course B-III	2		2			
SUBTOTAL:			13	1	9			
TOTAL:			23			29		

SEMESTER	COURSE CODE	COURSE TITLE	L	S	LA	ECTS	COURSE LECTURER	COURSE ASSOCIATES
IV	13679	Elective Course A-III	(2)	1	1	min 10		
IV	13680 15908	Elective Course B-IV	2	(1)	(2)			
IV	177801	Diploma Thesis			10		10	20

SUBTOTAL:	4	12	13	30	
TOTAL:	29				

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

Elective Courses A – 2982 (2nd semester), 13679 (4th semester)

SEMESTER	COURSE CODE	COURSE TITLE	L	S	LA	ECTS	COURSE LECTURER	COURSE ASSOCIATES
II	88270	Functional Foods and Supplements	2	1	1	6	D. Čačić Kenjerić, PhD, full prof.	I. Banjari, PhD, full prof. M. Cvijetić Stokanović, MSc
II	43782	Isolation and Clean-Up Techniques	2		2	5	D. Gašo-Sokač, PhD, full prof. V. Bušić, PhD, assist. prof.	
II	88271	Antioxidants in Food	2	1	1	5	D. Gašo-Sokač, PhD, full prof. I. Banjari, PhD, full prof. V. Bušić, PhD, assist. prof.	
IV	43784	Rapid Methods in Food Analysis	1	1	1	5	H. Pavlović, PhD, full prof.	
II	43785	Occupational Toxicology	2		1	5	T. Klavec, PhD, full prof.	
II	43786	Interaction of Food and Genes	2	2	0	6	I. Strelec, PhD, full prof.	
IV	88272	Computer Aided Diet Optimisation	2	1	1	6	D. Magdić, PhD, full prof.	

Elective Courses B – 5752 (3rd semester), 15908 (3rd and 4th semester), 13680 (4th semester)

SEMESTER	COURSE CODE	COURSE TITLE	L	S	LA	ECTS	COURSE LECTURER	COURSE ASSOCIATES
III	81740	Technology of Confectionery and Related Products	2	1	1	5	D. Šubarić, PhD, full prof. J. Babić, PhD, full prof. Đ. Ačkar, PhD, full prof. A. Jozinović, PhD, assoc. prof.	
III	79486	Chemistry and Technology of Carbohydrates	2	1	1	5	D. Šubarić, PhD, full prof. J. Babić, PhD, full prof. Đ. Ačkar, PhD, full prof. A. Jozinović, PhD, assoc. prof.	
III	62330	Chemistry and Technology of Fruit and Vegetables	2		2	5	M. Kopjar, PhD, full prof.	
III	66935	Technology of Milk and Dairy Products	2		2	5	M. Lučan, PhD, assoc. prof.	M. Antunović, MSc
III	143777	Nutritional Aspects of Food Preparation	2	1		5	T. Klavec, PhD, full prof.	
III, IV	62329	Chemistry and WineTechnology	2		2	5	A. Pichler, PhD, full prof.	
III, IV	62332	Chemistry and Technology of Oils and Fats	2		2	5	T. Moslavac, PhD, full prof.	
III, IV	88274	Spices and Herbs	2	1		5	M. Kopjar, PhD, full prof.	
IV	143778	Nutrition and Sport	2	1		5	D. Čačić Kenjerić, PhD, full prof.	

**Course description and learning outcomes of courses at the
university graduate study programme
*Food science and nutrition***

Course title	Nutrition Throughout the Life Cycle		
Course code	62325	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Daniela Čačić Kenjeric, PhD, full prof.		
Course associates			
Course content	<p>This course describes the nutrient needs, sources, physiological changes that take place during each stage of human growth, explains the role nutrition plays in human development, maturation and aging, alteration during pregnancy and lactation, and considers problems that can be addressed with nutritional remedies; how and why nutrient needs change during each stage of the life cycle; the food effect in health maintain and improvement; RDA for all nutrients through life cycle; Impact of socio-economic, cultural, and psychological factors on food and nutrition behaviour.</p> <p>Seminars: Interpretation of research literatures related to nutrition in the life cycle; Describing how the diet can be planned to meet nutrient needs during each stage of the life cycle; Describing how dietary, biochemical, and anthropometric are used to identify nutritional risk factors. Guest speakers.</p>		
General and specific knowledge acquired in course (objective)	<p>Application of nutrition principles to the human life cycle. Become acquainted with resources for delivery of nutrition care in community programs. The student will be able to act in promoting adequate nutrition and health. The student will be able to select, utilize and evaluate appropriate materials and methods for communication of nutrition information to a given audience.</p>		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	
(total)	30	15	
Examination method	2 written exams throughout the semester and final exam at the end of the semester		
Credits	5	Language	Croatian, English
Compulsory reading	<ol style="list-style-type: none"> 1. M.K. Mitchell: Nutrition across the life span – 2nd ed., Saunders, USA, 2003. 2. Web resources 		
Recommended reading	<ol style="list-style-type: none"> 1. Selected scientific papers and books 2. B.S. Worthington-Roberts, S.R. Williams: <i>Nutrition Throughout the Life Cycle</i>, McGraw-Hill, 2000. 		

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	List and explain reasons for specific dietary needs in pregnancy and lactation
2.	List and explain reasons for specific dietary needs in growth and development
3.	List and explain reasons for specific dietary needs in adults
4.	List and explain reasons for specific dietary needs in elderly
5.	Distinguish dietary needs of males and females
6.	Analyse adequacy of dietary habit sin various population groups
7.	Apply gained knowledge in recommending diet for individuals and/or groups

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures	1	1-5	Attendance, participation in discussions	Attendance lists and participation in discussions	6	10
Seminars	1.5	6,7	Individual literature study aimed to prepare seminar on a selected topic in written and/or oral form	Attendance list, Written seminar evaluation, Presentation evaluation	18	30
Continuous knowledge check	1	1-2	Individual literature study, participation in continuous knowledge check	Partial exam 1	9	15
Continuous knowledge check	1	3-5	Individual literature study, participation in continuous knowledge check	Partial exam Individual literature study	9	15
Written exam*	2*	1-5	Individual literature study, participation in written exam *	Written exam*	18*	30*
Final exam	0.5	6,7	Literature study, Oral exam	Oral exam	18	30
TOTAL	4				60	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Nutritional Biochemistry		
Course code	135769	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	I		
Course lecturer	Tomislav Klavec, PhD, full prof. Ivica Strelec, PhD, full prof.		
Course associates	Tihomir Kovač, PhD		
Course content	<p><u>Lectures:</u></p> <ul style="list-style-type: none"> -a review of necessary knowledge of chemistry and biochemistry -interaction between nutrients and chemistry of living organisms in the metabolism of macronutrients (proteins, carbohydrates, lipids), energy requirements, and metabolism of vitamins and minerals -biochemical basis of the role of nutrients and nonnutritive (dietary fiber, phytoestrogens, phenolic compounds, antioxidants...) food components in preventive nutrition -food-drug interactions <p><u>Labs:</u></p> <ul style="list-style-type: none"> -determination of HDL and LDL cholesterol levels in serum -determination of selenium level in nails as a long-term exposure biomarker and its comparison to the intake calculated using a validated food frequency questionnaire 		
General and specific knowledge acquired in course (objective)	The course provides understanding of why nutrients and other food ingredients are required for human health by describing their function at the cellular and molecular level.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	3	1	
(total)	45	15	
Examination method	oral plus two written (mid-term and final) exams		
Credits	5	Language	Croatian, English
Compulsory reading	1. T. Klavec: <i>Prehrambena biokemija</i> , Interna skripta, Prehrambeno tehnološki fakultet, Osijek, 2005.		
Recommended reading	1. T. Brody: <i>Nutritional Biochemistry</i> , Academic Press, San Diego, 1999. 2. M.H. Stipanuk: <i>Biochemical and Physiological Aspects of Human Nutrition</i> , Saunders, New York, 2000. 3. A. Bendich, R.J. Deckelbaum: <i>Preventive Nutrition</i> , Humana Press, Totowa, 2005. 4. B.J. McCabe, J.J. Wolfe, E.H. Frankel (ur.): <i>Handbook of Food-Drug Interactions</i> , CRC Press, Boca Raton, 2003.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Describe biomolecules, structure and function of cells and tissues
2.	Define biochemical individuality i define molecular bases of metabolism
3.	Identify critical points of interaction between food components and body on the molecular level
4.	Use specialized scientific literature in the fields of molecular biology and biochemistry
5.	Formulate new dietary regimes, functional foods and supplements
6.	Apply analytics of molecular biology and biochemistry in nutritional studies

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures and laboratory practice	0.2	1-6	Attendance	Attendance list	0	5
Laboratory practice	0.8	6	Experimental work; Report writing	Report	10	15
Final exam	4.0	1-5	Individual literature study; Participation in exam	Oral exam	50	80
TOTAL	5				60	100

Course title	Physiology of Digestion		
Course code	43774	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	I		
Course lecturer	Tomislav Klapac, PhD, full prof. Ines Banjari, PhD, full prof.		
Course associates			
Course content	<p>Lectures and Seminars: Relationship between anatomy and function of segments of the gastrointestinal tract, pancreas, liver and biliary tract Autonomous nervous system control over motility and function of digestion organs Basic hormonal regulation of metabolism and gastrointestinal function Digestion and absorption of carbohydrates, fats, proteins, and essential nutrients (vitamins, amino acids, unsaturated fatty acids), electrolytes (calcium, potassium, sodium) Metabolic disturbances linked to diabetes mellitus Association between nutritional habits and health with special emphasis on treatments of excess or insufficient body weight, malabsorption syndrome, gluten enteropathy and food allergy.</p>		
General and specific knowledge acquired in course (objective)	The course offers knowledge of basic human anatomy and physiology of digestion and an awareness of the complexity of metabolic processes in the body.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	
(total)	30	15	
Examination method	written exam is a test (MCQ); oral exam determines final grade		
Credits	4	Language	Croatian
Compulsory reading	Selected parts of: A.C. Guyton, J.E. Hall: <i>Medicinska fiziologija</i> . Medicinska naklada, Zagreb, 2003.		
Recommended reading	W.F. Ganong: <i>Review of Medical Physiology</i> . Lange Medical Publications, Los Altos, 1997. -students will also be given an opportunity to select a topic of the seminar		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Describe organs of the human digestive system, their functions and neuroendocrine regulation of digestion
2.	Distinguish specifics of digestion and absorption of nutrients and other food compounds
3.	Describe impact of oral and digestive microbiota on health
4.	Analyse causes of disorders and digestive tract diseases
5.	Apply physiologic principles behind new dietary regimes, functional foods and supplements
6.	Use scientific literature in the field of physiology of digestion

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures and seminars	0.2	1-6	Attendance	Attendance list	0	5
Seminars	0.8	1-6	Individual literature study	Discussion	5	15
Final exam	3.0	1-6	Literature study; Participation in exam	Oral exam	55	80
TOTAL	4				60	100

Course title	Instrumental Methods I		
Course code	79485	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	I		
Course lecturer	Ivana Flanjak, PhD, full prof.		
Course associates	Blanka Bilić Rajs, PhD, assist. prof.		
Course content	<p><u>Lectures:</u> Chromatography: historical perspective. Chromatography nomenclature. Physicochemical principles of separation: adsorption, partition, ion-exchange, gel-filtration (GFC), affinity chromatography. Chromatographic techniques: paper chromatography, thin-layer chromatography, column liquid chromatography, supercritical fluid chromatography. Gas chromatography (gas supplies, injection devices, columns, detectors, applications). High performance liquid chromatography (separation modes, columns, pumps, detectors, application). Sample preparation for chromatographic analysis (Isolation and concentration techniques, derivatization techniques). Electrophoresis (principles, application).</p> <p><u>Seminars:</u> Individual literature search and preparation of seminar on the application of chromatographic methods in food analysis – students choice of food matrix.</p> <p><u>Labs:</u> Analysis of food components by HPLC (sugar, acids, flavonoids) and gas chromatography (GC) (fatty acids, aroma compounds).</p>		
General and specific knowledge acquired in course (objective)	Course is designed to provide student with principles of chromatographic separations focusing on liquid (HPLC) and gas (GC) chromatography which are introduced to students through practical exercises as well.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	2
(total)	30	15	30
Examination method	Oral and written exam with two written exams over the course of semester. To enter the final exam all practical exercises must be completed.		
Credits	4.5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. D.A. Skoog, F.J. Holler, T.A. Nieman, <i>Principles of Instrumental Analysis</i>, Saunders College Publishing, New York 1997. 2. Š. Cerjan-Stefanović, V. Drevenkar, B. Jurišić, M. Medić-Šarić, M. Petrović, N. Šegudović, V. Švob, S. Turina. <i>Kromatografsko nazivlje</i>, HINUS i Sekcija za kromatografiju HDKI, Zagreb 1999. 		
Recommended reading	<ol style="list-style-type: none"> 1. C.T. Mant, R.S. Hodges (ed): <i>High-Performance Liquid Chromatography of Peptides and Proteins: Separation, Analysis and Confirmation</i>, CRC Press Boca Raton, Boston, London, 1991. 2. A.J. Handley, E.R. Adlard (ed): <i>Gas Chromatographic Techniques and Applications</i>. CRC Press. 2001. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define basic term and explain principles of chromatographic separation.
2.	Differentiate and describe types of chromatography based on physical means by which stationary and mobile phase are brought into contact, aggregative state of mobile phase and mechanisms of compound separation and chromatography.
3.	Calculate parameters of retention, capacity, selectivity and efficiency of chromatographic column, resolution and their parameters used in evaluation of selected method.
4.	Describe specific characteristics and basic principles of separation in various chromatographic techniques (HPLC, GC, SFC, CEC)
5.	Apply gained knowledge in selection of proper technique and detection method for the specific sample and compound analysis.
6.	Compare and argument strengths of specific method in a selected compound determination.
7.	Prepare the sample and conduct the analysis on various chromatographic instruments.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures	1	1-6	Lectures attendance, participation in disscussions	List of attendance, Discussions	6	10
Seminars	1	5,6	Individual literautre studying and preparation of presentations and written reports	List of attendance, Evaluation of seminars	12	20
Laboratory practice	1	3,7	Laboratory practice – selected food anayses	Reports and onbtained analytical values	6	10
Continuous knowledge check	0.5	1-4	Literature studying	Partial written exam 1	9	15
Continuous knowledge check	0.5	4	Literature studying	Partial written xam 2	9	15
Written exam *	1*	1-4	Literature studying *	Written exam*	18*	30*
Final exam	0.5	5,6	Oral exam: discussion	Oral exam	18	30
TOTAL	4.5				60	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Statistics		
Course code	43776	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	I		
Course lecturer	Nenad Šuvak, PhD, assoc. prof.		
Course associates			
Course content	<p>Descriptive statistics (Types of data, Data collection, Data description: Graphs and tables)</p> <p>Probability (Probability- classical approach, Some rules of probability, Probability- statistical definition)</p> <p>Random variables (Discrete random variables, numerical characteristics and their meaning, Independent Bernoulli trials and binomial random variable, meaning of parameters, normal approximation, Continuous random variable)</p> <p>Inference based on a single sample (Estimation for a population proportion, Large-sample confidence interval for a population proportion, Estimation of a population mean, Large-sample confidence interval for a population mean, Tests of hypothesis about a population proportion and a population mean (large- sample))</p> <p>Inference based on two samples (Comparing two population means, Comparing two population proportions, Comparing two population distributions)</p> <p>Two-dimensional random vector (Definition, Conditional distributions. Independence, Contingency tables analysis, The coefficient of correlation, Simple linear regression)</p> <p>Multiple regression (ANOVA, Model development, Variable selection)</p>		
General and specific knowledge acquired in course (objective)	The aim is to teach students to be able to make conclusions and decisions by using statistical methods.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	1
(total)	30	15	15
Examination method	Students are obliged to attend classes and submit reports due to defined deadlines. Successfully solved project is a precondition for oral exam.		
Credits	4.5	Language	Croatian
Compulsory reading	1. G.R. Iversen, <i>Statistics, The Conceptual Approach</i> , Springer, Berlin, 1997		
Recommended reading	<p>1. G. McPherson, <i>Applying and Interpreting Statistics</i>, Springer, Berlin, 2001</p> <p>2. S. Lipschutz, J. Schiller, <i>Introduction to Probability and Statistics</i>, Schaum's Outline Series, McGraw-Hill, New York – Toronto, 1998</p> <p>3. J.T. McClave, P.G. Benson, T. Sincich, <i>Statistics for Business and Economics</i>, Prentice Hall, London, 2001</p> <p>4. J. O. Rawlings, S.G. Pantula, D.A. Dicky, <i>Applied Regression Analysis</i>, Springer, Berlin, 1998</p>		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Differentiate deterministic and random experiment.
2.	Apply classical and static probability modeling.
3.	Use concept of probability, conditional probability, random variable and random vector in professional practice.
4.	Interpret variance of random variable.
5.	Analyse and interpret statistical model used in statistical conclusion.
6.	Based on obtained data and simple sample model evaluate population variance as numeric value and confidence interval; test classical hypotheses regarding expectations and distribution.
7.	Based on obtained data and classical statistical models test hypotheses on differences in frequencies/distributions.
8.	Analyse conditional distributions of dependent variables and test the hypothesis on their independency based on contingency tables.
9.	Make a conclusion on linear relationship between variables based on simple regression model.
10.	Demonstrate capability to apply methods learned within the course to analyse real data set from the field of profession.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures and computer exercises	0.5	1-10	Attendance and active participation in discussions	Attendance list and active participation	5	10
Continuous knowledge check	2	1-10	Literature studying	2 written partial exams and final exam	30	60
Seminar and oral presentation of the seminar assignment	2	1-10	Individual problem solving and discussion	Discussion of the presented seminar and oral exam	15	30
TOTAL	4.5				50	100

Course title	Dietary Assesment and Nutritional Epidemiology		
Course code	62326	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	I		
Course lecturer	Daniela Čačić Kenjerić, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> Overview of the principles of nutritional epidemiology; Nutritional epidemiological studies; Food consumption, nutrient intake and the relationship with diseases; Nature of variation in diet; Dietary assessment methods (24-hour recall, food record methods, food frequency methods, diet history method, duplicate diet study, recall of remote diet); Reproducibility and validity of methods (food frequency questionnaires); Surrogate sources of dietary information; Biochemical indicators of dietary intakes and their application in validation of other assessment methods; Anthropometric measures and body composition; Implications of total energy intake for epidemiologic analysis; Correction for the effects of measurement error (random and systematic); Statistic analysis and presentation of dietary data.</p> <p><u>Seminars:</u> Examples of diet-disease relationship (dietary fibre and different diseases, vitamin A and lung cancer, dietary fat and breast cancer, diet and cororary heart disease).</p>		
General and specific knowledge acquired in course (objective)	Students are introduced to fundamentals of nutritional epidemiology and dietary assessment. The course provides knowledge and a link between diet and a number of human diseases and disorders.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	
(total)	30	15	
Examination method	Oral with three written exams over the course of semester.		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. W. Willet Ed.: <i>Nutritional Epidemiology</i>. Oxford University Press, New York, 1998. 2. B.M. Margetts, M. Nelson: <i>Design concepts in nutritional epidemiology</i>. Oxford University Press, New York, 2003. 		
Recommended reading	<ol style="list-style-type: none"> 1. S. Selvin: <i>Statistical analysis of epidemiologic data</i>. Oxford University Press, New York, 1996. 2. S.A. Bingham: The dietary assessment of individuals; Methods, accuracy, new techniques and recommendations. <i>Nutr. Abstr. Rev.</i>, 57, 705-742, 1987. 3. H. Lee-Han, V. McGuire, N.F. Boyd: A review of methods used by studies of dietary measurement. <i>J. Clin. Epidemiol.</i>, 42, 269-279, 1989. 4. C. Medlin, J.D. Skinner: Individual dietary intake methodology: A 50-year review of progress. <i>J. Am. Diet. Assoc.</i>, 88, 1250-1257, 1988. 5. S.A. Bingham: Limitations of the various methods for collecting dietary intake data. <i>Ann. Nutr. Metab.</i>, 35, 117-127, 1991. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define nutritinal epidemiology and explain its purpose in studies relating dietary intake and disease
2.	Diferentiate and describe types of epidemiological studies
3.	Liste and describe dietary assessment methods and compare their strengths and limitations
4.	Apply gained knowledge in dietary data collection
5.	Select the most aproprate method fordietary assessment in a specific study setting
6.	List and describe methods for the assessment of nourishment status and body composition
7.	Analyse and present the dana gained in epidemiological study
8.	Apply gained knowledge in designing the epidemiological study by students choice

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures	1	1-3;5-7	Attendance and active participation	Attendance list, discussions	6	10
Seminars	1.5	4;8	Individual tasks (preparation of questionnaires and their application)	Attendance list, Prepared questionnaires, Presentations	18	30
Continuous knowledge check	1	1-3	Literature studying	Partial written exam 1	9	15
Continuous knowledge check	1	5-7	Literature studying	Partial written exam 2	9	15
Written exam *	2*	1-3;5-7	Literature studying*	Written exam *	18*	30*
Final exam	0.5	4,7,8	Literature studying	Oral exam	18	30
TOTAL	4					100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Introduction to Scientific and Research Work		
Course code	43751	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	I		
Course lecturer	Đurđica Ačkar, PhD, full prof. Stela Jokić, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> Definition of science. Characteristics of science. Classification of scientific work. Category of scientific research. Methods of research. Overview and presentation of literature. Classification of publications. Computer browsing of literature. Setting of operating hypothesis. Planning and conducting of experiment. Analysing results. Preparation of manuscripts of scientific paper. Writing of thesis and other qualification papers. Congress and other scientific meetings. Scientific projects. Evaluation and classification of scientific paper. Selection procedure of scientific research and teaching profession. Scientific Research Activities Act. Classification and browsing of primary, secondary and tertiary databases. News and latest achievements in Croatian and world science.</p> <p><u>Seminar:</u> Writing a seminar paper – suggested or choice theme.</p>		
General and specific knowledge acquired in course (objective)	The aim of the course is to provide knowledge of opportunities for scientific work in Croatia. During the course students will be introduced with planning, setting and conducting of experiments, with manuscript preparation of scientific paper and thesis. They are introduced with databases and methodology of browsing databases. They acquire knowledge about selection procedure of scientific research and teaching profession and introduce Research Activities Act basic elements.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	
(total)	30	15	
Examination method	Seminar paper: Oral exam		
Credits	4	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. J. Kniewald: <i>Metodika znanstvenog rada</i>. Sveučilište u Zagrebu, Zagreb, 1993. 2. Lj. Baban, K. Ivić, S. Jelinić, M. Lamza-Maronić, A. Šundalić: <i>Primjena metodologije stručnog i znanstvenog istraživanja</i>. Ekonomski fakultet, Osijek, 2000. 3. Knežević: <i>Uvod u znanstveni rad</i>. Poljoprivredni fakultet, Osijek, 1988. 4. T. Salitrežić: <i>Uvod u znanstvenoistraživački rad</i>. Fakultet organizacije i informatike, Varaždin, 1981. 5. M. Žugaj: <i>Metodologija znanstvenoistraživačkog rada</i>. Fakultet organizacije i informatike, Varaždin, 1997. 		
Recommended reading	<ol style="list-style-type: none"> 1. V. Silobrčić: <i>Kako sastaviti i objaviti znanstveno djelo</i>. Jumena, Zagreb, 1989. 2. M. Žugaj, K. Dumičić, V. Dušak: <i>Temelji znanstvenoistraživačkog rada – metodologija i metodika</i>. Fakultet organizacije i informatike, Varaždin, 1999. 3. R. Zelenika: <i>Metodologija i tehnologija izrade znanstvenog i stručnog djela</i>. Ekonomski fakultet, Rijeka, 2000. 4. M. Q. Patton: <i>Qualitative Evaluation and Research Method</i>, 2nd Edition. Sage Publications Newbury Park, London, 1990. 5. G. G. Chowdhury: <i>Introduction to modern information retrieval</i>. Facet Publishing, London, 2004. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Present the system of higher education and scientific research in the Republic of Croatia Znati sustav visokog obrazovanja i znanstvenog istraživanja u RH
2.	Differentiate the methods of scientific research
3.	Search scientific databases
4.	Write scientific review without plagiarism
5.	Know the rules of writing the diploma theses

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lecture attendance	0.5	1-5	Oral presentation; Discussion; Active participation	Attendance list	5	10
Seminars	0.5	2-4	Preparatin of seminars, Work on specific tasks	Evaluation of seminars ant specific tasks	10	20
Final exam	3	1-5	Literature search; Preparation of scientific review on a selected topic; Discussion	Evaluation of scientific review and oral exam	40	70
TOTAL	4				55	100

Course title	Foodborne Hazards		
Course code	43761	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Tomislav Klapac, PhD, full prof. Tihana Marček, PhD, assoc. prof.		
Course associates			
Course content	<p><u>Lectures:</u> -pathogenic biological foodborne agents (viruses, bacteria, helminths...) -chemical contaminants in food (natural components, pesticides, additives, environmental contaminants, toxicants produced during food processing...) -physical hazards (pieces of glass, bone, metal...) in food -adverse effects caused by biological, chemical and physical agents -prevention of food contamination, destruction of pathogenic organisms, chemical and physical decontamination approaches -detection of foodborne hazards and relevant legislation</p> <p><u>Labs:</u> detection and destruction of pathogenic microorganisms; detection of <i>Trichinella spiralis</i> in pork; examination of fish for the presence of <i>Cryptosporidium parvum</i>; determination of aflatoxins in grains by HPLC; determination of heavy metals in food by AAS; application of metal detectors in food industry</p>		
General and specific knowledge acquired in course (objective)	This course focuses on sources, adverse health effects, prevention, decontamination, detection and legislation on food safety hazards.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	oral plus two written (mid-term and final) exams		
Credits	4	Language	Croatian, English
Compulsory reading	1. U.S. Food & Drug Administration, Center for Food Safety & Applied Nutrition: <i>The Bad Bug Book</i> , FDA/CFSAN, Rockville, 2003. 2. T. Klapac: <i>Osnove toksikologije s toksikologijom hrane</i> , Interna skripta, Prehrambeno tehnološki fakultet, Osijek, 2002. 3. S. Duraković, F. Delaš, B. Stilinović, L. Duraković: <i>Moderna mikrobiologija namirnica - knjiga prva</i> . Kugler, Zagreb, 2002. 4. S. Duraković, F. Delaš, L. Duraković: <i>Moderna mikrobiologija namirnica - knjiga druga</i> , Kugler, Zagreb, 2002.		
Recommended reading	1. A. Wallace Hayes (ur.): <i>Principles and Methods of Toxicology</i> , Taylor & Francis, Philadelphia, 2001. 2. R.H. Schmidt, G.E. Rodrick (ur.): <i>Food Safety Handbook</i> , John Wiley & Sons, Hoboken, 2002.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	To describe the most common parasites, differentiate stages of infection, sources of parasites and health risks of the parasite presence in food
2.	To describe sources and most common microbiological risks related to food
3.	To describe types, sources and health risks related to physical and chemical food contaminants
4.	Apply appropriate measures to minimise the risks related to various food contaminants
5.	To detect biological contaminants in food samples
6.	To analyse selected toxic compounds in food samples

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures	0.2	1-4	Attendance	Attendance list	0	5
Laboratory practice	0.8	5-6	Laboratory practice	Report	10	15
Final exam	3	1-6	Literature studying	Written or oral exam (Possibility of selection between two partial written exams or single oral exam)	50	80
TOTAL	4				60	100

Course title	Instrumental Methods II		
Course code	43777	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Lidija Jakobek Barron, PhD, full prof. Ivana Tomac, PhD, assist. prof.		
Course associates	Petra Krivak, PhD		
Course content	<p><u>Lectures:</u> Electroanalytical methods. Conductometry. Potentiometry. Voltammetry. Cyclic voltammetry (CV). Differential-pulse voltammetry (DPV). Square-wave voltammetry (SQV). 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).</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>		
General and specific knowledge acquired in course (objective)	The aim of this study is to bring the students the basic knowledge about electrochemical and spectrometric instrumental methods that are used in food analysis. Through practical work students will learn about criteria for selecting instrumental techniques as well about their work principle.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		3
(total)	30		45
Examination method	Oral exam and/or 2 written exams during the semester		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. J. R. J. Pare, J. M. R. Belanger: <i>Instrumental Methods in Food Analysis</i>. Elsevier Science, Amsterdam, 1997. 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. 3. K. A. Rubinson, J. F. Rubinson: <i>Contemporary Instrumental Analysis</i>. Prentice Hall, New Jersey, 2000. 4. I. Piljac: <i>Elektroanalitičke metode</i>. RMC, Zagreb 1995. 		
Recommended reading	<ol style="list-style-type: none"> 1. D. A. Skoog, D. M. West, F. J. Holler: <i>Osnove analitičke kemije</i>. Školska knjiga, Zagreb, 1999. 2. M. R. Smith, J. G. Vos (Eds.): <i>Analytical Voltammetry</i>. U <i>Comprehensive Analytical Chemistry (vol XXVII)</i>, Elsevier, Amsterdam, 1992. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	To analyse and define validation parameters of instrumental techniques
2.	To describe principles of spectroscopic methods (UV/Vis, IR absorption spectroscopy, atomic spectroscopy), mass spectrometry, NMR spectroscopy
3.	To differentiate atomic and molecular absorption of electromagnetic radiation
4.	Describe the principles of electroanalytical methods (conductometry, potentiometry, coulometry, voltametric techniques)
5.	Solely conduct analyses on a selected instruments (UV/Vis spectroscopy, conductometry, potentiometry, voltametric techniques)
6.	To perform the validation of instrumental techniques
7.	To describe spectra of selected compounds (UV/Vis spectra, mass spectra) and conduct the identification of a compound

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures	1	1-4	Attendance; Individual problems solving	Attendance list; individual assignments evaluation	2,5	5
Laboratory practice	1.5	5-7	Laboratory work, Resulty analysis, writing the report	Attendance list; Evaluation of reports	7,5	15
Continuous knowledge check	2.0	1-4	Literature studying	Partial written exam 1 Partial written exam 2	30	50
Written exam *	2.0*	1-4	Literature studying	Written exam*	30*	50*
Final exam	0.5	1-4	Discussion	Oral exam	20	30
TOTAL	5				60	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Sensory Analysis		
Course code	43778	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Ivana Flanjak, PhD, full prof. Antonija Perl Pirički, PhD, full prof.		
Course associates	Blanka Bilić Rajs, PhD, assist. prof.		
Course content	<p><u>Lectures:</u> Introduction to sensory analysis (definition, historical 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. Statistical analysis and interpretation of results of sensory examinations.</p>		
General and specific knowledge acquired in course (objective)	Over the course of lectures and lab work, students are introduced to physiological bases, sensory attributes and methodologies of sensory evaluation.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		3
(total)	30		45
Examination method	Oral. Prerequisites: completed laboratory classes and taken written colloquium. Written examination twice in semester.		
Credits	5	Language	Croatian
Compulsory reading	1. M.L. Mandić, Lj. Primorac, T. Klapac, A. Perl, D. Kenjeric: <i>Senzorske analize. Interna skripta</i> , Prehrambeno tehnološki fakultet u Osijeku, 2002.		
Recommended reading	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.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Explain physiology behind organoleptic perception
2.	Discuss parameters which influence sensory evaluation
3.	Describe tests for the selection and training of sensory panel members
4.	Explain principles and application of sensory methods in various types of consumer testing
5.	Statistically analyse obtained results and interpret them
6.	To select and conduct appropriate sensory evaluation

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures	1	1-6	Attendance and active participation in discussions	Attendance list and active participation	4	10
Labratory practice	1.5	3,5,6	Laboratory practice; reports	Attendance list and results od assignments	6	15
Continuous knowledge check	1	1-3	Literature studying	Witten exam	10	25
Continuous knowledge check	0.5	4-6	Literature studying	Writen evaluation - calculus	8	20
Exam	1	1-6	Literature studying	Oral exam	12	30
TOTAL	5				40	100

Course title	Company Management		
Course code	43762	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Borislav Miličević, PhD, full prof. Jurislav Babić, PhD, full prof. Antun Jozinović, PhD, assoc. prof. Mario Panjičko, PhD, assist. prof.		
Course associates			
Course content	<ul style="list-style-type: none"> - The nature of strategy - How to create successful strategies - The sense of traditional wisdom - What systems in stable balance disregard in real life - Where systems with complex recurring connections lead - What unpredictability and self-emerging strategies mean for managers - What constant change and political decisions mean for control - What managers do when applying everyday management - What managers do when applying non-everyday management - Strategic management in perspective 		
General and specific knowledge acquired in course (objective)	Acquiring general knowledge on management and leadership, ability to create and make decisions that are important for successful implementation of tasks in the field of business systems functioning.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		
(total)	30		
Examination method	Oral exam. Two control tests during the semester.		
Credits	3	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. Stacey, D.R.: Strateški menedžment i organizacijska dinamika, Mate d.o.o. Zagreb, Zagreb 1993. 2. Žugaj, M., Šehanović, J., Cingula, M.: Organizacija, TIVA Tiskara Varaždin, Varaždin 2004. 		
Recommended reading	<ol style="list-style-type: none"> 1. Campbell, D.J.: Organizations and the Business Environment, Butterworth – Acinemann, Linacre House, Jordan Hill, Oxford, 1999. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define basic elements of the company
2.	Define basic skills, role and functions of company management
3.	To analyse influence of internal and external factors influencing company management
4.	To analyse successfulness of company management

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESSMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	TEACHING METHOD	
					min	max
Lectures	1	1-4	Attendance, Active participation	Attendance list and active participation	0	10
Continuous knowledge check	2	1-4	Literature studying	Partial written exam 1 Partial written exam 2	55	90
Exam*	2*	1-4	Literature studying*	Partial exam*	55*	90*
TOTAL	3				55	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	English language		
Course code	177794	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Antonija Šarić, PhD, assoc. prof. L. Budić., MSc		
Course associates			
Course content	Students are introduced to the following topics: functional food, antioxidants in food, methods in food analysis, diet for various age groups, fast food, genetically modified food. Students are introduced to different scientific discourses and rhetorical functions. The emphasis is on the ways of integrating extralinguistic and linguistic knowledge in generating meanings at the sentence and text level. Complex nominal groups, coordinated and subordinated sentences, prepositional and participle phrases are dealt with.		
General and specific knowledge acquired in course (objective)	The course objective is to enable students to comprehend and interpret various scientific discourses via recognizing text organization at the macro and micro level. Students are exposed to very specific lexis in the field of food science and nutrition.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		
(total)	30		
Examination method	The exam is composed of the written and oral part taken at the end of the first and second semester. Students are also given several smaller test during the academic year.		
Credits	2	Language	Croatian, English
Compulsory reading	1.L.Obad: <i>An English Language Workbook for Students of Food Technology III</i> . Prehrambeno tehnološki fakultet, Osijek, 2003 2.L.Obad: <i>Radni materijali iz engleskog jezika za studente četvrte godine</i> .PTF, Osijek, 2003 . 3.Ž.Bujas: <i>Veliki englesko-hrvatski rječnik</i> , Globus, Zagreb, 1999.		
Recommended reading	1.C.Hughes&McCarthy: <i>Exploring Grammar in Context</i> , CUP, 2000. 2.Ž.Bujas: <i>Veliki hrvatsko-engleski rječnik</i> , Globus, Zagreb, 1999.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Comprehend and analyse various professional text
2.	To select and explain key information from the professional discourse
3.	To recognize and apply language in writing of professional text
4.	Listen, revise and synthesize basic information based on audio and video records
5.	To prepare oral and written presentation of a selected professional topic

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESSMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lecture attendance	0.20	1-5	Lectures	List of participation	5	10
Continuous knowledge check	0.75	1-5	Literature studying	2 evaluations (written) 2 partial exams (written and oral)	25	40
Seminars	0.30	1-5	Seminar preparation	Public presentation of seminars	5	10
Final exam	0.75	1-5	Literature studying	Final exam (written and oral)	25	40
TOTAL	2				60	100

Course title	German language		
Course code	177796	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	2		
Course lecturer	Antonija Šarić, PhD, assist. prof.		
Course associates			
Course content	The collection of texts enables the students to upgrade the language competence in the field of their profession and specialization. The specialized texts are used to introduce students to language structures at the lexical, morphological and syntactic level to facilitate comprehension. The text selection is done in relation with other courses and involves topics that deal with nutrition, food biochemistry, functional food, food quality, chemistry and technology of food products. Students comprehend the text via global and detailed reading, and unite the knowledge and skills in writing and oral discourse. The emphasis is on specialized lexis and word understanding is related to extralinguistic knowledge.		
General and specific knowledge acquired in course (objective)	The course objective is to master reading skills to facilitate understanding of more complex specialized texts and to expand specialized lexis. Students also upgrade the writing skills through summary writing and question posing relating to essential information.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		
(total)	30		
Examination method	Written exam twice in semester and after the second semester both written and oral exams		
Credits	2	Language	Croatian, German
Compulsory reading	<ol style="list-style-type: none"> 1. S. Moro: <i>Radni materijal iz njemačkog jezika</i>, (Zbirka tekstova iz literature stručnih kolegija) 2. I. Medić: <i>Kleine deutsche Grammatik</i>, Školska knjiga, Zagreb, 1999. 3. T. Marčetić: <i>Deutsche Grammatik im Ueberblick</i>, Školska knjiga, Zagreb, 1999. 4. M. Uroić, A. Hurm: <i>Njemačko - hrvatski rječnik</i>, Školska knjiga, Zagreb, 1994. 		
Recommended reading	<ol style="list-style-type: none"> 1. Z. Glovacki-Bernardi: <i>Osnove njemačke gramatike</i>, Školska knjiga, Zagreb, 1999. 2. B. Jakić, A. Hurm: <i>Hrvatsko - njemački rječnik</i>, Školska knjiga, Zagreb, 1991. 3. G. Wahrig: <i>Deutsches Woerterbuch</i>, Bertelsmann Lexikon Verlag, 1997. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Comprehend and analyse various professional text
2.	Follow oral presentations from the profession on german language
3.	Reproduce text information in oral and written form
4.	Listen, revise and synthesize basic information based on audio and video records

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures attendance	0.20	1-4	Lectures	List of participation	5	10
Continuous knowledge check	0.75	1-4	Literature studying	2 evaluations (written) 2 partial exams (written and oral)	25	40
Seminars	0.30	1-4	Seminar preparation	Public presentation of seminars	5	10
Final exam	0.75	1-4	Literature studying	Final exam (written and oral)	25	40
TOTAL	2				60	100

Course title	Diet Therapy		
Course code	62327	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Ines Banjari, PhD, full prof.		
Course associates	Milica Cvijetić Stokanović, MSc		
Course content	<p><u>Lectures:</u> Preventive and clinical approach to an optimal nutrition; Nutrition of patients (gastrointestinal patients; diet in heart and blood vessel diseases; diet in kidney diseases; nutrition of oncological and haematological patients; nutrition of diabetic patients; nutrition of obese and thin persons; nutrition of trauma patients); Special diets (celiac disease, osteoporosis, psoriasis, rheumatic diseases, food allergy patients); Planning of menus for different conditions; Estimation of nutritional status and calculation of energy requirements of patients.</p> <p><u>Labs:</u> Adequate food choice in nutritional planning; Planning of menus for different diets; Calculation of energetic and nutritional value of meals.</p>		
General and specific knowledge acquired in course (objective)	The course provides awareness of adequate food choice during and after the course of disease being an important factor in determining the final outcome. Student is familiarized with the concept of specific dietary requirements depending on the nutritional and health status of individuals, planning of meals, and aims of special diets.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	Oral with two written exams during the course of semester.		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. M. Adam Perl, M.L. Mandić, A. Perl: Osnove dijetoterapije, <i>Autorizirana predavanja</i>, Prehrambeno tehnološki fakultet u Osijeku, 2004. 2. R. Živković: <i>Dijetoterapija</i>, Naprijed, Zagreb, 1994. 3. R. Živković: <i>Dijetetika</i>, Medicinska naklada, Zagreb, 2002. 4. A. Kaić-Rak, K. Antičić: <i>Tablice o sastavu namirnica i pića</i>, Zavod za zaštitu zdravlja SR Hrvatske, Zagreb, 1990. 		
Recommended reading	<ol style="list-style-type: none"> 1. M.L. Mandić: <i>Znanost o prehrani</i>. Prehrambeno tehnološki fakultet u Osijeku, Osijek, 2003. 2. M. Coulston, C.L. Rock, E.R. Mousen: <i>Nutrition in the prevention and treatment of disease</i>. Academic Press, San Diego, 2001. 3. S. Williams Rodwell: <i>Essentials of Nutrition and Diet Therapy</i>. Mosby, St. Louis, 1999. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define clinical approach in evaluation and planning of diet for hospitalised patient considering its health problems
2.	To describe HACCP principles applied in hospital kitchen
3.	Differentiate principles of diet for various diseases
4.	Identify international and national guidelines for planning and development of menus in relation to patient health status
5.	Identify specifics of menus for various health issues/diseases
6.	Apply gained knowledge in menu and diet planning

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures, Computer exercises	0.5	1-5	Attendance, Active participation	Attendance list, active participation in discussions	0	5
Cmputer exercises	1.5	1, 3-6	Specialised software, Reports	Attendance list, Evaluatin of submitted reports	20	35
Final exam	3	1-6	Literature studying	Written/oral exam	40	60
TOTAL	5				60	100

Course title	New Food Products Development		
Course code	43750	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Mirela Kopjar, PhD, full prof.		
Course associates			
Course content	The new food product definition. Research and development of the new product. Basics of the innovation analysis and trends in food production. Basics in food innovation. The role of the science, experience and methodology in the new product development. The role of the multidisciplinary teams. Steps (methodology) in new products development. The factors that are important for the new product success. The influence and the role of the management on the new product development.		
General and specific knowledge acquired in course (objective)	This course allows student to individualize his or her knowledge related to the courses got at the undergraduate study.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	
(total)	30	15	
Examination method	Written reports (seminars) during semester and oral examination at the end of courses.		
Credits	4	Language	Croatian, English
Compulsory reading	1. R. C. Baker, P. W. Hann, K. R. Robbins, Fundamentals of New Food Product Development, Elsevier, Amsterdam, 1988.		
Recommended reading	Scientific journal: Food Technology (IFT, Chicago, Ill, U.S.A.; www.ift.org)		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define new product from the aspect of food industry
2.	To explain the importance of the new food product development from the aspect of food industry
3.	To list phases of new food product development and to explain them
4.	To define and explain factors determining the success of new products on the market
5.	To prepare plan of new food product development in line with guidelines provided through the course

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESSMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures attendance	0.5	1-5	Attendance	Attendance list	6	10
Seminars	1.5	1-5	Preparation of seminars	Public presentation of seminars	24	40
Final exam	2	1-5	Literature studying	Oral exam	30	50
TOTAL	4				60	100

Course title	Food Quality and Safety Management		
Course code	88268	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Ivana Flanjak, PhD, full prof.		
Course associates			
Course content	General concept of quality, historical background. Quality management principles and standards. Food quality legislation. Statistical quality control: statistical process control, control charts, process capability, sampling procedures. Food safety and legal requirements. Risk analysis. Traceability in food safety management. Food safety management standards. Principles and implementation of HACCP system. GMP and GHP principles and implementation. Accreditation, scope, standards.		
General and specific knowledge acquired in course (objective)	The course introduces student with legislative bases, principles and methodology of food quality and safety management. Participants are provided with the skills needed to assess existing food safety and quality management systems and introduce improvements.		
Teaching method	Predavanja	Seminari	Vježbe
(hrs/week)	2		
(total)	30		
Examination method	Oral and written exam with two written exams over the course of semester.		
Credits	3	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. Zakoni, Pravilnici, Norme (ISO 9000, ISO 22000) 2. P.A. Luning, W.J. Marcelis, W.M.F. Jongen: Food quality management a techno-managerial approach. Wageningen Pers, Wageningen 2002. 3. P.A. Luning, F. Devlieghere, R. Verhe (ed): Safety in the agri food chain. Wageningen Academic Publishers Pers, The Netherlands 2006. 		
Recommended reading	1. J.M. Juran, Frank M Gryna: Quality planning and analysis/ Planiranje i analiza kvalitete/. Mate, Zagreb, 1999.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	To present roles and obligations of a subject in a food provision chain
2.	Discuss principles and tools used in food legislation
3.	Select and explain methods of product authenticity control
4.	Apply sampling plans and control maps
5.	Describe characteristics of specific phases in food quality development
6.	Explain principles of quality management with special focus on the production process
7.	To present the ISO 9001 with special focus on documents
8.	To compare various quality assurance systems

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures	1	1-8	Attendance and active participatin	Attendance list and active participation	4	10
Individual work	0.5	1-8	Individual work on a topic by students couice	Evaluation of the presentation an written report	8	20
Continuous knowledge check	0.7	1-4	Literature studying	Written and oral exam	14	35
Continuous knowledge check	0.8	5-8	Literature studying	Written and oral exam	14	35
TOTAL	3				40	100

Course title	Laboratory Quality Management		
Course code	88288	Course status	Compulsory
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Ivana Flanjak, PhD, full prof.		
Course associates			
Course content	<p><u>Predavanja:</u> Laboratory quality assurance (QA) system, Standards. Good laboratory practice, principles and rules. Accreditation in Europe. Accreditation in Croatia. EN ISO/IEC 17025–Requirements. Management requirements. Technical requirements. Validation (scope, definitions,). Performance characteristics (selectivity, specificity, accuracy/trueness, repeatability precision..) The tools of validation.</p> <p><u>Vježbe:</u> Examples of method validation</p>		
General and specific knowledge acquired in course (objective)	Course is designed to provide student with the skills needed to initiate or improve a QA system. Students will develop the expertise to validate the performance of analytical testing procedures and assess their acceptability for the laboratory needs.		
Teaching method	Predavanja	Seminari	Vježbe
(hrs/week)	1		1
(total)	15		15
Examination method	Oral and written exam with two written exams over the course of semester and one seminar paper.		
Credits	2	Language	Croatian
Compulsory reading	1. Norme: HRN EN ISO/IEC 17025 2. Zakoni, propisi 3. R. Wood R., A. Nilsson, H. Wallin.: <i>Quality in the food analysis laboratory</i> . C.H.I.P.S. Weimar, 1998.		
Recommended reading	The Fitness for Purpose of Analytical Methods. A Laboratory Guide to Method Validation and Related Topics. Eurachem, 1998. Quantifying Uncertainty in Analytical Measurement. Eurachem/Citac Guide, 2000.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define basic terms and explain specifics of laboratory quality assurance system
2.	Describe proces of laboratory accreditation
3.	Select parameters of validation for selected analysis
4.	To evaluate measurement insecurity
5.	Conduct validation of a laboratory method
6.	Write the report of conducted analysis

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures	0.5	1-4	Attendance, active participation in discussions	Attendance list	6	10
Laboratory practice	0.5	3, 5, 6	Laboratory practice - individual	Evaluation of obtained results	12	20
Continuous knowledge check	0.8	1-4	Literature studying	Partial written exam 1 Partial written exam 2	24	40
Written exam*	0.8*	1-4	Literature studying	Written exam	24*	40*
Final exam	0.2	1-6	Literature studying	Oral exam	18	30
TOTAL	2				60	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Functional Foods and Supplements		
Course code	88270	Course status	Elective
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Daniela Čačić Kenjerić, PhD, full prof.		
Course associates	Ines Banjari, PhD, full prof. Milica Cvijetić Stokanović, MSc		
Course content	<p><u>Lectures and seminars:</u> Defining functional foods, functional foods legislation (EU, US, Japan etc.), labelling 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 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 The role and position of supplements in human health. To disseminate course content, the students according the favour, elect particular content, independently elaborate, present and discuss.</p> <p><u>Labs:</u> 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>		
General and specific knowledge acquired in course (objective)	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.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	1
(total)	30	15	15
Examination method	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		
Credits	6	Language	Croatian, English
Compulsory reading	1. G.R. Gibson, M.W. Williams: <i>Functional foods</i> . CRC Press, Woodhead Publishing Limited, Boca Raton, Boston, New York, Washington, DC, 2000. 2. Lectures - written material will be prepared		
Recommended reading	1. R. 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.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Describe role and application of dietary supplements
2.	List and explain selected dietary supplement and reasons for their use
3.	Define principles of development and marketing of functional foods
4.	Present the scientific evidence for use of functional food in health promotion
5.	Present the possibilities of attenuating the functional properties of selected foods
6.	Follow the legislation regarding the functional foods and dietary supplements with special focus on dietary and health claims
7.	Apply gained knowledge in evaluating the potential of food/food compound from the aspect of functionality

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures	1	1-6	Attendance	Attendance list and active participation	6	10
Seminars	2	7	Individual work on a selected topics	Attendance list, Evaluation of seminars	12	20
Laboratory practice	0.5	7	Laboratory practice – individual work	Results of the analysis	6	10
Continuous knowledge check	1	1-3	Literature studying	Partial written exam 1	9	15
Continuous knowledge check	1	4-6	Literature studying	Partial written exam 2	9	15
Written exam*	2*	1-6	Literature studying*	Written exam*	18*	30*
Final exam	0.5	7	Literature studying	Oral exam	18	30
TOTAL	6				60	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Isolation and Clean-Up Techniques		
Course code	43782	Course status	Elective
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Dajana Gašo-Sokač, PhD, full prof. Valentina Bušić, PhD, assist. prof.		
Course associates			
Course content	<p><u>Lectures:</u> Introduction. Extraction. Chromatography (column chromatography, preparative thin-layer chromatography, high performance liquid chromatography). Ion-Exchange methods. Crystallization and final stages of purification. Special problems with the extraction of plants</p> <p><u>Labs:</u> Isolation: allicin from garlic, chatehin from green tea, azulene from chamomile, polyphenols from different vegetables</p>		
General and specific knowledge acquired in course (objective)	Learning basic methods of active substance isolation from natural sources and purification of biologically active substances from natural sources. Application of different technique of isolation in laboratory.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	Grades are based on oral examinations, class participation and written reports.		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. <i>Natural Product Isolation</i>. R. J. P. Cannell (ed.), Humana Press, Totowa, New Jersey, 1998. 2. C. F. Poole, S. K. Poole: <i>Chromatography today</i>. Elsevier, Amsterdam, Oxford, New York, Tokyo, 1991. 3. Z. Kniewald i sur: Priručnik za pripravu i izolaciju biološki djelatnih supstancija. Alfej, Zagreb, 2000. 		
Recommended reading	<ol style="list-style-type: none"> 1. <i>High – Speed Countercurrent Chromatography</i>. Y. Ito, W. D. Conway (ed.), John Wiley&Sons, New York, Chichester, Brisbane, Toronto, Singapore, 1996. 2. <i>High – performance Liquid Chromatography of peptides and proteins: Separation, Analysis and Conformation</i>. (C. T. Mant, R. S. Hodges, ed.) CRC Press, Boca Raton, Ann Arbor, Boston, London, 1991. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define methods of isolation, extraction, distillation, chromatography and crystallisation
2.	Combine chemical structure of compounds with the choice of isolation and clean-up method
3.	Predict factors influencing the efficacy of isolation and clean-up
4.	Apply gained knowledge in practical laboratory scale isolation of natural organic compounds from the plant materials

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESSMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Oral presentation, Discussion	2.5	1-4	Attendance, Active participation, Laboratory practice, Written reports	Attendance lists, Evaluation of the reports	15	30
Written exam, discussion	2.5	1-4	Literature studying	Written/oral exam	45	70
TOTAL	5				60	100

Course title	Antioxidants in Food		
Course code	88271	Course status	Elective
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Dajana Gašo-Sokač, PhD, full prof. Ines Banjari, PhD, full prof. Valentina Bušić, PhD, assist. prof.		
Course associates			
Course content	<p><u>Lectures:</u> Antioxidants and food stability. Antioxidants and health: antioxidative vitamins, polyphenols; cardiovascular diseases, cancers; predicting the bioavailability of antioxidants in food Natural and syntetic antioxidants. Antioxidation mechanisms. Factors influencing antioxidation.</p> <p><u>Seminari:</u> Individual seminars on a topic ba students choice.</p> <p><u>Labs:</u> Analysis of oxidative damage (TBK), caffeine isolation, measuring of total antioxidant capacity (honey) by FRAP method and total flavonoids determination.</p>		
General and specific knowledge acquired in course (objective)	The aim of the course is to introduce students into natural and syntetic antioxidants and their mechanisms of action. Students will also be introduced into health aspects and new studies regarding antioxidants and their role in disease prevention.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	1
(total)	30	15	15
Examination method	Active participatin through the semester and written exam		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. C. B. Bourgeois: Antioxidant vitamins and health. HNB Publishing, New York, 2003. 2. <i>Antioxidants in food</i>. J. Pokorny, N.Yanishlieva, M.Gordon (ur.), CRC Press, Boca Raton, 2001. 3. ppt of lectures 		
Recommended reading	1. H. D. Belitz, W. Grosch. P. Schieberle: Food Chemistry, Springer , Berlin, Heidelberg 2004.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define causes of ROS development
2.	Explain the connection of compounds chemical structure and its antixidatice activity
3.	Predict the factors that influence the antioxidative activity the most
4.	Define the bioavailability of antioxidants in food and differentiate the factors influencing bioavailability of coupounds of group of compounds (fat soluble vitamins)
5.	Diferentiate antioxidative activity of groups and specific copounds from foods and dietary supplements
6.	Identify the role of food antioxidants as compounds related to health protection
7.	Apply gained knowledge in laboratory practice of antioxidative activity determination by various clasical and instrumental methods

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures, seminars, laboatory practice	0.2	1-7	Active class participation	Attendance lists, Active participation in discussions	0	5
Seminar presentation	0.8	1-6	Literature studying, Writing the seminar	Evaluation of seminars	7,5	10
Laboratory practice	0.8	7	Laboratory practice, Report wriiting	Attendance, Evaluation of written reports	7,5	10
Final exam	3.2	1-7	Literature studying	Oral/written exam	45	75
TOTAL	5				60	100

Course title	Rapid Methods in Food Analysis		
Course code	43784	Course status	Elective
Study programme	Food science and nutrition		
Semester	IV		
Course lecturer	Hrvoje Pavlović, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> History and prospects for rapid and instrumental methods in microbiological examination of foods. Membrane filtration techniques. Rapid kits and immunological methods. Microbial applications of immunomagnetic techniques. Automated electrical techniques in microbiological analysis. Luminiscent techniques and applications. Modern methods for detecting and enumerating foodborne fungi. Genetic methods in food microbiology. Development of selective and chromogenic media. Miniaturized microbiological techniques and rapid cell count. The role of rapid methods in modern food industry.</p> <p><u>Labs:</u> Detection of pathogens by chromogenic plates. Membrane filtration. Nephelometric method. Immunological methods of bacterial toxin determination. Comparison of classical and rapid microbiological methods.</p>		
General and specific knowledge acquired in course (objective)	Introduction for students to rapid methods in food microbiology. The course prepares students for independent work in microbiological laboratory through application of rapid methods in food analysis.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	1	1	1
(total)	15	15	15
Examination method	oral exam		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. S. Clark, K.C. Thompson, C.W. Keevil, M. Smith: Rapid Detection Assays for Food and Water. Royal Society of Chemistry, Cambridge, 2001. 2. E. Tothill: Rapid and on-line instrumentation for food quality assurance. CRC Press, Cambridge, 2003. 3. P. Patel: Rapid analysis techniques in food microbiology. Blackie Academic and Professional. London, 1995. 4. P.J. Rangel: Rapid food analysis and hygiene monitoring. Springer, New York, 1999. 		
Recommended reading	<ol style="list-style-type: none"> 1. T. Abee, W. van Schaik, R.J. Siezen: Impact of genomics on microbial food safety. <i>Trends in Biotechnology</i>, 22, 653-660, 2004. 2. R.R. Meer, D.L. Park: Immunochemical detection methods for <i>Salmonella</i> spp., <i>Escherichia coli</i> O157:H7, and <i>Listeria monocytogenes</i> in foods. <i>Rev. Environ. Contm. Toxicol.</i>, 142, 1-12, 1995. 3. S.M. Russel: Comparison of the traditional three-tube most probable number method with the Petrifilm, SimpPlate, BioSys optical, and Bactermer conductance methods for enumerating <i>Escherichia coli</i> from chicken carcasses and ground beef. <i>J. Food Protec.</i>, 63, 1179-1183, 2000. 4. M. Manafi, W. Kniefel: Fluorogenic and chromogenic substrates used in bacterial diagnostics. <i>Microbiol. Rev.</i>, 55, 335-348, 1991. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Explain application of classic microbiological methods in various food matrixes
2.	Explain differences in sample types from the aspect of rapid method analysis
3.	Explain differences among electronic rapid methods and their application in food analysis
4.	Explain microscopic methods and their application in food industry
5.	Explain methods of separation and isolation of a selected microorganism and application of chromogenic plates in rapid pathogen analysis
6.	Apply immunological assays and methods in pathogen and toxin analysis
7.	Describe and explain genetic methods in food analysis; explain preventive approach and introduce PCR method.
8.	Explain DNA microarray and biosensors application in food industry

No	LEARNING OUTCOMES
9.	Explain validation procedures for rapid methods and present their benefits in relation to classical microbiological methods.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures and laboratory practice	1	1-9	Attendance	Attendance list	5	10
Laboratory practice	1	1-6	Laboratory performance; written report preparation	Attendance list	10	15
Final exam	3	1-9	Literature studying	Oral exam	35	75
TOTAL	5				60	100

Course title	Occupational Toxicology		
Course code	43785	Course status	Elective
Study programme	Food science and nutrition		
Semester	II		
Course lecturer	Tomislav Klačec, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> -toxicology review -potentially harmful chemical, biological and physical agents in the workplace -occupational disorders -analytical techniques in exposure assessment -selection and use of personal protective equipment -occupational health standards</p> <p><u>Labs:</u> -student will select a hazardous agent, research it to determine its properties, and in an industrial and/or laboratory setting examine its effects on workers, and recommend control measures</p>		
General and specific knowledge acquired in course (objective)	Awareness of the effects of potentially hazardous occupational exposures, methods of control, and occupational health standards.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		1
(total)	30		15
Examination method	oral plus two written (mid-term and final) exams		
Credits	5	Language	Croatian
Compulsory reading	1. T. Klačec: <i>Osnove toksikologije s toksikologijom hrane</i> , Interna skripta, Prehrambeno tehnološki fakultet, Osijek, 2002. 2. T. Klačec: <i>Toksikologija radne sredine</i> , Interna skripta, Prehrambeno tehnološki fakultet, Osijek, 2005.		
Recommended reading	1. M.I. Greenberg, R.J. Hamilton, S.D. Phillips, G.J. McCluskey (ur.): <i>Occupational, Industrial, and Environmental Toxicology</i> , Mosby, Philadelphia, 2003. 2. A. Wallace Hayes (ur.): <i>Principles and Methods of Toxicology</i> , Taylor & Francis, Philadelphia, 2001.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Identify potential sources of toxins in work environment
2.	Describe absorption, distribution and metabolism of various toxins
3.	Predict negative impacts of toxins based on the exposure conditions
4.	Apply adequate analytical procedures for the risk analysis of exposures
5.	Analyse legislative with the aim of assurance of healthy work environment

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures and laboratory practice	0.2	1-5	Attendance	Attendance list	0	5
Laboratory practice	2.8	3-5	Laboratory practice and report preparation	Report evaluation	20	65
Final exam	2.0	1-3	Literature studying	Oral exam	40	30
TOTAL	5				60	100

Course title	Computer Aided Diet Optimisation		
Course code	88272	Course status	Elective
Study programme	Food science and nutrition		
Semester	IV		
Course lecturer	Damir Magdić, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> Application of linear programming method for optimisation of nutrition models. Optimisation of raw material mixtures content. Optimisation of meal content and price. Optimisation of meal and menu according RDA recommendations. Nonlinear dynamic systems (vitamin degradation, changes of sensoric properties, changes of texture properties). Basics in digital image analysis application on raw materials and foodstuff. Optimisation of appearance of biscuits, bakery and meat products. Optimisation of appearance and colour of dairy products. Basics in sound application in analyses and modelling of raw materials for human diet.</p> <p><u>Labs:</u> Examples of optimisation of food and meal content by using linear programming method. Optimisation of raw material mixtures content, of meal content and price and optimisation of meal and menu according RDA recommendations (students, heart patients, diabetes patient, ..., different age groups and sexes). Models of vitamin degradation in food. Examples of digital image analysis application. Optimisation of appearance of biscuits, bakery and meat products. Optimisation of appearance and colour of dairy products. Examples of acoustic impulse response method application. Following of changes on fruits' and vegetables' texture stiffness.</p>		
General and specific knowledge acquired in course (objective)	<ul style="list-style-type: none"> - Application of computer and software in tasks solving - Optimisation of menus and diet plans in line with recommendation by use of software - Optimisation of menus and diet plans for various age groups - Optimisation of specific menus (athletes, people with health problems) - Computer aided analysis of foods and foodstuffs 		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	1
(total)	30	15	15
Examination method	Computer practice evaluation, written and oral examination with computer using.		
Credits	6	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. M. Mandić: <i>Znanost o prehrani</i>. PTF, Osijek, 2003. 2. D. Magdić: <i>Numeričke metode</i>. PTF, Osijek, 2001. 3. Ž. Kurtanjek: <i>Matematičko modeliranje procesa</i>. PBF, Zagreb, 2000. 4. D. Magdić: <i>Računalna analiza slike</i>, PTF, Osijek, 2001. 5. ... <i>Inženjerski priručnik - ip1</i>, Školska knjiga, Zagreb, 1996 		
Recommended reading	<ol style="list-style-type: none"> 1. R. Živković: <i>Dijetoterapija</i>. IK Naprijed, Zagreb, 1994. 2. D. Matasović: <i>Hrana, prehrana i zdravlje</i>. Fovis, Zagreb, 1992. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Compare various softwares for diet analysis, modeling and optimisation
2.	Use software for diet analysis, modeling and optimisation
3.	Prepare diet plan by software
4.	Conclude on diet plan quality based on optimisation results
5.	Evaluate positive and negative sides of prepared diet plan
6.	Prepare and present diet plan and its expected influences
7.	Follow the literature in the field of software aided diet optimisation
8.	Solely or as a team member present activities involved in computer aided diet optimisation

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures	2	1, 2, 4, 5, 7, 8	Active participation	Attendance lista and participation	20	30
Seminars	1	3-5	Discussion	Evaluation of seminars	10	15
Computer exercises	1	1, 2, 4, 5, 8	Application of computer programmes in individual tasks	Evaluation of the written report	15	25
Individual tasks	2	1-8	Literature studying	Public presentation of seminar	15	30
TOTAL	6				60	100

Course title	Technology of Confectionery and Related Products		
Course code	81740	Course status	Elective
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Drago Šubarić, PhD, full prof. Jurislav Babić, PhD, full prof. Đurđica Ačkar, PhD, full prof. Antun Jozinović, PhD, assoc. prof.		
Course associates			
Course content	<p><u>Lectures and seminars:</u> Confectionery products through the history. Trends in confectionery products production and consumption. Confectionery products and health. Raw materials in confectionery product (fats, sugar, milk, colours, emulsifiers...). Types of cocoa products. Cocoa bean, fermentation, drying and storage. Cocoa mass, cocoa powder, cocoa butter and chocolate mass production. Cocoa butter and cocoa butter replacement properties. Chocolate production. Rheological properties of chocolate. Bonbon products production. Production of other confectionery products. Chemistry and technology of coffee. Tea. Snack products. Packing materials and packaging. Product storage. Equipment in confectionery products production. Law regulations.</p> <p><u>Labs:</u> Quality of cocoa bean determination. Determination of thermophysical properties of chocolate, cocoa butter and cocoa butter replacement. Rheological properties of chocolate. Sensorial evaluation of confectionery products. Industrial practice</p>		
General and specific knowledge acquired in course (objective)	The course is intended to provide students with knowledge and understanding of confectionery and related products production, starting from raw material demands, all phases of a production, packing materials and packaging, final products storage to product quality control.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	1
(total)	30	15	15
Examination method	Oral or written examination of the whole subject matter at the end of semester or in the form of two oral exams during semester.		
Credits	5	Language	Croatian
Compulsory reading	1. S. T. Beckett (1999): Industrial chocolate manufacture and use. Blackwell Science. 2. S.T. Beckett: The science of chocolate, Royal Society of chemistry, York, 2000.		
Recommended reading	1. R.J. Clarke, R. Macrae: Coffee-Technology. Elsevier Applied Science, London, New York, 1987. 2. R.J. Clarke, R. Macrae: Coffee-Chemistry. Elsevier Applied Science, London, New York, 1985.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Describe process of cocoa grain processing and chocolate production
2.	Describe process of candies production
3.	Describe processes of snack products production
4.	Define quality parameters of foodstuffs and products for above mentioned products
5.	Describe production process of tee, coffe and similar products
6.	Define rheological properties of chocolate and list parameters influencing them

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSEMENT METHOD	CREDITS	
					min	max
Lectures and laboratory practice	2	1-6	Attendance; Active participation in discussions	Attendance list and disscussion	5	10
Seminar practice	1	1-6	Individual work on a selected topic	Public presentation of seminars	15	25
Continuous knowledge check	2	1-6	Lietrature studying	Partial written exam 1 Partial written exam 2	35	65
Final exam*	2*	1-6	Literature studying*	Written exam*	35*	65*
TOTAL	5				55	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Chemistry and Technology of Carbohydrates		
Course code	79486	Course status	Elective
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Drago Šubarić, PhD, full prof. Jurislav Babić, PhD, full prof. Đurđica Ačkar, PhD, full prof. Antun Jozinović, PhD, assoc. prof.		
Course associates			
Course content	<p><u>Lectures and seminars:</u> Polysaccharides, classification and properties. Trends in sucrose, starch, starch hydrolysates and modified starches production and consumption. Chemical and physical properties of starch. Raw material in starch production (corn, wheat, potato and rice). Corn starch production. Starch hydrolysates production. Enzymes in starch technology. Crystalline glucose production. Fructose syrups and fructose. Polyols. Modified starches, production and application in food industry. Potato and wheat starch production and application. By-products in starch industry. Sweeteners in food industry. Sucrose production from sugar beet and sugar cane. By-products in sugar beet processing. Waste water processing. Sugar production from sugar cane. Hydrocolloids, properties and application in food industry.</p> <p><u>Labs:</u> Analytical methods in carbohydrates technology. Sugar quality. Thermophysical properties of starch. Rheological properties of starch suspensions. Water holding capacity. Modified starches preparation.</p>		
General and specific knowledge acquired in course (objective)	Upgrade of specific knowledge on previously gained knowledge from natural science and engineering to provide students with an understanding of starch production from different raw material and starch hydrolysates and modified starches, as well as sucrose production from sugar beet and sugar cane. Additionally, students gain broad knowledge about starch structure, starch properties and products on starch basis as well as possibilities of application of mentioned products in food industry, and latest trends in carbohydrates production and consumption.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	1
(total)	30	15	15
Examination method	Oral or written examination of the whole subject matter at the end of semester or in form of two oral exams during semester.		
Credits	5	Language	Croatian
Compulsory reading	<p>M. W. Kearsley, S. Z. Dziedzic: Handbook of starch hydrolysis products and their derivatives., Blackie Academic & Professional, 1995. G. M. A. Van Beynum, J. A. Roel: Starch conversion technology, Marcel Dekker INC, New York and Basel, 1985. M.F. Chaplin and J.F. Kennedy, Carbohydrates analysis, IRL Press, Oxford Washington, 1986.</p>		
Recommended reading	<p>F. W. Schenck, R. E. Hebeda: Starch hydrolysis products. VCH, New York, Weinheim, 1992. R.H. Walter: Polysaccharide association structures in food, Marcel Dekker, INC, New York, Basel, Hong Kong, 1998. 3. M. Shore, N.W. Brought, J.V. Dutton and A. Sissons Factors affecting White sugar colour, Eastbourne 1984.</p>		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define chemical characteristics of carbohydrates, hydrocolloids and sweeteners
2.	Define characteristics and guide processes of starch production from corn, potato and wheat
3.	Define characteristics and guide processes of sucrose production
4.	Present basic knowledge on by-products of starch and sucrose industrial production
5.	Guide processes of production: crystalline glucose and fructose; starchy syrups, polyols
6.	Define and describe application of enzymes in technology of starch

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lectures and laboratory practice	1	1-6	Attendance; Active participation in a discussion	Attendance list	5	10
Seminars	1	1-6	Individual preparation on a selected topic	Public presentation	10	20
Continuous knowledge check	3	1-6	Literature studying	Partial written exam 1 Partial written exam 2	40	70
Written exam*	3*	1-6	Literature studying	Written exam	50*	90*
TOTAL	5				55	100

*Activity performed only in case if minimum is not achieved throughout the semester on continuous knowledge check.

Course title	Chemistry and Technology of Fruit and Vegetables		
Course code	62330	Course status	Elective B
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Mirela Kopjar, PhD, full prof.		
Course associates			
Course content	Relationship of chemical, physical and microbiological principles to processing of fruits and vegetables from procurement of raw material through preparation, preservation, packaging, storage, transportation and distribution. Emphasis on preservation methods such as sterilization, freezing, drying (dehydration), fermentation, radiation and nonthermal technologies. <u>Labs.</u>		
General and specific knowledge acquired in course (objective)	Students are getting knowledge in principles of fruit and vegetables processing and preservation.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	Written and oral examination at the end of courses.		
Credits	5	Language	Croatian, English
Compulsory reading	<ol style="list-style-type: none"> 1. T. Lovrić i V. Piližota 1994, Tehnologija konzerviranja i prerade voća i povrća, ur. akademik Milan Maceljki, Nakladni zavod, GLOBUS, Zagreb. 2. A.A. Kader, 1992., Postharvest technology of Horticultural Crops, Sec.Ed., Univ.of California, Division of Agriculture and Natural Resources, Publication 3311. 3. S. Nagy, C. S. Chen, P. E. Shaw, Fruit Juice Processing and Technology, 1993, AGSIENCE Inc., Auburndale, Florida 4. D. Arthey, and P. R. Ashurst, Fruit Processing 1996, Blackie Academic and Profesional, U.K., Chapman and Hall. 		
Recommended reading	Books for processing and technology of fruits and vegetables. Different journals.		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define chemical composition and characteristics of fruit and vegetables and factors influencing quality of fruit and vegetables as well as their products.
2.	Explain storage conditions for fruit, vegetables and their products.
3.	Describe basic principles of technology of fruit and vegetables based products.
4.	Describe factors influencing degradation of compounds in fruit and vegetables as well as in their products.
5.	Define compounds of fruits and vegetables with positive effects on human health and their stability during the processing.
6.	Define compounds of fruits and vegetables with negative effects on human health and their stability during the processing.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Lecture attendance	0.5	1-6	Attendance	Attendance list	6	10
Laboratory practice	1	1-6	Active participation	Attendance list and written reports evaluation	12	20
Final exam	3.5	1-6	Literature study	Oral exam	42	70
TOTAL	5				60	100

Course title	Technology of Milk and Dairy Products		
Course code	66935	Course status	Elective B
Study programme	Food science and nutrition		
Semester	III or IV		
Course lecturer	Mirela Lučan, PhD, assoc. prof.		
Course associates	Martina Antunović, MSc		
Course content	<p><u>Lectures:</u> Production and primary treatment of milk. Biochemistry and composition of milk. Importance of milk processing in dairy industry. Microbiology of milk and milk products. Nutritive value of milk and dairy products. Technology of milk and dairy products. Regulations and standards in dairy industry. Fermented dairy products. Probiotic, prebiotic and symbiotic in dairy industry. Specific types of dairy products.</p> <p><u>Labs:</u> Presentation of equipments and operations in dairy industry. Physical-chemical methods of analysis of milk and dairy products. Sensory evaluation of milk and dairy products.</p>		
General and specific knowledge acquired in course (objective)	The objective of this course is to provide knowledge about modern dairy technology. Lectures include description of production of main dairy products from raw milk (liquid and cultured milk, concentrated milk, milk powder, cream, butter, cheeses etc). Students will know fundamentals of modern dairy technology, as well as the role of biochemical and microbiological changes of milk and dairy products during handling, storage and processing. Emphasis is on nutritional value of milk and dairy products.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	Accepted exercise reports Oral exam		
Credits	5	Language	Croatian, Hungarian
Compulsory reading	<ol style="list-style-type: none"> 1. Lj. Tratnik: <i>Mlijeko – tehnologija, biokemija i mikrobiologija</i>. Hrvatska mljekarska udruga, Zagreb, 1998. 2. S. Miletić: <i>Mlijeko i mliječni proizvodi</i>. Hrvatsko mljekarsko društvo, Zagreb, 1994. 3. Lj. Kršev: <i>Mikrobiološke kulture u proizvodnji mliječnih proizvoda</i>. Udruženje mljekarskih radnika Hrvatske, Zagreb, 1989. 4. S. Duraković: <i>Prehrambena mikrobiologija</i>. Medicinska naklada, Zagreb, 1991. 5. D. Sabadoš: <i>Kontrola i ocjenjivanje kakvoće mlijeka i mliječnih proizvoda</i>. Hrvatsko mljekarsko društvo, Zagreb, 1996. 		
Recommended reading	<ol style="list-style-type: none"> 1. I. F. Vujičić: <i>Mlekarstvo – I. dio</i>. Naučna knjiga, Beograd, 1985. 2. R. K. Robinson: <i>Modern Dairy Technology – Advances in Milk Processing</i>, vol. 1. Elsevier Applied Science, London – New York, 1986. 3. R. K. Robinson: <i>Modern Dairy Technology – Advances in Milk Products</i>, vol. 2. Elsevier Applied Science, London – New York, 1993. 4. G. D. Miller, J. K. Jarvis, L. D. McBean: <i>Handbook of Dairy Food and Nutrition</i>. CRS Press, LLC, Boca Raton, New York, 2000. 5. E. Spreer: <i>Technologie der Milchverarbeitung</i>. VEB Fachbuchverlag, Leipzig, 1978. 		

Course title	Nutritional aspects of food preparation		
Course code		Course status	Elective B
Study programme	Food science and nutrition		
Semester	III		
Course lecturer	Tomislav Klapac, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> Positive nutritional changes during food preparation: increased digestibility of protein, starches and other nutrients, inactivation and/or removal of anti-nutrients (avidin, phytates, tannins, oxalates, protease inhibitors, etc.), improved organoleptic properties by formation of aromatic substances, reducing the content of pesticide residues, nitrates, increased shelf life, release or generation of protective substances, etc. Negative changes during food preparation: Procedures which induce positive changes, reduce losses during preparation and prevent formation of adverse by-products.</p> <p><u>Seminars:</u> Analysis of selected scientific papers from the topics of changes in food caused by food processing and preparation.</p>		
General and specific knowledge acquired in course (objective)	Course main objective is to introduce students into influences of food preparation and processing on its nutritional value. Specific aims are to introduce students with selected food preparation methods aimed to improve and/or keep nutritional value of foods along with its safety.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	0
(total)	30	15	0
Examination method	Continuous evaluation through the semester; two written partial exams, oral final exam		
Credits	5	Language	Croatian, English
Compulsory reading	<ol style="list-style-type: none"> 1. R. H. Stadler, D. R. Lineback: Process-induced Food toxicants – occurrence, formation, mitigation and health risks, John Wiley & Sons, New Jersey, 2009. 2. ppt presentations on the web of the Faculty 		
Recommended reading	<ol style="list-style-type: none"> 1. C. J. K. Henry and N. J. Heppell: Nutritional aspects of food processing and ingredients, Aspen Publishers Inc., U.S., 1998. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Classify positive and negative changes in food caused by food processing
2.	Compare methods of food preparation and their impact on positive and negative changes in food
3.	Use gained knowledge in proposing best choice of food preparation method aimed to reduce compound with adverse effects
4.	Hypothesize and present the influence of a specific food preparation method on positive and negative changes in food

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESMENT METHOD	CREDITS	
					min	max
Active participation on lectures	1	1-4	Lectures	Attendance list, Discussion	7	10
Individual task solving	1	1-4	Written report, Presentation	Evaluation of the report and presentation	18	30
Literature studying	2	1-4	Written exam	Written exam (or two partial written exams through the semester)	18	30
Literature studying	1	1-4	Final exam	Oral exam	18	30
TOTAL	5					100

Course title	Chemistry and WineTechnology		
Course code	62329	Course status	Elective
Study programme	Food science and nutrition		
Semester	III or IV		
Course lecturer	Anita Pichler, PhD, full prof.		
Course associates			
Course content	<p>Grape vine origin, botanic properties of grape vine, family, genera (species), subgenera and grape vine types. Wine-growing region in R. Croatia, zones, regionsubregion, wine-growing hills and viticultural (vineyard) location. Grape as the raw material for wine production, mechanical and chemical grape composition, chemical composition of must, water, carbohydrates, resinous substances, mucilaginous substances, organic acid, colored substances, tanins, aromatic compounds, waxen and greasy compounds, compounds of nitroge, vitamins, enzimes, mineral substances. Grape sorts for wine production, grape sorts for white wine production, grape sorts for red wine production. Grape vintage, meaning for maturity and vintage time, transport and grape reception for processing. Technological process of white wines manufacturing. Technological process of red wines manufacturing. Usage and effects of sulphure dioxide in must and wine, mechanisms and effects on the stability and protection of must and wine. Wine stabilization, natural stabilization, wine decauting, clearing and coloidal phenomenon, clearing and stabilization processes. Chemical composition of wine, organic acid, alcohol and volatile compounds, carbohydrates, extractive substances, compounds of nitrogen, compounds of phenols, aroma substances. Categorization of wine by Wine Law and Regulation of wine production. Fruit wines, raw materials for fruit wine productions, fruit wines production, stabilization and fruit wine bottle filling. Methods of chemical analyses of wine.</p>		
General and specific knowledge acquired in course (objective)	The course objective is to provide students with special knowledge of wine production, chemical composition of must and wine, procedures of fermentation, stabilization, bottle filling and determination of chemical composition and wine quality.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	Written and oral examination of the whole subject matter at the end semester or in form of two written exams during semester and oral at the end of semester		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. P. Riberean Gayon, D. Dubourdieu, B. Doneche, A. Lonvaud: Handbook of Enology <ol style="list-style-type: none"> a. Volume II: The Chemistry of Wine Stabilization and Treatments. b. Volume I: The Microbiology of Wine and Vinifications, Wiley, 2000. 2. R. B. Boulton, V. L. Singleton, L. F. Bisson, R. I. Kuukee: Principelsw and Practies of Winemaking, The Chapman-Hall Enology Library, October 1995. 3. B. W. Zoecklein, K. C. Fugelsang, B. H. Gump, F. S. Nury, Wine Analisis and Production, The Chapman-Hall Enology Library, June 1995. 4. S. Muštović: Vinarstvo sa enohemijom i mikrobiologijom, Privredni pregled, Beograd, 1985. 5. R. Licul, D. Premužić: Praktično vinogradarstvo i podrumarstvo, Nakladni zavod Znanje, Zagreb, 1977. 		
Recommended reading	<ol style="list-style-type: none"> 1. J. J. Hadiburg: Winning with Quality, The FP2 Story, New York, 1991. 2. K. C. Fugelsang: Wine Microbiology, The Chapman-Hall Enology Library, January 1997. 3. D. R. Storm: Winery Utilities, The Chapman-Hall Enology Library, January 1997. 4. R. P. Vine, B. Bordelon, T. Browning, Winemaking: Frof Grape growing to Marketplace, TheChapman-Hall Enology Library, June1997 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	List species and types of grapes and define basics of grape production
2.	Analyse chemical composition of grapes and factors influencing grape and wine quality
3.	Differentiate grape production by grape type and explain influence of climatic conditions on the quality of grapes and wine
4.	Analyse chemical composition of grape must and wine and explain enzymatic and nonenzymatic browning of must and wine
5.	Analyse the treatment options of must and wine with sulphur dioxide
6.	Describe technological equipment in winery and technological process of white and red wine production
7.	Apply gained knowledge in problems solving related to wine production
8.	List and differentiate categories of wine based on their quality and explain each parameter

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESSMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Class attendance and active participation in laboratory practice	0.5	1-8	Lectures and laboratory practice	Attendance list, written report on laboratory task	10	20
Written exam	2	1-8	Learning from the prescribed literature and exam attendance	Written exam	20	30
Final exam	2.5	1-8	Literature studying	Oral exam	30	50
TOTAL	5				60	100

Course title	Chemistry and Technology of Oils and Fats		
Course code	62332	Course status	Elective
Study programme	Food science and nutrition		
Semester	III or IV		
Course lecturer	Tihomir Moslavac, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> Oils and fats importance in diet. Trends in oils and fats production and consumption. Composition of oils and fats. Fats biochemistry. Seeds and olive enzyme. Chemical reactions of fats and fatty acids. Properties of oils and fats (chemical and physical properties). Raw materials of oils and fats production (classification, chemical composition). Oilseeds preparation and storage. Production of animal fats and vegetable oils. Oil extraction by pressing (pre-pressing, full pressing, cold pressing). Solvent extraction. Refining (chemical, physical). Storage, stability and transport of oils and fats. Production and application of lecithin. Oils and fats products (margarine, mayonnaise, shortenings). Hydrogenation of oils.</p> <p><u>Labs:</u> Analytical methods in oils and fats technology. Examination methods of oils and fats quality. Properties determination methods of oils and fats identification. Oils and fats oxidation degree. Deterioration and sustainability of oils and fats. Rheological properties of oils, fats and products. Laboratory technological practices.</p>		
General and specific knowledge acquired in course (objective)	Upgrade of specific knowledge on previously gained knowledge from nature science and engineering to provide students with an understanding of oils and fats technology production from different raw material (vegetables and animals). Besides, students gain wide knowledge's about quality properties and sustainability of oils, fats and products, chemical composition as well as possibilities of application in production of different products in food and other industries.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2		2
(total)	30		30
Examination method	Oral or written examination in the whole subject matter is at the end of semester or in form of two oral exams during semester.		
Credits	5	Language	Croatian
Compulsory reading	<ol style="list-style-type: none"> 1. D. Swern: Industrijski proizvodi ulja i masti po Baileyju, Znanje, Zagreb, 1972. 2. W. Hamm, R. J. Hamilton: Edible Oil Processing, Sheffield Academic Press, CRC Press, England, 2000. 3. M. Rac: Ulja i masti (sirovine, kemija i tehnologija jestivih ulja i masti), Privredni pregled, Beograd, 1964. 4. B. O. Matijašević, J. Turkulov: Tehnologija ulja i masti, Univerzitet u Novom Sadu Tehnološki fakultet, Novi Sad, 1980. 5. D. Rade, Ž. Mokrovčak, D. Štrucelj: Priručnik za vježbe iz kemije i tehnologije lipida, Zagreb, 2001. 		
Recommended reading	<ol style="list-style-type: none"> 1. D. F. Gunstone: Vegetable Oils in Food Technology: Composition, Properties and Uses, C.H.I.P.S., 2002. 2. Y. H. Hui: Bailey's industrial oil & fat product, Volume 4, Edible Oil and Fat Product: Processing Technology, Culinary and Hospitality Industry Publications Services (C.H.I.P.S), 2005. 3. E. Dimić, J. Turkulov: Kontrola kvaliteta u tehnologiji jestivih ulja, Univerzitet u Novom Sadu Tehnološki fakultet, 2000. 4. R. J. Hamilton, A. Bhati: Recent Advances in Chemistry and Technology of Fats and Oils, Elsevier Applied Science, London and New York, 1987. 		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Describe the importance of plant oils and animal fats in human diet
2.	Diferentiate chemical composition of plant oils and animal fats as well as the reactions on fatty acids
3.	Describe the biochemistry and enzymes of seeds and fruits used in oil production
4.	Diferentiate type, quality and criteria of plant materials used for oil production

No	LEARNING OUTCOMES
5.	Define parameters important in oil production raw materials storage
6.	Explain preparation of raw materials (conditions, process equipment) and their influence on oil quality
7.	Differentiate technological process of raw oils and fats production (pressing equipment, extraction, schemes, equipment)
8.	Describe the processing of animal fat
9.	Define and apply refining processes on raw plant oils (chemical, physical refining)
10.	Analyse possibilities of using oil production by-products (lecithine, etc)
11.	Apply adequate storage conditions for fat and oil stabilisation
12.	Describe fat and oil deterioration
13.	Apply analytical methods to determine stability of oils and fats
14.	Define and differentiate production of unrefined and cold pressed plant oils and their quality control.
15.	Define hydrogenation of oils and describe application of edible oils and fats in production of margarines, mayonaise, shortenings etc.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures / individual consultations	0.5	1-15	Class attendance (lectures/consultations)	Attendance list, discussion	5	10
Laboratory practice	1	6-15	Laboratory practice attendance and writing the report on performed laborator task	Attendance list and evaluation of written report	10	20
Final exam	3.5	1-15	Preparation for written/oral exam	Written and oral exam	45	70
TOTAL	5				60	100

Course title	Spices and Herbs		
Course code	88274	Course status	Elective
Study programme	Food science and nutrition		
Semester	III or IV		
Course lecturer	Mirela Kopjar, PhD, full prof.		
Course associates			
Course content	History of use of herbs and spices in different cultures. Definition of herbs and spices. Types of herbs and spices. Function (primary and secondary) of herbs and spices. Preparation (production process) of herbs and spices. Use of herbs and spices. Common spices. Active compounds in common spices. Exotic spices. Toxic compounds in herbs and spices. Quality of herbs and spices. Trends in herbs and spices production, market and use.		
General and specific knowledge acquired in course (objective)	Course is aimed to introduce student into basic knowledge on herbs and spices, their use in food. Individual seminar tasks are aimed to involve student into presentation of selected herbs and spices of its choice.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	
(total)	30	15	
Examination method	Seminars throughout the semester and oral final exam.		
Credits	5	Language	Croatian, English
Compulsory reading	K.V. Peter: Handbook of herbs and spices. Woodhead Publishing Limited and CRC Press LLC. 2001. S. Raghavana: Handbook of spices, seasonings and flavorings. CRC Press, Taylor & Francis Group. 2007. K.H. Can Baser, G. Buchbauer: Handbook of Essential Oils. Science, Technology and Applications. CRC Press, Taylor & Francis Group. 2010. Y.H. Hui: Handbook of Food Science, Technology and Engineering. Taylor & Francis Group. 2006. G. Reineccius: Flavour Chemistry and Technology. Taylor & Francis Group. 2006.		
Recommended reading	Web sources, scientific journals		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Define herbs and spices
2.	Describe primary and secondary functions of herbs and spices.
3.	Compare various types of spices and their production.
4.	Explain influence of herbs and spices on human body.
5.	Explain characteristics of selected spices on human health.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESSMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures	0.5	1-5	Attendance	Attendance list	6	10
Seminar	1.5	5	Seminar preparation	Public presentation of prepared seminar topic	24	40
Final exam	3	1-5	Repetition of gained knowledge	Oral exam	30	50
TOTAL	5				60	100

Course title	Nutrition and Sport		
Course code		Course status	Elective B
Study programme	Food science and nutrition		
Semester	IV		
Course lecturer	Daniela Čačić Kenjerić, PhD, full prof.		
Course associates			
Course content	<p><u>Lectures:</u> Principles of nutrition in elevated physical activity due to athletic performance – energy, macro- and micronutrients and water intake. Dietary supplements designed specifically to athletes. Weight management. Diet and endurance sports. Diet and strength sports. Diet in athletes with specific needs. Diet planning for athletes.</p> <p><u>Seminars:</u> Translating theory into practice: Diet planning for individuals involved in various sports – sports by students choice.</p>		
General and specific knowledge acquired in course (objective)	Student will gain general knowledge on the importance of balanced nutrition (micro- and macronutrients) in athletes as well as the specific knowledge on selected sports. Translation of knowledge into skills will be practiced through the seminar tasks in which students will create diet plan for the individual involved into sport.		
Teaching method	Lectures	Seminars	Labs
(hrs/week)	2	1	0
(total)	30	15	0
Examination method	Continuous knowledge check through the semester, two written partial exams, oral final exam		
Credits	5	Language	Croatian, English
Compulsory reading	Fink HH, Mikesky AE, Burgoon LA: Practical Applications in Sports Nutrition – 3rd ed. Jones & Bartlett Learning. 212 (568 pp.)		
Recommended reading	Dunford M, Doyle JA: Nutrition for Sport and Exercise – 3rd ed. Cengage Learning, Stamford, 2015. (624 pp.)		

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	List and explain principles of nutrition in elevated physical activity
2.	List types of food supplement used in athletes and explain purpose of their use.
3.	Identify and explain reasons for weight management in athletes.
4.	Identify and explain specifics of diet in athletes engaged in various sports.
5.	Give example and explain additional demands which should be considered in diet planning for athletes with special health problems or dietary issues.
6.	Explain principles of diet planning for athletes.
7.	Analyse adequacy of diet for an individual involved into selected sport.
8.	Apply gained knowledge in creating diet plan for an athlete.

CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES, TEACHING AND ASSESMENT METHODS

TEACHING METHOD	ECTS	LEARNING OUTCOME	STUDENT ACTIVITY	ASSESSMENT METHOD	CREDITS	
					min	max
Lectures	1	1-8	Active participation – lectures	Attendance list, Discussion	7	10
Individual tasks – seminars	1	1-8	Written report, Public presentation	Evaluation of the seminar report	18	30
Written oral exam	2	1-3	Literature studying	Written exam (or two partial written exams)	18	30
Final exam	1	7, 8	Repetition and summarisation of gained knowledge	Oral exam	18	30
TOTAL	5				61	100

