

Josip Juraj Strossmayer University of Osijeku
Faculty of food technology Osijek

POSTGRADUATE DOCTORAL STUDY
FOOD TECHNOLOGY AND NUTRITION

Osijek, 2017.

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1. INTRODUCTION

1.1. Basic information on the higher education institution

Josip Juraj Strossmayer University of Osijek

Faculty of Food Technology Osijek

Franje Kuhača 20, PO box 709, 31000 OSIJEK

Phone: +385 (0)31/224-300, Fax: +385 (0)31/207-115

URL: <http://www.ptfos.unios.hr>

E-mail: office@ptfos.hr

1.2. Decision on the initiation of a new study programme

The initiation of the procedure for preparation of **an Overview of Postgraduate Doctoral Study "Food Technology and Nutrition"** resulted from the Decision of the Council of the Faculty of Food Technology Osijek, CLASS: 003-06/13-01/02, FILE NO: 2158-82-12-13-133, of 17 December 2013.

1.3. Teaching staff involved in the overview preparation

The Decision of the Council of the Faculty of Food Technology Osijek, CLASS: 003-06/13-01/02, FILE NO: 2158-82-12-13-133 of 17 December 2013 resulted in initiation of the procedure for preparation of **an Overview of Postgraduate Doctoral Study "Food Technology and Nutrition"**, which was followed by establishment of a Committee for Overview Preparation. The Committee is composed of the following members:

1. Vlasta Piližota, PhD, full professor, biotechnical sciences, food technology
2. Daniela Čačić Kenjerić, PhD, full professor, biotechnical sciences, nutrition
3. Srećko Tomas, PhD, full professor, technical sciences, chemical engineering
4. Jurislav Babić, PhD, associate professor, biotechnical sciences, food technology
5. Tomislav Klavec, PhD, full professor, biotechnical sciences, nutrition
6. Ljiljana Primorac, PhD, full professor, biotechnical sciences, food technology
7. Drago Šubarić, PhD, full professor, biotechnical sciences, food technology

2. INSTITUTION PREREQUISITIES

2.1. Developmental strategy and action plans for quality improvement at the Faculty of Food Technology Osijek

Osijek and reporting on plan implementation

The Developmental Strategy of the Faculty of Food Technology Osijek (hereinafter: FFT) for the period 2012/2013 – 2016/2017 was adopted at the first (1st) special session of the Faculty Council in the academic year 2012/2013, held on 13 November 2013. The Developmental Strategy of the FFT is available to the public at

<http://www.ptfos.unios.hr/index.php/dokumenti>.

Every strategic area includes defined strategic goals as well as methods and activities necessary for their accomplishment, and specified success indicators with regard to accomplishment of particular goals and task. The document ends with a list of persons and bodies responsible for goal accomplishment and task completion and with a plan implementation timetable.

Action Plan is a document, according to which the activities focused on quality improvement at the FFT are performed. Its implementation is continuously monitored and evaluated, which is accompanied with submitting an annual report to the Agency for Science and Higher Education.

Action Plan for Quality Improvement at the Faculty of Food Technology Osijek (2013 - 2015) is available to the public at

<http://www.ptfos.unios.hr/index.php/kvaliteta>.

The Strategic Scientific Research Programme of the Faculty of Food Technology Osijek for the period 2014 – 2018 was adopted at the sixth (6th) regular session of the Faculty Council in the academic year 2013/2014, held on 25 March 2014. The Programme is available to the public at

<http://www.ptfos.unios.hr/index.php/kvaliteta>.

2.2. Defining and announcing standards and regulations for classification of learning outcomes within the study programmes offered at the Faculty of Food Technology Osijek

The procedures for student performance evaluation and grading are laid down in the Handbook for the Monitoring and Assurance of the Quality of the Higher Education at the Faculty of Food Technology Osijek. The procedures comprise definition of grading rules and criteria, definition of the procedure for lodging a complaint about a given grade, analysis of the data on the progression to the next year of study, exam performance analysis, monitoring of the procedure for topic selection and for registration and defence of final and diploma papers as well as student mobility monitoring.

Learning outcomes and the methods for their classification are, pursuant to the above Handbook, available to the public and posted on the Faculty webpage for every single course.

These encompass data on specific activities for every course, assessment and grading/evaluation methods as well as other course-specific information. The requirements related to curricular activities, continuous monitoring and final examination can be checked for every course respectively. This set of information is available on a permanent basis and it is updated pursuant to amendments to a defined implementation plan at the beginning of every academic year.

2.3. Student participation in all the processes related to the quality assurance at the Faculty of Food Technology Osijek

Putting the students in the centre of the interest of the primary activities of the FFT (higher education; implementation of the programme of undergraduate, graduate and postgraduate university studies, scientific research in the scientific field of biotechnical, technical and natural sciences) is disclosed by student involvement in the work of most of the FFT bodies where permitted by applicable regulations of the FFT and University of Osijek as well as by the minutes of their meetings witnessing student presence.

The students are, pursuant to the Statute of the Josip Juraj Strossmayer University of Osijek and the Statute of the Faculty of Food Technology Osijek, represented in the Faculty Council by their representatives who shall make at least 15 % of the total members of the Faculty Council. Student representatives in the Faculty Council are appointed by the Student Assembly of the Faculty.

It is important to note that in the last five years, all of the regular sessions of the Faculty Council have incorporated at least one student-proposed agenda item.

The Committee for the Monitoring and Assurance of the Quality of the Higher Education at the Faculty of Food Technology Osijek shall, in accordance with the provisions of the Statute of the Josip Juraj Strossmayer University of Osijek and the Statute of the Faculty of Food Technology Osijek as well as of the Rulebook on the Establishment of a Higher Education Quality System, include, alongside of representatives of the teaching staff and assistants and external stakeholders, a student representative too. The student representative as a full member of the Committee shall attend all the sessions and be involved in all the decision-making processes within the competences of the Committee.

2.4. Participation of representatives of the labour market in the development of the Faculty of Food Technology Osijek

Representatives of the labour market are members of the Committee for the Monitoring and Assurance of the Quality of the Higher Education at the Faculty of Food Technology Osijek. The tasks and competences of the Committee are set forth in the Rulebook on the Establishment of a Higher Education Quality System at the Faculty of Food Technology Osijek.

Besides, one should mention the Association of Former Students and Friends of the Faculty of Food Technology Osijek (Decree of the State Administration Office in the Osijek-Baranya County of 25 March 2011) which is aimed at improving the studying quality, facilitating scientific research and providing current students with assistance in performing practical work and job search.

The FFT has concluded more than 40 bilateral cooperation agreements with various business entities, which regulate different forms of cooperation such as

- preparation and proposal of projects of common interest and mutual support in submitting project funding proposals to Croatian and international organizations,
- joint participation in project implementation,
- organization of professional (and/or scientific) conferences, seminars and meetings,
- staff education and training,
- organization of student visits to plants and factories and other.

2.5. Establishment of an IT system intended for collecting, managing, processing and reporting on the statistical data related to the organization and implementation of study programmes and programmes needed for quality assurance

Like all the other faculties in the Republic of Croatia, the Faculty of Food Technology takes advantage of the ISVU system (Higher Education Information System) for the purpose of collecting, managing, processing and reporting on the statistical data related to the organization and implementation of study programmes.

The ISVU support centre (Higher Education Information System) commenced with the preliminary phase of introducing ISVU support to postgraduate studies in 2014. The first phase envisages collection and analysis of applicable rules referring to all postgraduate studies.

The Ordinance on Student Documents (Official Gazette no. 91/14) prescribes that the student ID card is a document, i.e. a public document which proves student status and ensures that postgraduate students are provided with a student ID card and registered within the system.

The student ID card and student status records kept within the ISAK and ISSP information systems by the Ministry of Science, Education and Sports are expected to be used by a central database for student status verification in all the business processes of the above Ministry, accreditation and other business processes of the Agency for Science and Higher Education, and processes of other authorities authorized to use these data.

Statistical research DOKTORANDI i DOKTORI ZNANOSTI (DOCTORAL STUDENTS AND PHD DEGREE HOLDERS) is conducted pursuant to the Annual Implementation Plan of Statistical Activities of the Republic of Croatia while based on the Act on National Statistics, this research implies the liability of higher education institutions to submit annual reports to the Central Bureau of Statistics of the Republic of Croatia.

2.6. Standards and regulations of the higher education institution related to the study programme periodical revision involving external experts

The frequency of conducting revision of study programmes and modes of their implementation are defined in the Quality Handbook which is open to the public and available at

<http://www.ptfos.unios.hr/index.php/kvaliteta>

By means of formal mechanisms, the FFT programmes and qualifications pass through an approval, a verification and a monitoring stage, no matter if that concerns evaluation of a new study programme or amendments to approved study programmes according to:

- Act on Quality Assurance in Science and Higher Education (Official Gazette no. 45/09),
- Rulebook on the Content of Accreditation and the Requirements for Issue of Accreditation for Conducting Higher Education Activities, Study Programme Implementation and Higher Education Institution Reaccreditation (Official Gazette no. 24/10),
- Instructions for Drawing Up Study Programme Proposals given by the Agency for Science and Higher Education (of 22 December 2010) and
- Rules for Conducting the Procedure for Evaluation of the Study Programmes of Undergraduate and Graduate University and Specialist Studies of the Josip Juraj Strossmayer University of Osijek (of 10 June 2009).

2.7. Standards and regulations related to student rights protection, particularly with respect to providing information, receiving and dealing with student complaints and procedures for student rights protection.

For the purpose of fulfilling ethical principles, fostering values and monitoring conduct, the FFT has established a disciplinary board for teaching staff and associates and a disciplinary board for students. The scope of these boards is governed by the *Rulebook on the Disciplinary Responsibility of Teaching Staff and Associates* and the *Rulebook on the Disciplinary Responsibility of Students at University Level*:

<http://www.ptfos.unios.hr/images/stories/pdf/dokumenti/Dokumenti%20na%20razini%20Sveu%C4%8Dili%C5%A1ta/Pravilnik%20o%20stegovnoj%20odgoovrnosti%20nastavnika.pdf>

<http://www.ptfos.unios.hr/images/stories/pdf/dokumenti/Dokumenti%20na%20razini%20Sveu%C4%8Dili%C5%A1ta/Pravilnik%20o%20stegovnoj%20odgovornosti%20studenta.pdf>

The Rulebook on the Studies and Studying at the Josip Juraj Strossmayer University of Osijek and the Rulebook on the Postgraduate Studies at the Josip Juraj Strossmayer University of Osijek regulate in detail study quality monitoring, establishment and implementation of studies, organization of classes and studying rules for part-time and full-time students attending the undergraduate, integrated undergraduate and graduate studies as well as graduate and postgraduate university studies established and implemented by the University:

<http://www.ptfos.unios.hr/images/stories/pdf/dokumenti/Dokumenti%20na%20razini%20Sveu%C4%8Dili%C5%A1ta/Pravilnik%20o%20studijima%20i%20studiranju.pdf>

2.8. Standards and regulations related to the continuous training of the Faculty staff

The FFT supports the professional development of teaching and technical staff in various ways: pedagogical-psychological-methodological-didactic training for the FFT teaching staff; in compliance with available funds, the FFT finances or co-finances participation of research

and technical staff in conferences, professional and scientific meetings; covers the doctoral study costs at other universities; supports organization of scientific and professional meetings; approves gap years and similar.

The general standards and regulations on the continuous training of FFT staff are laid down in the Act on Scientific Activity and Higher Education, the Requirements for Election in Scientific Positions stipulated by the National Science Council and the Minimum Requirements for Election in Scientific-Teaching and Teaching Positions set forth by the Croatian Rectors' Conference.

The FFT particularly encourages its scientific staff to take up vocational training abroad in a way that it does not hinder their absence from the Faculty, connects them with institutions which have entered into a cooperation agreement with the Faculty and informs them about available scholarships and other.

The FFT shows great concern for vocational training of its non-teaching staff in a way that it, in order to follow applicable or apply new legal regulations, refers all the employees who are required to attend additional training for performing certain tasks to seminars, workshops and similar.

After completion of a training/seminar, FFT employees shall fill in a report template and submit it to the vice-dean for science.

2.9. Assurance of the quality of work performance of all the Faculty departments

The non-teaching staff provides students with support through the operations of the student administration, library, IT system and other extracurricular activities. For the purpose of evaluation, students' impressions, opinions and experiences related to the work performance of the technical and administrative staff are collected in line with the procedure stipulated by the Handbook for Quality Assurance (item 6.2. of the Handbook). Aiming to provide continuous and target training, the Faculty Strategy anticipates preparation of a training plan for the non-teaching staff.

3. GENERAL ON STUDY PROGRAMME

3.1. Name of study

Food Technology and Nutrition

3.2. Study provider / implementer

Josip Juraj Strossmayer University of Osijek, Faculty of Food Technology Osijek

3.3. Type of study programme (specialist or university)

University

3.4. Level

3 - Postgraduate university study

3.5. Scientific discipline

4. Biotechnical sciences

3.6. Scientific field

4.0.5. Food Technology

4.0.6. Nutrition

3.7. Scientific branch

All branches within the fields Food Technology and Nutrition.

3.8. Admission Requirements

Applications for admission to postgraduate university study "Food Technology and Nutrition" will be taken into consideration only if submitted by candidates who have completed graduate / undergraduate studies in the field of food technology, biotechnology and nutrition while those

who have completed relating undergraduate or graduate studies (e.g. pharmacy, chemical engineering, engineering technology, agronomy, biology, chemistry and similar) in the Republic of Croatia or abroad can get admitted if they pass exams in courses within undergraduate and/or graduate study offered at the Faculty of Food Technology, which are deemed necessary for attending postgraduate university study "Food Technology and Nutrition". Such exams shall be passed prior to taking exams in postgraduate study courses. Decisions on supplemental exams are made by the Faculty Council following a proposal of the Committee for Obtaining a PhD Degree. The passed supplemental exams shall not be incorporated in the ECTS credit sum.

A postgraduate university can be attended by a person who has completed an undergraduate or graduate study within a relating scientific field with the GPA of at least 3.50 or above or an equivalent GPA in case of foreign students who were subject to other grading systems.

Exceptionally, candidates whose GPA achieved in the undergraduate or graduate study was below 3.50 can get accepted if their application is supplemented with references issued by two university professors working at the higher education institution which such candidates have graduated from. Decisions on an Admission Approval are made by the Faculty Council following a proposal of the Committee for Obtaining a PhD Degree.

After having been matriculated in the 1st year of study, candidates who have completed a relating scientific postgraduate master study can opt for recognition of corresponding ECTS credits obtained in compulsory and elective courses.

A completed scientific postgraduate study carries 15 ECTS credits in extracurricular activities.

Candidates who have completed a specialist postgraduate study within a relating scientific field can be, in accordance with a study programme, recognized corresponding ECTS credits obtained in elective courses.

A completed specialist postgraduate study carries 10 ECTS credits in extracurricular activities.

Foreign candidates are admitted to the study under the same conditions as Croatian citizens.

3.9. Duration of study

A full-time postgraduate university study lasts in the principle three years, but on justified grounds which should be accompanied with an explanation, this period can be extended to five years. Such a decision is made by the Expert Board of the study provider.

A part-time postgraduate university study shall not last more than five years, but on justified grounds which should be accompanied with an explanation, this period can be extended to seven years. Such a decision is made by the Expert Board of the study provider.

3.10. Total ECTS credits

180 ECTS credits

3.11. Academic title obtained upon study completion

A doctoral degree (PhD.) is obtained after meeting all the prescribed requirements and public defence of a doctoral thesis.

Major Food Technology: doctoral degree (PhD.) in biotechnical sciences, scientific field Food Technology

Major Nutrition: doctoral degree (PhD.) in biotechnical sciences, scientific field Nutrition.

3.12. Accredited undergraduate and graduate studies offered at the Faculty of Food Technology Osijek

The documents on accredited undergraduate and graduate studies are enclosed with this Overview.

Since the academic year 2005./2006, the FFT has been providing undergraduate and graduate studies according to the principles of the Bologna Process:

- Undergraduate study **Food Technology**,
- Graduate study: **Food Engineering; Process Engineering; Food Science and Nutrition**.

According to the definition of the Institute of Food Technologists (IFT, USA, 1964), food technology is an application of science and engineering in the production, processing, packaging, distribution, preparation and use of wholesome healthful and nutritionally valuable food.

The curriculum of existing undergraduate study "Food Technology" comprises, as derived from the definition, a number of contents based on the latest knowledge in the field of food chemistry, biochemistry and microbiology and on engineering knowledge related to food production and food quality assurance. Also, the contents of the study are built on the latest knowledge in the design and production of wholesome healthful and nutritionally valuable food products.

After completing this undergraduate study, the graduates possess sufficient knowledge to continue their education and start graduate studies (Food Engineering, Process Engineering, Food Science and Nutrition) as well as enough skills and competences enabling successful performance of tasks in food and relating industry plants, process management, process and product quality improvement, laboratory work and other.

3.12. Harmonization of the proposed study programme with the strategic goals of the higher education institution

The Developmental Strategy of the Faculty of Food Technology for the period 2012/2013 – 2016/2017 includes establishment of a new postgraduate university study. The goals and structure of the proposed postgraduate university programme have been harmonized with the Strategy of the Faculty of Food Technology and Josip Juraj Strossmayer University of Osijek.

For 44 years, the Faculty of Food Technology Osijek has been conducting various studies in the field of food technology and nutrition. The studies have been completed to date by:

- 382 bachelor's degree holders;
- 1120 graduate engineers;

- 224 master's degree holders;
- 5 masters of science attending a postgraduate study;
- 46 PhD degree holders;
- 27 specialist degree holders.

Today, the Faculty of Food Technology Osijek is a higher education institution which offers studies harmonized with relating European studies and which has successfully implemented the Bologna Process, according to which one undergraduate study ("Food Technology") has been provided since the academic year 2005/2006 and through three graduate studies ("Food Engineering", "Process Engineering" and "Food Science and Nutrition") since the academic year 2008/2009. The FFT conducts postgraduate education through postgraduate doctoral study "Food Technology and Nutrition" and postgraduate specialist studies "Food Safety and Quality", "Traditional Meat Product Technologies" and "Nutrition". Along with formal education, the Faculty offers and organizes various programmes within the concept of lifelong learning.

3.13. Competences and qualifications obtained upon proposed study completion

After completing postgraduate university study "**Food Technology and Nutrition**", the postgraduates are expected to possess the following key competences:

- broad theoretical and practical knowledge acquired in courses related to food, the technological process of its production and its impact on human health;
- awareness of the sociological and ethical consequences of the development in the field food technology and nutrition;
- ability to critically assess and comprehend food-related scientific literature;
- ability to work alone, in a team or with experts from relating areas;
- ability to analyse a problem applying mathematical and statistical principles;
- ability to critically analyse, evaluate and synthesize new and complex ideas;
- ability to understand basic concepts and conduct scientific research in the area of food technology or nutrition;
- ability to acquire and interpret new knowledge through original research and publishing of the results of own research in national and internationally recognized publications aimed at generating new knowledge and understanding;
- ability to present the results and conclusions of original research to experts and popular audience in a clear and efficient way;
- ability to apply knowledge and implement new technologies and procedure for advancement of production and organization processes;
- ability to independently study general and specific problems in the area of food technology or nutrition as well as to participate in scientific research projects in the country and abroad.

After completing the study, the candidates are provided with the possibility of employment and postdoctoral training in various institutions in the country and abroad.

3.14. Mechanism for ensuring vertical student mobility in national and international higher education

Students attending postgraduate university study "Food Technology and Nutrition" can obtain a maximum of 10 ECTS credits by enrolling in corresponding courses within other studies at the Josip Juraj Strossmayer University of Osijek or other universities in the Republic of Croatia or elsewhere in the world. Attending a study abroad for at least three months implies 20 ECTS credits in extracurricular activities.

3.15. Link between the proposed study and, basic and modern skills and profession

The proposed study (majors: Food Technology and Nutrition) is based on the yearlong experience of the Faculty of Food Technology in teaching at all three levels of higher education (undergraduate, graduate and postgraduate), scientific research within the framework of numerous international scientific and professional projects, and cooperation with other research institutions in the country and abroad and with the industrial sector.

The study is provided in accordance with the latest knowledge and skills based thereon and is as such comparable with programmes offered in the EU Member States. The appertaining curriculum contains topics revolving around the latest achievements in food technology and nutrition. Apart from applying classical, direct teaching methods, the study greatly leans on the evaluation and recognition of learning outcomes realized through extracurricular learning forms. The curriculum also encompasses detailed elaboration of all the extracurricular and curricular activities. In regard to learning outcomes, the emphasis is put on the competences for generation and evaluation of new knowledge and on the development of abstract and creative ways of thinking.

The interdisciplinary study programme pays special attention to the development of skills necessary for successful scientific research and transfer of knowledge and skills, aiming to improve the quality of higher education and research institutions, enhance industrial competitiveness and foster smooth adjustment of the candidates to permanent changes and the complex needs of a contemporary work environment. The most important transferrable skills which have been incorporated in the curriculum involve teamwork, oral communication and presentation, problem solving, work organization, time management and business awareness (understanding the market and conditions for running a successful business).

Lecturers whose references reveal that they are professionally and scientifically active in the field of food technology and nutrition represent a guarantee for successful transfer of contemporary knowledge and skills.

3.16. Link between the study and local community needs

The curriculum of postgraduate doctoral study "Food Technology and Nutrition" is aimed at expanding knowledge and skills, which is to contribute to the growth of companies dealing with nutrition and appertaining services. Furthermore, after completing the study, the students are expected to possess knowledge and skills needed for development of new products.

Students who have completed postgraduate doctoral study "Food Technology and Nutrition" at the Faculty of Food Technology Osijek are eligible for employment in higher education institutions, research institutes, the economic sector ((both private and state-owned), Croatian ministries, the Croatian Food Agency, public health institutes, hospitals as well as local,

regional and state agencies engaged in preparation of food technology and nutrition-related programmes and other.

3.18. Analysis of the employability of students having completed the study programme, including an opinion of three organizations dealing with the labour market on the suitability of expected learning outcomes for labour market needs

The food industry is one of the most relevant industrial branches in the Republic of Croatia, which, in comparison with other branches of the processing industry, realizes the highest revenue and employs the most people. Pursuant to the data provided by the Agency for Investments and Competiveness (<http://www.aik-invest.hr/sektori/prehrambena-industrija/>), currently there are more than 3,000 food and beverage manufacturing companies with more than 65,000 employees in the Republic of Croatia. The proposed study programme attempts to satisfy the needs of the dynamic labour market and contribute to the strengthening of the food processing sector. Besides, the doctoral students can compete for a job in higher education institutions, research institutes, Croatian ministries, the Croatian Food Agency, public health institutes, hospitals and other. According to the latest data of the Croatian Employment Agency (November 2015.), currently there are no registered unemployed holders of a PhD degree in the field of food technology and nutrition.

In compliance with analysis of students attending doctoral study "Food Technology" at the Faculty of Food Technology Osijek, it is evident that doctoral studies are mostly enrolled by working people with the aim of acquiring new competences and skills and getting promoted in their career. Moreover, most doctoral students are covered the costs of studying by their employers, which is a good indicator of the employers' wish for continuous learning of their employees and thus advancement of their business. The proposed programme of postgraduate doctoral study "Food Technology and Nutrition" was prepared with assistance of potential candidates from the economic sector.

The Faculty of Food Technology Osijek provides a one-year postgraduate study entitled "Nutrition" which is enrolled, on average, by 10 domestic and international students every year. Many students wish to start the proposed doctoral study and choose nutrition for their major. An opinion of three labour market-related organizations on the suitability of expected learning outcomes for labour market needs are enclosed with the survey.

3.18. Comparison of the proposed university study with the relating international accredited programmes of respected higher education institutions, particularly those in the EU Member States

Postgraduate doctoral study "Food Technology and Nutrition" can be compared with similar studies focusing on food technology, food engineering, food science and nutrition in Europe and in the rest of the world. European universities offering such study programmes include the Biotechnical Faculty of the University of Ljubljana (Slovenia), BOKU (Vienna, Austria), University of Bristol (Bristol, UK), DTU - Technical University of Denmark (Lyngby, Denmark), Wageningen University (Wageningen, the Netherlands) and several US universities such as VirginiaTech (Blacksburg, VA), North Carolina State University (Raleigh, NC), CLEMSON UNIVERSITY (Clemson, SC) and other. The curricula of the above foreign universities as well as of the proposed study at the Faculty of Food Technology Osijek comprise only few

mandatory courses (out of the total courses) based on classical teaching methods and these refer to research methodology in certain fields.

Owing to the comparability of the proposed postgraduate university study with the relating programmes of prominent higher education institutions in the EU Member States, the students are provided with the mobility option. In addition, foreign postgraduate students can opt for attending particular courses at the Faculty of Food Technology Osijek or for conducting part of their research there. These and similar issues are regulated by means of inter-institutional agreements, which enables not only course attendance but also performance of joint research and preparation of doctoral theses at partner institutions as well as postgraduate student co-mentorship.

3.20. Previous experience of the proposing body in organizing the same or similar university studies

For more than 44 years (since 1976), the Faculty of Food Technology Osijek has been educating food engineers. Since 1997, it has provided postgraduate master courses (Food Engineering) and since 2002, it has also offered a doctoral study (Food Engineering).

Today, the Faculty of Food Technology Osijek is a higher education institution which has successfully implemented the Bologna Process and now offers harmonized studies at European level. It conducts postgraduate education through postgraduate doctoral study "Food Technology and Nutrition" and postgraduate specialist studies "Food Safety and Quality", "Traditional Meat Product Technologies" and "Nutrition". Along with formal education, the Faculty offers and organizes various programmes within the concept of lifelong learning.

3.20. Partners beyond the higher education system which are expected to participate in study implementation

Croatian Veterinary Institute (Cooperation Agreement of 20 February 2015)

3.21. Development of the International Cooperation of the Faculty of Food Technology Osijek with Croatian and foreign scientific institutions

The Faculty of Food Technology Osijek is proud of its fruitful cooperation with scientific institutions in Croatia and abroad. The international cooperation is mostly based on international projects, membership in international associations and on the CEEPUS and ERASMUS mobility programmes.

The Faculty of Food Technology Osijek is involved in the following international associations:

- *International Association for Cereal Science and Technology (ICC).*
- *The International Honey Commission (IHC).*
- *ISEKI Food Association (IFA)*
- *European hygienic engineering & design group (EHEDG)*

In the last five years, the Faculty of Food Technology Osijek has organized or co-organized the following international conferences:

- "Ružičkine dani (Ružička Days)" (2010, 2012 and 2014). Initiated by the Faculty in 2010, "Ružičkine dani" have become an international conference co-organized with EFFOST and since 2012 with EuCheMS too,
- conference "Brašno – Kruh (Flour – Bread)" (2011, 2013 and 2015) co-organized with ICC,
- "Voda za sve (Water for All)", is organized every year and in 2015, it gained an international character
- co-organizer of the 48th Croatian and 8th International Symposium on Agriculture in 2013
- co-organizer of international symposium "Power of Microbes in Industry and Environment 2010",
- co-organizer of the "International Medicinal Mushroom Conference" (2011).

Besides, the Faculty of Food Technology Osijek is a co-organizer of the conference "Hranom do zdravlja (With Food to Health)" which is held in Tuzla (Bosnia and Herzegovina) and gained an international character in 2015. The other co-organizers were the Faculty of Technology of Tuzla and the HiST University of Trondheim (Norway).

In 2008, the Faculty of Food Technology Osijek launched a scientific magazine named *Croatian Journal of Food Science*. The magazine was first released in 2009. It is published twice a year, indexed in the CAB *abstracts*, FSTA (*Food Science and Technology Abstract*) and EBSCO databases and available on the *Hrčak* portal. It uses the services of 85 consulting editors from the EU, USA, Asia, South America and neighbouring countries.

Together with the Faculty of Pharmacy of the University of Tuzla, the Faculty of Food Technology Osijek published a scientific magazine for nutrition and dietetics entitled *Hrana u zdravlju i bolesti (Food in Health and Disease)* which was first released in Tuzla in April 2012.

The Faculty of Food Technology Osijek encourages vocational training of its research-teaching staff through different forms of funding (CEEPUS, ERASMUS and similar). The mobility and cooperation result from bilateral cooperation agreements concluded with similar institutions in surrounding countries:

- Faculty of Technology of the University of Novi Sad, Serbia,
- Faculty of Agriculture and Food Technology of the University of Mostar, Bosnia and Herzegovina,
- Faculty of Chemistry and Chemical Engineering of Maribor, Slovenia,
- Faculty of Agriculture and Food Sciences of Sarajevo, Bosnia and Herzegovina.
- "St. Clement of Ohrid" University of Bitola „Sv. Kliment Ohridski“, Faculty of Biotechnical Sciences of Bitola, Macedonia
- University of Belgrade, Faculty of Chemistry, Serbia.

In the last five years, the Faculty of Food Technology Osijek has worked on international projects with the following foreign higher education institutions:

- Universidad de Lleida, Spain,
- BOKU University, Austria,
- Glasgow Caledonian University, Glasgow, Scotland,
- Aristotle University of Thessaloniki, Greece,

- Technological Educational Institute of Western Macedonia, Greece
- University of Food Technologies, Plovdiv, Bulgaria,
- University of Economics - Varna, Bulgaria,
- "St. Clement of Ohrid" University of Bitola - Bitola, Macedonia,
- Ss. Cyril and Methodius University of Skopje, Macedonia,
- University of Belgrade, Serbia,
- University of Novi Sad, Serbia,
- Tessedik Samuel College, Hungary,
- Politehnica University of Timisoara, Romania,
- Agora University, Romania,
- Telford College of Arts and Technology, UK,
- Southwest University, China,
- Corvinus University of Budapest, Hungary,
- University of Udine, Italy.
- University of Montenegro, Faculty of Medicine, Montenegro.
- University of Ljubljana, Biotechnical Faculty, Slovenia.

3.22. Regulated professions – the mode setting forth harmonization with the minimum training requirements prescribed in the Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications and the Act on Regulated Professions and the Recognition of Foreign Professional Qualifications

A document called "A List of Regulated Professions in the Republic of Croatia" (pursuant to Article 72 paragraph 1 of the Act on Regulated Professions and the Recognition of Foreign Professional Qualifications – Official Gazette no. 124/09, 45/11, Zagreb, May 2013) does not contain regulated professions referring to the proposed study programme.

4. DESCRIPTION OF THE PROGRAMME

The organization and implementation of the postgraduate university study is described in detail in the *Rules for the Implementation of Postgraduate University Studies*.

The postgraduate university study is organized as a three-year study (6 terms).

The curriculum of the doctoral study includes as follows:

- Curricular activities (minimum 50 ECTS credits);
- Extracurricular activities (Table 4.2.2) (minimum 60 ECTS credits);
- Registration and defence of doctoral theses (20 ECTS credits);
- Scientific research under supervision and with assistance of a supervisor or co-supervisor, which is to result in preparation and defence of a doctoral thesis (50 ECTS credits).

Postgraduate doctoral study "Food Technology and Nutrition" offers two majors:

1. Food Technology
2. Nutrition

The curriculum of both majors of postgraduate doctoral study "Food Technology and Nutrition" consists of two groups of courses:

- compulsory (required) and
- elective.

The classes are scheduled for the first two years of the study whereat the students are required to obtain at least 50 ECTS credits on the grounds of curricular activities and exams.

First year students are obliged to obtain not less than 20 and not more than 30 ECTS credits as well as to take up at least two compulsory courses.

Second year students shall attend the rest of the compulsory and/or elective courses.

The rest of the necessary ECTS credits (minimum 130 ECTS credits) can be obtained through compulsory and elective activities, defence of the doctoral thesis topic and preparation and defence of the doctoral thesis.

The deadline for full-time study completion is five years and the deadline for part-time study completion is ten years. Pursuant to a decision of the Expert Board of the study provider, the deadline for study completion can be extended on justified grounds by another two years.

Table 4.2.1. Students' liabilities per year

	1 st year	2 nd year	3 rd year
Curricular activities	<ul style="list-style-type: none"> • obtain min. 20 - max. 30 ECTS credits from compulsory and elective courses. • take up min. 2 compulsory courses. 	<ul style="list-style-type: none"> • enrol in compulsory and/or elective courses (min. 20 - max. 30 ECTS credits) 	-
	obtain min. 50 ECTS credits on the ground of attending required and elective courses.		
Extracurricular activities	Credits from extracurricular activities (Table 4.2.2.)		

The postgraduate university study is organized as a three-year study (Table 4.2.1.). Based on curricular activities (lectures, seminars and practices), the students shall obtain 50 ECTS credits and the rest of the necessary credits (130 ECTS credits) through extracurricular activities, registration and defence of the doctoral thesis (Table 4.2.2.).

First year student shall enrol in at least two required courses.

First year students are obliged to obtain not less than 20 and not more than 30 ECTS credits from required and elective courses.

Second year students shall attend the rest of the compulsory and/or elective courses.

The requirements for advancement to a subsequent year refer to completed liabilities in the current year of the study.

There are no requirements for enrolling and attending a particular course within the postgraduate study.

Registration and defence of the topic of the doctoral thesis (positive report of the Board for Evaluation of the Topic of the Doctoral Thesis) imply 20 ECTS credits.

Preparation and defence of the doctoral thesis entails 50 ECTS credits.

Table 4.2.2. Rating of student extracurricular activities.

No.	Activity	Credits
1.	Trips abroad (months, days)	7
2.	Scientific papers belonging to category a1	15
3.	Scientific papers belonging to category a2	7
4.	Scientific papers belonging to category a3	4
5.	Scientific papers reviewed and published in the collection of works from a scientific meeting	2
6.	Science book and monograph	15
7.	Chapter in a book or monograph	10
8.	Lecture at an international scientific meeting	5
9.	Lecture at a domestic scientific meeting	3
10.	Participation in international scientific meetings	2
11.	Participation in international scientific meetings	2
12.	Work on projects	5
13.	Awards	1-5

Note:

Until the defence of the doctoral thesis, the candidate shall obtain at least 30 ECTS credits on the grounds of publishing scientific papers belonging to categories a1, a2 and a3, out of which at least one paper shall be classified as a1* (*requirements for appointment in the field of biotechnical sciences).

4.1. The list of compulsory and elective courses

Compulsory courses

Module: Food technology

Course code	Course title	Hours	L	P	S	ECTS
PTN101	Food process engineering	30	25	0	5	10
PTN102	Food chemistry	30	20	5	5	10
PTN103	Heat and mass transfer in food processing	30	25	0	5	10
PTN104	Planiranje eksperimenata i analiza rezultata	30	15	10	5	10

Compulsory courses

Module: Nutrition

Course code	Course title	Hours	L	P	S	ECTS
PTN105	Nutritional needs throughout the life cycle	30	20	0	10	10
PTN106	Clinical nutrition	30	20	10	0	10
PTN107	Physiological and biochemical aspects of nutrition	30	25	0	5	10
PTN104	Planiranje eksperimenata i analiza rezultata	30	15	10	5	10

Elective courses

Module: Food technology

Course code	Course title	Hours	L	P	S	ECTS
PTN108	Achievements in technology of oils and fats	20	15	4	1	6
PTN155	Achievements in technology, processing and preservation of fruits and vegetables	20	15	0	5	6
PTN109	Achievements in technology of carbohydrates	20	14	3	3	6
PTN110	Achievements in wine technology	20	15	5	0	6

PTN111	Achievements in Technology of Flour Production and Processing	20	15	0	5	6
PTN112	Achievements in technology of milk processing	20	15	0	5	6
PTN113	Meat and fish technology achievements	20	15	0	5	6
PTN114	Technology of indigenous meat products	20	15	5	0	6
PTN115	Malting and brewing technology achievements	20	15	0	5	6
PTN116	Novel food packaging materials	20	15	0	5	6
PTN117	Food microbiology	20	15	0	5	6
PTN118	Mycotoxicology	20	10	5	5	6
PTN119	Food quality and safety management	20	15	0	5	6
PTN120	Application of sensory analysis in the food industry	20	10	5	5	6
PTN121	Development of new products in food industry	20	15	0	5	6
PTN122	Instrumental methods of analysis	20	10	0	10	6
PTN124	Modern extraction techniques	20	15	0	5	6
PTN125	Kinetic modelling of special techniques of drying in food-process engineering	20	10	0	10	6
PTN126	Non-destructive methods of processes and food analysis	20	15	0	5	6
PTN127	Natural organic compound	20	15	0	5	6
PTN128	Modern technologies for water purification	20	10	5	5	6
PTN129	Waste Management in Food Industry	20	10	0	10	6
PTN130	Food process design and optimisation	20	10	5	5	6
PTN131	Organic Food Production and Processing	20	15	0	5	6
PTN132	Achievements in technology of confectionery products	15	12	0	3	4
PTN133	Generic processes in technology of alcoholic drinks production	15	8	0	7	4

PTN134	Technology of Cereals-Based Functional Products	15	15	0	0	4
PTN135	Minimally processed fruits and vegetables	15	10	0	5	4
PTN136	Food additives	15	12	0	3	4
PTN139	The energy efficiency of the process of the food industry	15	10	0	5	4

Elective courses

Module: Nutrition

Course code	Course title	Hours	L	P	S	ECTS
PTN140	Functional foods	20	10	0	10	6
PTN141	Food additives	20	10	0	10	6
PTN142	Phytonutrition	20	15	0	5	6
PTN143	Nutrition from the aspect of public health	20	15	0	5	6
PTN144	Nutritional epidemiology	20	15	0	5	6
PTN145	Food proteomics	20	10	5	5	6
PTN146	Dietary assessment and nutritional status	20	15	0	5	6
PTN147	Personalized nutrition	15	5	5	5	4
PTN148	Alternative nutrition	15	10	0	5	4
PTN149	Nutritional aspects of food preparation	15	10	0	5	4
PTN150	Weight reduction diets and prevention of obesity	15	15	0	0	4
PTN151	Nutrition and Sport	15	5	0	10	4
PTN152	Food – drug interactions	15	10	0	5	4
PTN153	Biochemical analytics in nutritional research	15	10	3	2	4
PTN154	Selected topics in food toxicology	15	10	0	5	4

4.1. Elective courses from other study programmes

Students who have opted for courses from other study programmes or other postgraduate university studies (maximum 10 ECTS credits from elective courses) shall be graded after analysis of the credit system of the respective postgraduate study, i.e. after examination of the credit loads carried by the respective course.

4.2. Study completion

The study is considered completed after meeting all the prescribed study programme requirements or after obtaining at least 180 ECTS credits and after public defence of the doctoral thesis.

The procedure for registration, evaluation and defence of doctoral theses is defined in the *Rules for the Implementation of Postgraduate University Studies* and the Ordinance on Postgraduate Studies of the Josip Juraj Strossmayer University of Osijek.

4.3. Conditions under which students who have interrupted their study or have lost the right to study within a study programme may continue their study

In compliance with the Ordinance on Postgraduate Studies of the Josip Juraj Strossmayer University of Osijek:

- Students who have lost the status of a student of a postgraduate university study due to its interruption may resume it if it has not been more than three years since the day of the study interruption and if the study programme has not been significantly amended (more than 20 % of the programme) meanwhile.
- Applications for approval of study resumption accompanied with corresponding documentation prescribed by the study provider shall be submitted to the Postgraduate Study Board.
- The decision on the approval of study resumption is made by the Postgraduate Study Board and contains the approval itself, recognition of exams with grades and ECTS credits obtained during the study, and the amount of tuition prescribed for the current generation of students.

5. STUDY IMPLEMENTATION CONDITIONS

5.1. Study programme implementation site

Osijek, F. Kuhača 18 i 20 (University Headquarters, Trg Sv. Trojstva 3)

5.2. Classrooms

The study programme takes advantage of the existing classrooms and equipment of the Faculty of Food Technology the Josip Juraj Strossmayer University of Osijek.

The equipment and classrooms of a partner institution beyond the high education system are also going to be utilized.

Analysis of the study coverage by the teaching staff employed by the higher education institution with respect to the total teaching staff necessary for implementation of the study programme

Number of higher education institution employees involved in the implementation of the study programme	36
Number of external associates involved in the implementation of the study programme	7
Number of ECTS credits covered by the higher education institution employees involved in the implementation of the study programme	306
Number of ECTS credits covered by the external associates involved in the implementation of the study programme	26
ECTS credits covered by the teaching staff employed by the higher education institution with respect to the total teaching staff necessary for implementation of the study programme (u %)	92.2

Table 4.5. Student/teaching staff ratio

Optimal number of students	30
Number of higher education institution employees involved in the implementation of the study programme	36
Student/teaching staff ratio	0.83

5.9. The costs of studying per student

The costs of studying per student total 60,000.00 HRK (20,000.00 HRK per year). In case a student decides to attend some other university during his/her study, the referring costs shall not be included in the above costs.

5.10. Monitoring of the quality and efficiency of the study programme implementation

The procedures for carrying out certain activities related to quality monitoring, assurance and improvement shall be conducted pursuant to the applicable Rulebook for the Monitoring and Assurance of the Quality of the Higher Education at the Faculty of Food Technology Osijek. The Rulebook and other documents relating to the monitoring, assurance and improvement of the quality of the study is available on the official webpage of the Faculty:

<http://www.ptfos.unios.hr/index.php/kvaliteta>.

5.11. Student support

Apart from education through formal study programmes, the Department of Vocational Student Guidance and other competent services provide students with the possibility of participation in various trainings.

Some of the workshops held in the previous period are as follows:

- "Time Management" – workshop organized by the Department of Vocational Student Guidance, held on 3 December 2014
- "Communication Skills – Nonverbal Communication" – workshop organized by the "Tehnos" Association, held on 13 November 2014; workshop leader Robert Raponja, associate professor
- "Writing CV and Supporting Letter" – workshop organized by the Department of Vocational Student Guidance, held on 5 November 2014.

Workshops organized by the Department of Vocational Student Guidance are held on a periodic basis.

Beside the above trainings intended specifically or primarily for students, the latter have the possibility to attend all the lectures organized by the "Tehnos" and "DKT" associations, the work of which is bound to the Faculty.

		N	N+1	N+2	N+3	N+4
1.	Operational revenue	21,844,503.00	22,062,948.00	21,953,726.00	21,953,726.00	21,953,726.00
a)	Foreign aid (grants) from entities within the general government	226,748.00	229,015.00	227,882.00	227,882.00	227,882.00
b)	Revenue from assets	39,388.00	39,782.00	39,585.00	39,585.00	39,585.00
c)	Revenue from administrative fees and based on special regulations	1,177,473.00	1,189,248.00	1,183,360.00	1,183,360.00	1,183,360.00
d)	Own revenue (market-related revenue)	1,113,296.00	1,124,429.00	1,118,862.00	1,118,862.00	1,118,862.00

e)	Donations by legal entities and natural persons beyond the general government	122,002.00	123,222.00	122,612.00	122,612.00	122,612.00
f)	Revenue from the budget for funding the regular activities of the budget beneficiary	19,126,377.00	19,317,641.00	19,222,009.00	19,222,009.00	19,222,009.00
g)	Other revenue	39,219.00	39,611.00	39,415.00	39,415.00	39,415.00
2.	Operational expenditure	20,965,900.00	21,175,559.00	21,070,730.00	21,070,730.00	21,070,730.00
a)	Personnel costs (salaries, contributions and other personnel costs)	16,639,131.00	16,805,522.00	16,722,327.00	16,722,327.00	16,722,327.00
b)	Material costs (reimbursement of costs to personnel, material and energy, service costs and other costs)	4,247,918.00	4,290,397.00	4,269,158.00	4,269,158.00	4,269,158.00
c)	Financial expenditure (interests and other financial expenditure)	33,627.00	33,963.00	33,795.00	33,795.00	33,795.00
d)	Subventions	-	-	-	-	-
e)	Aid provided abroad and within the general government	-	-	-	-	-
f)	Compensation to citizens and households based on insurance and other compensation	2,224.00	2,246.00	2,235.00	2,235.00	2,235.00
g)	Other expenditure	43,000.00	43,430.00	43,215.00	43,215.00	43,215.00
3.	Surplus/deficit of operational revenue (6 - 3)	878,603.00	887,389.00	882,996.00	882,996.00	882,996.00
a)	Revenue from sale of real assets	3,560.00	3,596.00	3,578.00	3,578.00	3,578.00
b)	Expenditure for purchase of real assets (buildings, plants and equipment, transportation means, books etc.)	862,828.00	871,456.00	867,142.00	867,142.00	867,142.00
4.	Surplus/deficit of revenue from real assets (7 - 4)	-859,268.00	-867,861.00	-863,564.00	-863,564.00	-863,564.00
a)	Receivables from financial assets and loans	-	-	-	-	-
b)	Liabilities for financial assets and loan repayment	-	-	-	-	-
5.	Surplus/deficit of expenditure from financial assets and liabilities (8 - 5)	-	-	-	-	-

6.	Total revenue and receivables	21,848,063.00	22,066,544.00	21,957,303.00	21,957,303.00	21,957,303.00
7.	Total expenditure and liabilities	21,828,728.00	22,047,015.00	21,937,872.00	21,937,872.00	21,937,872.00
8.	Surplus/deficit of revenue and receivables	19,335.00	19,528.00	19,432.00	19,432.00	19,432.00

	N	N+1	N+2	N+3	N+4
1. State	19,353,125.00	19,546,656.00	19,449,891.00	19,449,891.00	19,449,891.00
a) budget of the Ministry of Science, Education and Sports	19,338,125.00	19,531,506.00	19,434,816.00	19,434,816.00	19,434,816.00
b) other competent ministries and public institutions	15,000.00	15,150.00	15,075.00	15,075.00	15,075.00
c) local and regional self-government units	-	-	-	-	-
2. Own revenue	2,333,717.00	2,357,054.00	23,45,386.00	23,45,386.00	23,45,386.00
a) tuition fees	1,720,511.00	1,737,716.00	1,729,114.00	1,729,114.00	1,729,114.00
b) research projects	548,521.00	554,006.00	551,264.00	551,264.00	551,264.00
c) publishing	21,737.00	21,954.00	21,846.00	21,846.00	21,846.00
d) other operational revenue	42,948.00	43,377.00	43,163.00	43,163.00	43,163.00
3. Donations	122,002.00	123,222.00	122,612.00	122,612.00	122,612.00
4. Other	39,219.00	39,611.00	39,415.00	39,415.00	39,415.00
5. Total (1+2+3+4)	21,848,063.00	22,066,544.00	21,957,303.00	21,957,303.00	21,957,303.00