



## **Dual Curricula – Study and Work Practice in Agriculture and Food Safety (DualAFS)**

# **GUIDE**

## **FOR BACHELOR CURRICULA IN FOOD ENGINEERING AND TECHNOLOGY (FET)**



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**ERASMUS+, KA2 – COOPERATION FOR INNOVATION & EXCHANGE OF GOOD PRACTICES**

**CAPACITY BUILDING IN THE FIELD OF HIGHER EDUCATION - JOINT PROJECTS**

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# **1. RATIONALE FOR THE REORGANISATION OF THE BACHELOR DEGREE PROGRAMME "FOOD ENGINEERING AND TECHNOLOGY"**

This guideline provides general information for the curriculum and professional practice of the Bachelor's Degree in "Food Engineering and Technology", offered by the Faculty of Food Technology of "The University "Isa Boletini" Mitrovicë. It is focused on the objectives that students have to achieve from the upgraded curriculum specifically to provide information on the organization of professional practice: the procedures and regulations before, during, and after the practice including the assessment methods. Furthermore, the roles and responsibilities of each participating group in the process are defined.

## **1.1. GENERAL DESCRIPTION OF THE STUDY PROGRAM "FOOD ENGINEERING AND TECHNOLOGY"**

Food Engineering and Technology is a multidisciplinary field of study that includes the whole food chain from farm to fork, starting from food production, processing, preparation, evaluation, etc.

The bachelor study program in "Food Engineering and Technology" as the name suggests focuses on topics related to Food Engineering and Technology with emphasis on providing knowledge with theoretical and practice, aiming to prepare successful food engineers and technologists in the food processing and safety sector and sub-sectors.

In this study program, knowledge is offered for the fundamentals of science, decision-making skills, the improvement of industrial production, innovation for food production, IT, and teamwork skills.

The multidisciplinary studies in various areas such as plant and animal origin materials, engineering and technology, food technology, and safety are suitable for students who intend to be employed as food engineers and technologists in agro-processing industries, sanitary inspectors in public institutions, and starting their food businesses.

Some of the specific objectives of the study program are:

- Developing students' skills to design and advance technological processes in the food industry;
- Preparation of students with professional knowledge of the needs of food industry development,
- Enables students with modern technological transformation methods,
- Promoting research activities on conservation methods and quality and food safety management systems.

## 1.2. RATIONALE FOR THE RESTRUCTURING OF THE CURRICULUM

Theoretical and practical professional training is considered the most important factor for food technologists in the labor market of the private and public sectors. Practice allows students to have hands-on experience in the professional field of studies.

There were many changes in the socio-economic development of Kosovo, while the unemployment rate remained high for graduates. The strategy of institutions of HEIs and government needed to be focused on the third mission and connection of studies with research and work-life partners into building capacities for the labor market.

Based on many studies in our country students lack professional practice and this is directly related to the employability rate of graduates. The National Education Strategy Draft (Chapter: Higher Education) 2022-2026, announced for public discussion, shows that there is a lack of practical work and connection with research of programs (<https://konsultimet.rks.gov.net/viewConsult.php?ConsultationID=41439>). It also says that “The practical work of students remains an underdeveloped aspect”. The study programs do not officially foresee the students' practical work as part of the curriculum, and the engagement in practical work is done individually by the students and not in a controlled manner by the institution. Apart from specific study programs where practice is unavoidable, in most other study programs, higher education institutions do not provide practical work. Moreover, career guidance and counseling services for students remain quite limited”.

The development of food technology in Kosovo and the need for experts in the labor market of the private and public sectors, has presented the need to build up capacities to follow the development trends. For this reason, the curriculum of the bachelor study program on “Food Engineering and Technology” in partnership with European universities has started the process of curriculum upgrade.

Food Engineering and Technology as a study profile has many students and continually emphasizes the need for professionalism, meaning a scientific curriculum toward an applied-oriented system, aiming to increase the professional practice in the study program.

Based on the results of the backdrop description survey that was undertaken in the framework of DualAFS, in which students, academic staff, representatives from private companies, and public institutions there is a need to upgrade the current bachelor study program. As such, professional practice placement of students in on-industry/businesses, public institutions, or faculty will prepare experts and enhance the employability of students.

As a partner in the "Dual Curricula - Study and Work Practice in Agriculture and Food Safety / DualAFS" project the Faculty of Food Technology at UIBM, aimed to upgrade the study program by increasing the laboratory exercise hours and implementing professional practice to prepare students for the everyday challenges and increase the employability.

### 1.3. GOALS OF THE UPGRADED CURRICULUM

In the upgraded curriculum of the study program “Food Engineering and Technology” integrated with professional practice, the main goal is improving the practical skills of the students through *increasing the laboratory exercise on professional subjects* and linking the theoretical part by *incorporation of professional practice*. This will contribute to increasing their *employment possibilities* and *fulfill the needs of the labor market for qualified food engineers and technologists for research and development in this field*.

The goals of the upgraded curriculum will be achieved through:

- Implementation of **professional practice in Companies/Scientific Research Institutions** of students for 2 weeks in which students will have hands-on experience in the industry. They will study real-life problems of the industry or case studies projects, according to the curriculum of the study program.
- Linking theoretical knowledge in the classroom to practice placement on industry or problem-solving-related case studies.

### 1.4. STRUCTURE OF THE “UPGRADED CURRICULUM”

The structure of the upgraded bachelor curricula in “Food Engineering and Technology” is indicated in the table below.

**Table 1. List of modules and total work load**

Nr	Module	Sem.	hrs/ wk.	Total hours			ECTS	Workload, hrs =ECTS x 25 h *
				Total	Lect	Pract		
<b>1<sup>st</sup> Study Year</b>								
<b>Semester I (15 weeks)</b>								
1	Mathematics I	I	5	75	45	30	7	
2	Physics	I	5	75	45	30	6	
3	General Chemistry	I	5	75	45	30	7	
4	Basis of Informatics	I	4	60	30	30	6	
5	English Language I	I	3	45	30	15	4	
6	German Language	I						
<b>Total 1<sup>st</sup> semester</b>				<b>330</b>	<b>195</b>	<b>135</b>	<b>30</b>	<b>750</b>
<b>Semester II (15 weeks)</b>								
7	Mathematics II	II	5	75	45	30	7	
8	Inorganic Chemistry	II	5	75	45	30	7	
9	Organic Chemistry I	II	4	60	30	30	6	
10	Biology	II	5	75	45	30	6	
11	English Language II	II	3	45	30	15	4	
12	German Language II	II						
<b>Total of semester II</b>				<b>330</b>	<b>195</b>	<b>135</b>	<b>30</b>	<b>750</b>
<b>Total of ECTS of the 1<sup>st</sup> Study Year</b>							<b>60</b>	<b>1500</b>
<b>2<sup>nd</sup> Study Year</b>								

	<b>Semester III (15 weeks)</b>							
13	Engineering Thermodynamics	III	5	75	45	30	7	
14	Physical Chemistry	III	5	75	45	30	6	
15	Organic Chemistry II	III	5	60	30	30	7	
16	Fluid Mechanics	III	4	60	30	30	6	
17	Ecology In the Food Industry	III	4	60	30	30	4	
18	Materials of Plant Origin	III						
	<b>Total 3<sup>rd</sup> Semester</b>			<b>330</b>	<b>180</b>	<b>150</b>	<b>30</b>	<b>750</b>
	<b>Semester IV (15 weeks)</b>							
19	General Microbiology	IV	5	75	45	30	7	
20	General Biochemistry	IV	5	75	45	30	6	
21	Heat and Mass Transfer	IV	4	60	30	30	7	
22	Analytical Chemistry	IV	4	60	30	30	6	
23	Colloidal Chemistry	IV	4	60	30	30	4	
24	Sensor Analysis	IV						
25	Materials of Animal Origin	IV						
	<b>Total for 4<sup>th</sup> Semester</b>			<b>330</b>	<b>180</b>	<b>150</b>	<b>30</b>	<b>750</b>
	<b>Total of ECTS, 2<sup>nd</sup> year</b>						<b>60</b>	<b>1500</b>
	<b>3<sup>rd</sup> Study Year</b>							
	<b>5<sup>th</sup> Semester (15 weeks)</b>							
26	Food Microbiology	V	5	75	45	30	5	
27	Basics of Reactor Engineering	V	4	60	30	30	5	
28	Food Quality Control	V	4	60	30	30	5	
29	Milk Processing Technology	V	5	75	30	45	5	
30	Fruit and Vegetable Processing Technology	V	4	60	30	30	5	
31	Fermentation Technology	V						
32	Software Application in Food Engineering	V						
33	Meat Technology	V						
34	Honey Production Technology and beekeeping by-products	V						
35	Legislation in Food Safety	V						
	<b>Total of semester V</b>			<b>390</b>	<b>195</b>	<b>195</b>	<b>30</b>	<b>750</b>
	<b>6<sup>th</sup> Semester (15 weeks)</b>							
36	Basics of Toxicology	VI	5	75	45	30	5	
37	Food Science I	VI	4	60	30	30	5	
38	Food Industry Processes	VI	4	60	30	30	5	
39	Water Preparation	VI	4	60	30	30	3	
40	Packaging and Storage Technology	VI						
41	Food Industry Economics	VI						
42	<b>Professional practice</b>	VI	-	-			3	<b>75</b>
43	<b>Bachelor thesis</b>	VI	-	-			9	<b>225</b>
	<b>Total of semester VI</b>			<b>255</b>	<b>135</b>	<b>120</b>	<b>30</b>	<b>750</b>
	<b>Total ECTS of 3<sup>rd</sup> study year</b>						<b>60</b>	<b>1500</b>
	<b>Total: Study years I+II+III, weeks</b>	<b>90</b>					<b>180</b>	<b>4500</b>

\*According to the by-laws in force 1 ECTS = 25 working/teaching hours.



## 1.5. DESCRIPTION OF CHANGES IN THE CURRICULA

In the framework of the DualAFS project, aiming to upgrade the curriculum of studies, having more lab exercises and professional practice, the Department of Technology in FFT in UIBM has initiated to upgrade the bachelor study program in “Food Engineering and Technology”.

The changes to the existing curriculum focus on fulfilling the quality standards provided by the Kosovo Accreditation Agency following:

- Law on Higher Education in the Republic of Kosovo, law nr. 04/1-037 for higher education in the Republic of Kosovo.
- Draft National Education Strategy 2022-2026, Strategic Objective 4 - Higher Education.
- Statute of the University “Isa Boletini” in Mitrovicë.

Faculty of Food Technology (UIBM) as a partner of the international project "Dual Curricula – Study and Work Practice in Agriculture and Food Safety" within the Erasmus + program, has applied the following changes:

### 1<sup>st</sup> and 2<sup>nd</sup> SEMESTER

- There was no change in the curriculum for the first academic year;
- These modules are developed in comparison with other international programs that have the same General Curricula;

### 3<sup>rd</sup> and 4<sup>th</sup> SEMESTER

- The list of second-year modules was kept as it was.

### **Changes in the 3rd Year of the FET curriculum**

#### 5<sup>th</sup> SEMESTER

- All existing modules were kept in the curriculum but there were changes within the modules.
- In the 5<sup>th</sup> semester Milk Processing Technology from elective module changes to compulsory. This was a request from the Milk Processing Industry Association. The practical laboratory lessons (lab exercises) hours changed from 2 to 3 hours/week.
- Two modules were added as electives in the 5<sup>th</sup> semester: Honey Production Technology and beekeeping by-products and Legislation in Food Safety Control. Our country has many honey producers and this module will enhance the knowledge of students in this field. The Legislation module is important as students will need more information about European and state legislation.

## 6<sup>th</sup> SEMESTER

- Semester VI will be reorganized as a semester that has all the existing modules in the curriculum but there was added on-industry/business/faculty professional practice, which lasts a total of 2 weeks or 10 days of practice on the industry and has a workload of 3 ETCS. It has been calculated that 7 hours of practice in the industry/day or a total of 70+5 hours of professional work directly in the industry. The changes within the modules are:
  - a) Module Water Technology and Processing of Wastewater from Food Industry was renamed as Water Preparation;
  - b) The economy in Food Engineering was renamed as Food Industry Economics
  - c) Modules Water Preparation, Packaging and Storage Technology, and Food Industry Economics, the practical laboratory exercise hours (module exercises) increased from 1 to 2 hours/week.

During this semester:

- The ETCS load of the "Professional Practice" module is 3 ECTS.
- Bachelor thesis has 9 ECTS and it is graded.

### **1.6. COMPETENCES AND SKILLS ACQUIRED BY THE STUDENTS**

Food Engineering and Technology study program refers to academic competencies, the ability to get adequate employment and meet the labor market needs, combining the theoretical aspect with the practical one and developing the student's personality in the areas of specialization.

The program FET offers a study program based on contemporary curricula, with scientific achievements and research accomplished in this field. The level of professional achievement and the scientific bases that students achieve with this study program are solid for the development of the food industry.

After finishing Bachelor studies, we evaluate that graduates will be prepared for:

- storage of raw materials and final products of plant and animal origin.
- the work of the engineer, respectively of the technologist in the food industry,
- to lead the technological processes in the food industry,
- to perform laboratory analysis,
- to use the software in food engineering,
- to identify the factors that affect the quality of food,
- to be part of the engineering team in food process engineering,
- gain basic knowledge for further studies in the field of engineering and food technology.

## **1.7. EMPLOYMENT POSSIBILITIES OF “FOOD ENGINEERING AND TECHNOLOGY” GRADUATES**

The food industry is evolving rapidly in Kosovo and businesses have an increasing demand to fulfill the food safety standards to be part of the global market. The economic development of our country is related to the agriculture and food processing sectors. Developing trends in the food processing sector are oriented towards producing high-quality products which can be achieved by trained professionals. To ensure that the implementation of the DualAFS project in the Faculty of Food Technology aimed to upgrade the curriculum to ensure that the program follows the trends and prepares the needed professionals.

The knowledge gained in the undergraduate studies in this study program will prepare adequate cadres for research institutes, public and private institutions, and enterprises both in the country, in the region but also abroad, as well as in the education process for the education of future staffs in the field of Food Engineering and Technology. Graduates can work as food engineers, food technologists, sanitary inspectors, food business managers, quality control, food analysis, research and development, etc. These possibilities can be found in the public sector: ministry, municipality, food and veterinary agency, regional water companies, teachers in vocational schools, and the private sector: dairy industry, meat industry, flour industry, beverage industry, drinking water production, wine and beer industry, bakery, packaging industry, private businesses, etc.

## **1.8. ADMISSION CRITERIA TO THE STUDY PROGRAM AND TUITION FEES**

The UIBM Senate, based on the proposal of the academic units and in agreement with the Kosovo Agency for Accreditation/State Quality Council (KAA/SQC) for program accreditation, announces a competition for the admission of students, after approval by MESTI. The total number of admitted students and quotas, the criteria for competition, the necessary documentation for application and registration, the way candidates are selected, the procedures related to the organization and holding of the entrance exam, the announcement of preliminary results, the right to appeal, the announcement of the final results are determined in detail by the public competition announced by UIBM.

Every candidate who passes the matriculation test has the right to compete for studies at FTU according to the legislation in force. The conditions for admission to basic studies - bachelor are:

- successful completion of secondary school in Kosovo, certified by a diploma;
- successful completion of primary and secondary school with at least twelve (12) years of education certified by a relevant diploma;
- successful completion of primary and secondary school at least twelve (12) years of schooling certified by a relevant diploma, obtained in the outside world, if the equivalence with the matriculation diploma has been made. The decision on the recognition of the diploma and the equivalent is obtained from MESTI.

*The candidate is required to submit in person the following documentation:*

- a) Extract of birth certificate*
- b) Copy of identification document*
- c) Record books of all high school classes*
- d) High School Matriculation Diploma with confirmation of the points obtained in the matriculation exam for educational subjects*
- e) Matura certificate, if there was a matura exam (original, notarized or duplicate)*
- f) Application form*
- g) Evidence of the recognition of education abroad*

The selection of candidates is based on the competition criteria, while the lists with the preliminary results are made public on the websites of the academic units and in physical form on the premises of the faculty.

Payments for bachelor's studies will be made based on the fees determined by the administrative instructions of MESTI and the decisions of the Governing Council of UIBM. Currently, the annual study fee is based on administrative instruction (MESTI) no. 09/2021 application of student payments in public institutions of higher education (All students are exempted from the payment of tuition fee from article 2, paragraph 1, subsection 1.1 and 1.3 and article 3 paragraph 1 subsections 1.1 and 1.2 of this Instruction, when they register the semester for the first time).

Moreover, there are scholarships for students who have a GPA above 8.

**2. GUIDELINE FOR ON-INDUSTRY/BUSINESSES TRAINING IN THE BACHELOR'S DEGREE PROGRAMME “FOOD ENGINEERING AND TECHNOLOGY (FET)”**

## 2.1. PARTNERS FOR THE REALIZATION OF PROFESSIONAL PRACTICE

The objective of the work-based learning and practical training, that is offered by the study program is to link theory with practice, knowledge learned during courses to be applied, and gain practical experience from real-life industry situations and problems.

Based on the regulations for basic studies – bachelor in FFT (based on the DualAFS project outcomes) Article 7- **Learning development** states: Learning is carried out in the form of lectures, seminars, theoretical exercises and laboratory exercises, practical work, and professional excursions, professional consultations and through the scientific - research work of students with physical participation.

1. The student must accumulate 3 ECTS credits from professional practice.

Also, Article 9 **Practical Work and Field Work**, states that:

1. During the studies, the student is obliged to spend a certain period in practical professional work according to the study program.
2. Practical work is carried out in manufacturing enterprises, or other cases also in scientific research institutions under the leadership of the professional worker and the supervision of the teacher designated by the Dean of the Faculty or the leader for practical work.

a) *The partners for the implementation of professional practice will be:*

- Agri-food Collection and Storage Companies
- Food & Beverage Processing Companies
- Central, regional, and local public institutions (municipality, Kosovo Food and Veterinary Agency, etc.)
- Food Processing Associations
- National Institutes
- Scientific research institutions

***b) Selection of companies for professional practice***

Companies/Institutions for the completion of the professional practice will be based on their food-related economic activity and the practice modules (courses). Companies must be from the whole country as students can have more possibilities to choose between different industries.

***c) Institutionalization of cooperation between the university and companies for professional practices. (FFT).***

c.1) Extension of FFT Agreements – companies/businesses/associations- Institutionalization of cooperation and contribution between the FFT and companies for the development of professional practices is done through existing Cooperation Agreements as well as new/improved ones with companies/businesses /associations. The agreements aim to regulate the modalities related to the professional practice of students in the companies and appreciate their contribution.

c.2) Cooperation with mutual benefit. The cooperation of the FFT with companies contributing to the practical training of students will create a relationship of mutual benefit, through the professional practice and bachelor thesis of the student with mentor and FFT can some services for contributing companies, such as solving problems, training and analysis with reduced fees, etc., as well as the involvement and cooperation of companies in research and development projects.

***d) Distribution of students to companies, farms, public institutions***

Students select the Company/Scientific Research Institution where they will do the professional practice based on the network list and cooperation agreements that it is offered by the *Faculty of Food Technology*. They can propose to other companies and choose the module and company based on their preferences and interests for their career advancements.

*The supervisor of the Company/Scientific Research Institution before their acceptance can interview, propose, and select the candidates.*

## 2.2. STRUCTURE OF PROFESSIONAL PRACTICE

### 2.2.1. *General objectives of professional practice*

The professional practice takes place during the last semester and should expand the student's practical repertoire and promote his/her ability to assume responsibility in his/her chosen profession. Also, the practice is an opportunity for the student to make connections between theoretical studies and the requirements of professional practice. The assessment of the student's professional practice will be evaluated based on the preparation of the final report and presentation PPT related to the company/businesses or case study in the Institution where they conduct their practice.

### 2.2.2. *Elements of professional practice*

These objectives of the professional practice will be realized through the development of its structuring as follows:

- **Professional practice in a Company**, during which the students, according to the program, received by the department, under the guidance of the mentor from the FFT follow the working processes and activities of the company, as guided by the technical staff (engineer/technologist) that runs the company/business.

- **Professional practice in Scientific Research Institutions**, in the form of case studies, through course projects (project-based learning), in special professional selected topics related to the food industry. Through this form of practice, students advance the knowledge gained in the theoretical part of the curriculum and develop skills for research and development in the chosen field of food technology. The practice is done under the guidance of the mentor from the FFT. The practice shows real-life situations that are part of the job and oriented toward problem-solving.

For the professional practice, students prepare a report of the professional practice and make a presentation in PPT (see subsection: Assessment of the professional practice), based on which the student's assessment of the professional practice is also made.



### *2.2.3. Timeline of the practice during the studies*

The professional practice of the “Food Engineering and Technology” study program is allocated in the 3<sup>rd</sup> year of studies, for its professional food modules to match their content with the theoretical part of the course curriculum. It helps students gain practical skills and prepares them for their final bachelor thesis defense as they have to write and present the professional practice report in front of the evaluation committee.

### *2.2.4. Supervision of students during practice*

The supervision of the student during his/her professional practice will be provided by the chosen **mentor by the Dean of the FFT** in cooperation with the **representative of the company** - technical staff (engineer/technologist) or representative of the **Scientific Research Institution** during the development of the practice. The cooperation will be well-coordinated for mutual benefit.

#### *a) Supervision by the mentor (lecturer)*

The institution establishes contact with the company and asks for a supervisor, who works with the students in the institutions selected for the professional/teaching practice. The mentor (department’s lecturer) is chosen to supervise the professional practice of the student after the **“Application for professional practice”** is approved (application form in this chapter). He/She should carefully guide the student and plan their internship/teaching experience. The initial planning is led by the mentor, who helps prepare students for the internship and undertakes the coordination of activities and their organization.

The responsibilities of the **mentor**:

- Gives the main information about the requirements of the study program.
- Plans the practice based on the chosen module in the company (see Chapter 3, they can be updated) in a scientific research institution (see description of the professional practice) in cooperation with the student.
- Signs the trilateral agreement (student/faculty/company).
- Internship coordinator (student/faculty/company).
- Member of the evaluation committee.

Furthermore, the lecturer guides students in the development of professional practice reports and presentation PPT. The lecturer will communicate and check the performance of the student before, after the first week, and at the end of the practice (online meetings with students and company representatives).

*b) Supervision by the technical staff in the company/institution*

Students do their practice with assistance from a representative of the company - technical staff (engineer/technologist) or representative of the Scientific Research Institution during the development of the practice. Their responsibilities are:

- Discuss the practice module plan and update it if necessary.
- Sign the cooperation agreement and instruct students during their professional practice.
- Verify that the students practice 7 hours daily.

*c) Student Responsibilities*

Students during their professional practice will follow the draft and perform the activities as planned and his/her responsibilities are:

- Define the professional skills that want to improve and choose the module to which they correspond.
- Cooperate with the head of the department to find related placements from the list or if have found other companies not on the list then fill out the application for the professional practice.
- Cooperate with the mentor to update the module and implement or draft the case study if applicable.
- Write the professional practice report according to the manual for the preparation of the thesis (FFT).
- Prepare a presentation PPT based on his practice in the company/institution.

### 2.2.5. Assessment of the workload of professional practice

The total workload of the practical part of the curricula specified in the self-evaluation report of the "Food Engineering and Technology" study program is evaluated with ETCS credits (Table 2). Based on the framework we calculate 1 ECTS is 25 hours of teaching hours thus practical work in the company (1 ECTS=25 hours). In total, there are 3 ECTS/75 teaching hours thus two weeks (10 days /7h =70 hours of professional practice) and 5 individual hours (individual work for the final report, in the company, and meetings with the internship supervisor) as foreseen in the Bachelor's curricula for the teaching practice.

**Table 2. Total workload of the practical part**

Structure of professional practice /workload	1 <sup>st</sup> Year		2 <sup>nd</sup> Year		3 <sup>rd</sup> Year	
	I	II	III	IV	V	VI
Professional practice						2 weeks 3 ECTS <b>75 hours</b>
Thesis						9 ECTS <b>225 Hours</b>

### 2.2.6. Assessment of the professional practice

The results of professional practice are:

- (i) **Professional Practice Report in Companies**, in which the student follows the course modules as described in the practice program for the company where he carries out it.
- (ii) **Professional Practice Report in Scientific Research Institutions**, in which the student develops a case study in a field and carries it out.

Professional practice is evaluated based on the submitted report and the presentation in PPT based on the criteria for evaluation as presented in Table 3.

**Table 3. Assessment criteria's**

<p><b>1. Report preparation &amp; presentation</b></p> <p>a) Compatibility with the manual for the preparation of the thesis</p> <p>b) Demonstration of their knowledge, understanding, and proficiency in performed activities.</p> <p>c) Writing skills</p> <p>d) Presentation skills</p>
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## 2.3. CHARACTERISTICS OF THE PROFESSIONAL PRACTICE

### 2.3.1. Description of the professional practice

Professional practice's main objective is practicing their knowledge in a workplace environment. It will introduce students to the challenges of the industry and prepare them for their careers. They will engage in different activities of the company/institution in the field of food technology. Students are required to follow the instructions of the supervisor in the company and the appointed mentor to prepare the described assignments required by the curriculum.

The documents required for completion of the practice and its evaluation are as follows:

- **Application for the professional practice.** The application for professional practice is signed by the student and submitted to the head of the department of the FFT.
- **Professional practical agreement.** The agreement must be signed by the student, the representative of the company/institution, and the mentor (4 copies).
- **Professional practice plan:** The plan is designed in cooperation with the appointed mentor based on the chosen modules and type of institution. The practice plan modules are from the third academic year and are developed in the theoretical part of the curriculum. Students develop the practice according to the description of the modules below:

- Food Microbiology
- Fermentation Technology
- Milk Processing Technology
- Food Quality Control
- Meat Technology
- Basics of Toxicology
- Packaging and Storage Technology
- Water Preparation
- Fruit and Vegetable Processing Technology

Students who choose the professional practice in a Company select one of the modules mentioned above and follow the instructions (see Chapter 3). For professional practice in Scientific Research Institutions, students choose a module

and prepare a detailed case study in methodology in cooperation with a mentor and then supervisor. They identify an area of focus related to a module-specific topic to study based on needs or challenges that the industry faces or is an important research topic. The student develops a plan for a case study which includes a description of the research topic, research questions and methods, objectives, and expected outcomes.

The steps that students should follow when preparing the case study for professional practice are as follows:

- i Identification of the case study topic
- ii Research questions or hypothesis
- iii Methodology
- iv Data collection and analysis
- v Results and discussions
- vi Conclusions

- **Week report.** The student has to meet online the mentor and write a short report after the first week about the activities that were performed.
- **Professional practice report (15-20 pages).** It has two parts, the first is descriptive and the student provides a general description and the second is focused on the activities performed during their practice. The first part describes the enterprise and its activities. The second part makes the connection between the lectures received at the faculty (theoretical training) and the work he has done during practice (professional training). Also, he/she develops the topics of the module including the challenges and approach to solving them, results from the practice, and conclusions. Students must not include in the report anything contrary to the company's interests or trade secrets as agreed in the trilateral agreement.
- **Completion of the practical work in industry.** After completing the internship, the representative of the company fills out the student's evaluation sheet and signs it. The student keeps the original and submits the photocopy to the responsible pedagogue of the internship. In addition to the form and documentation provided by the host faculty and institution, all materials processed by the student must be submitted to the e-mail address of the mentor. At the end of the internship, the student must apply for

submission of the final report and request its defense following the “**Application for the recognition of professional practice**” (application form in this chapter).

- **Presentation.** The students should prepare a final presentation (10 – 15 minutes), based on a professional practice report, describing the practice, results and discussions, and personal and professional benefits.
- **Evaluation criteria of the professional practice.** At the end of the 2-week internship period, the Evaluation Committee makes the final evaluation following the provided evaluation criteria. Following the FFT Regulation, each committee must be composed of a minimum of 3 (three) leading pedagogues, the mentor of the student is one of them as a member. The evaluation of student performance is done based on the assessment criteria in Table 3: Professional Practice Report (70%) and presentation (30%) are graded.

*In academic terms, it is the mentor is responsible for the final assessment of a student together with the internship assessment committee. It is also recommended that students also have the opportunity to evaluate their professional practice. The mid-internship assessment is intended as supportive feedback, while the final assessment focuses on the student's overall achievement.*



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**Application for professional practice**  
(Mandatory to be completed by the applicant)

Name and Surname: \_\_\_\_\_

Faculty: \_\_\_\_\_

Department: \_\_\_\_\_

E-mail: \_\_\_\_\_

Phone: \_\_\_\_\_

I, the undersigned, present the request for professional practice.

**General description of the type of professional practice required:**

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*Note: The student describes why he is looking for a specific organization for the internship, e.g., based on professional interests, thesis topic, etc. The student should not focus on the place of the internship but should try to describe the type of internship that may be most suitable for his/her further study and future career.*

**I) Possible internship institutions** (*mandatory to be completed by applicants*):

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*Note: The student selects potential institutions from the list of approved institutions and organizations. It is recommended that at least three sites be mentioned.*

**II) The student's proposal for a professional practice institution** (*optional to be completed by applicants*):

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*Note: The student can propose a possible institution, which is not on the list. In this case, it is mandatory to provide detailed data (description of the institution or organization, address, etc.). A responsible body at the departmental level will decide and inform the student of the final decision.*

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Name and Surname of the Student

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Date





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**Application for the recognition of professional practice**

(Instructions for the form of submission of the final report and request for its defense)

Name and surname: \_\_\_\_\_

Faculty \_\_\_\_\_

Department: \_\_\_\_\_

E-mail: \_\_\_\_\_

Phone: \_\_\_\_\_

**I, the undersigned, apply for the recognition of my professional practice and request the public defense of the final report.**

**General description of the completed professional practice** (*mandatory to be completed by applicants*):

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***Note:** The student describes why his experience should be recognized as professional practice. It describes the institution/organization where it was engaged, as well as details the tasks it performs there. The student should describe the importance of an internship for his/her further study and career.*

\_\_\_\_\_  
Name and Surname of the Student

\_\_\_\_\_  
Date

## Assessment sheet of the professional practice report from the evaluation committee

Name and surname of the student: \_\_\_\_\_

### Report preparation & presentation

Compatibility with the manual for the preparation of the thesis	70%	
Demonstration of their knowledge, understanding, and proficiency in performed activities.		
Writing skills		
Presentation skills	30%	

After assessment of the report preparation and presentation the committee evaluates the professional practice with a grade \_\_\_\_\_ (“6-10”)

### Evaluation Committee

\_\_\_\_\_  
Chairman, member

\_\_\_\_\_  
Date

\_\_\_\_\_  
Mentor, member

\_\_\_\_\_  
Date

\_\_\_\_\_  
Member

\_\_\_\_\_  
Date

*Note: The assessment sheet is given to the head of the department who prepares the official note. Officially the student has completed professional practice.*



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**Official Note**

The decision taken by the Head of the Department based on the Assessment of Evaluation Committee  
\_\_\_\_\_ on (date) \_\_\_\_\_ :

The professional practice of \_\_\_\_\_ (student`s name and surname) will be  
recognized as equivalent to the period of professional practice as required by the study program.

His/her chosen mentor was: \_\_\_\_\_

His/her practice supervisor in company/institution was: \_\_\_\_\_

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Signature of the Head of Department

### ***2.3.2. Bachelor Thesis***

Bachelor study programs end with a bachelor's thesis following their study programs. The thesis is formalized in the last semester of studies, with a corresponding load of ECTS credits. According to the study program, students should have completed professional practice and have left only one exam. At the beginning of each new academic year, the departments present proposals for diploma topics to the faculty studies committee. The teacher, who has proposed the subject of the diploma, guides the student in the role of a mentor, until the completion of the thesis. To receive the topic of the diploma thesis, the student submits the request for the officialization of the thesis of the diploma thesis. For the preparation of the thesis, a deadline of at least 1 and at most 6 months from the day of officialization is provided. It is carried out individually by the student, or it can be carried out together by two (2) or three (3) students (research group) and the contribution of each candidate must be noted there. The faculty council decides on the request for the bachelor thesis by two (2) or three (3) students.

The thesis for the bachelor's degree is carried out to prove that the theoretical skills achieved during the study can be successfully used to solve practical problems in certain scientific fields. It has a workload of 9 ECTS and the workload is 225 hours of independent work (9 ECTS x 25 hours) for experiments, writing, and presentation. It must consist of no less than 10,000 and no more than 15,000 words, or no less than 32 and no more than 50 pages (excluding notes, bibliography, and appendix), and will be defended through a PPT presentation (15 minutes). During the thesis, students work on the research guided by the mentor. It deals with topics from those subjects that belong to the FTU programs. Research can be conducted in the facilities of the FTU, using secondary data or in cooperation with the mentor with food industries and public institutions based on needs and trends.

#### **• *Results:***

- a) Bachelor thesis, which should be 32-50 pages.
- b) PPT presentation, prepared from the Thesis, 15 minutes.

### **3. PRACTICE MODULES CONTENT**

### 3.1. FOOD MICROBIOLOGY

**Lectures:** *Prof. Dr. Dilaver Salihu*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [dilaver.salihu@umib.net](mailto:dilaver.salihu@umib.net);

#### **Summary and learning outcomes**

##### **Aim:**

Students acquire the necessary practical knowledge about microorganisms and their activity, starting from the changes that food undergoes as well as the nutritional values, knowledge must be obtained for the use of methods to increase the stability and quality of food products. To become familiar with the definition of microorganisms, the diseases that come from contaminated food, the preservation of the health of consumers, and to get to know the microorganisms that cause the spoilage of food products of plant and animal origin. Physiological and morphological properties of microorganisms, their classification. To describe the shape and cellular structure of microorganisms. Direct identification by microscopy and direct methods for enumeration of microorganisms.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of food microbiology:

- Methods for counting microorganisms.
- Identification of microorganisms directly under the microscope.
- Counting and determination of microorganisms of food origin.
- Physical, chemical, and immunological methods.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Food microbiology laboratory;
- b) Sample taking for microbiological analysis;
- c) Sample and media preparation;
- d) Medium sterilization;
- e) Cultivation of microorganisms;
- f) Pure culture preparation;
- g) Keys for identification of microorganisms;
- h) Total bacteria count in food (meat and meat products, milk, eggs, etc.);
- i) Total bacteria count in food (meat and meat products, milk, eggs, etc.);
- j) Mold and yeast in food products;

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I</b>	Introduction of laboratory rules, and laboratory equipment. Practical work in the food industry laboratory. <i>(1 practice day or 7 hours).</i>
<b>II</b>	Methods for taking samples for microbiological analysis. Practical work in the food industry laboratory: determination and application of microbiological criteria. <i>(1 practice day or 7 hours).</i>
<b>III</b>	Definitions: party, field sample, representative sample. Practical work in the food industry laboratory: preparation of nutrient medium. <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Sterilization methods, autoclave, drying ovens for sterilization, medium and equipment sterilization. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Microorganism cultivation methods. Practical work in the food industry laboratory: cultivation of microorganisms on solid food grounds, cultivation from test tube to test tube. <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Preparation of agar for the development of microorganisms. Practical work in the food industry laboratory: preparation of pure cultures of microorganisms, lactic bacteria, and yeasts. <i>(1 practice day or 7 hours).</i>
<b>VII</b>	Contamination with air bacteria, in food processing industries, practical work in the food industry laboratory: characteristics of identification, necessary material for identification. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Microbiological examinations in food products in food centers. Practical work in the food industry laboratory: determination of the number of microorganisms in meat products, milk, eggs, etc. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Microbiological examinations in food products in food centers. practical work in the food industry laboratory: determination of the number of microorganisms in meat products, milk, eggs, etc. <i>(1 practice day or 7 hours.)</i>
<b>X</b>	Detection of molds and yeasts in food products. <i>(1 practice day or 7 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	

**Guideline for Case Study**, if selected in the respective module.

The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.

**Evaluation/assessment methods of practical training.**

based on:

-Written practice report (70%)

-PPT presentation (30%)

**Appendices: e.g., templates for the implementation** of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.



### 3.2. FERMENTATION TECHNOLOGY

**Lectures:** *Prof. Dr. Dilaver Salihu*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [dilaver.salihu@umib.net](mailto:dilaver.salihu@umib.net);

#### **Summary and learning outcomes**

##### **Aim:**

In the context of the Fermentation Technology subject, they will gain knowledge about the selection and evaluation criteria of industrial strains in fermentation processes. The practice envisages to enable the use of the knowledge acquired in the theoretical courses, in a practical and professional context. To fulfill the anticipated requirements, students must develop an internship in one or several institutions/organizations/companies. Students to become familiar with the definition of useful microorganisms, and the modifications in depth towards permitting the quality and food important for the health of consumers.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of fermentation technology:

- Selection of industrial strains in fermentation processes
- Fermentation process.
- Fermentation of food products of plant or animal origin.
- Fermented foods safety.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Raw materials;
- b) Industrial microorganisms;
- c) Processing of food, inoculation;
- d) Fermentation;
- e) Fermented food products;
- f) Packaging and storage
- g) Analysis of fermented food products;
- h) Safety of products

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I</b>	Metabolic types of microorganisms. Classification of fermenting microorganisms used in the industry. <i>(1 practice day or 7 hours).</i>
<b>II</b>	The main qualities of chosen industrial microorganisms. <i>(1 practice day or 7 hours).</i>
<b>III</b>	Preparation of medium for fermentation (upstream processing). <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Preparation of industrial microorganisms for fermentation. Fermentation process. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Fermentation of food products (industry-related). <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Practical lessons related to the fermentation process. <i>(1 practice day or 7 hours).</i>
<b>VII</b>	Control of fermentation process. Problems and solutions. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Ending of the fermentation process. Downstream processing. Packaging and storage. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Analysis of fermented products. <i>(1 practice day or 7 hours).</i>
<b>X</b>	Fermented foods safety. <i>(1 practice day or 7 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	
<b>Guideline for Case Study</b> , if selected in the respective module.	
The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.	
<b>Evaluation/assessment methods of practical training.</b>	
based on:	
-Written practice report (70%)	
-PPT presentation (30%)	
<b>Appendices: e.g., templates for the implementation</b> of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.	

### 3.3. MILK PROCESSING TECHNOLOGY

**Lectures:** *Prof. Dr. Dilaver Salihu,*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [dilaver.salihu@umib.net](mailto:dilaver.salihu@umib.net);

#### **Summary and learning outcomes**

##### **Aim:**

In the framework of the subject, students should be trained in organo-sensory, physicochemical, and microbiological analyses, as well as to know the bacterial cultures for the production of yogurt. To fulfill the anticipated requirements, students must develop an internship in one or several institutions/organizations/companies. The way of processing milk, they will get knowledge about the amount and composition of milk, its mechanical and thermal processing, as well as understand the standardization of fat.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of milk processing technology:

- Collection and composition of milk.
- Mechanical and thermal processing.
- Yogurt and cheese starter cultures.
- Yogurt and cheese processing.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Milk collection and quality;
- b) Raw milk analysis;
- c) Heat treatment of milk;
- d) Milk processing;
- e) Milk product: yogurt;
- f) Milk product: cheese;
- g) Milk products: analysis.

**Concrete situations/examples/case studies from the company/business**

Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.

<b>I</b>	Milk quality control, collection, and sampling of milk. (1 practice day or 7 hours).
<b>II</b>	Organo-sensory assessment, physicochemical analyses. (1 practice day or 7 hours).
<b>III</b>	Methods for obtaining microbiological analyses in lactofreezers and cans. Evaluation of somatic cells. (1 practice day or 7 hours).
<b>IV</b>	Methods for evaluating fat in fresh milk. Estimation of fat in milk according to Geber's method. (1 practice day or 7 hours).
<b>V</b>	Thermal processing of milk, pasteurization, UHT, sterilization. (1 practice day or 7 hours).
<b>VI</b>	Fermentation of dairy products, the benefit of yogurt, evaluation of pH, titration acidity °SH. (1 practice day or 7 hours).
<b>VII</b>	Rules and standards of milk, fat content - standardization using separators. (1 practice day or 7 hours).
<b>VIII</b>	The benefit of secondary products including curd. (1 practice day or 7 hours).
<b>IX</b>	The benefit of white cheeses is the milk curdling process with starter cultures. (1 practice day or 7 hours).
<b>X</b>	The benefit of milk products, ice cream, and butter in the industry. (1 practice day or 7 hours).

**Learning methods: The methods of work-based learning must be described.**

**Results/outcomes of the on-industry/company practice**

- Professional practice report
- PPT presentation

**Guideline for Case Study**, if selected in the respective module.

The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.

**Evaluation/assessment methods of practical training.**

based on:

- Written practice report (70%)
- PPT presentation (30%)

**Appendices: e.g., templates for the implementation** of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.

### 3.4. FOOD QUALITY CONTROL

**Lectures:** *Prof. Dr. Alush Musaj*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [alush.musaj@umib.net](mailto:alush.musaj@umib.net)

#### **Summary and learning outcomes**

##### **Aim:**

Students gain practical knowledge about food safety. They understand the food chain in the particular industry and analyze the whole process. Based on the guidelines they assess the preparatory programs: good hygiene practices, good manufacturing practices, sanitation standard operating procedures, waste management plan, pest control program, traceability, and a recall plan. The knowledge must be applied to the industry by making a plan for the improvement of safety. Also, students have to evaluate the application of the HACCP plan if applicable in a food product or to make an HACCP plan for another product by shortly planning all the principles.

##### **Objectives of the module:**

Students gain basic practical knowledge in the course food quality control as follows:

- Evaluation of prerequisite programs
- Implementation of food safety management systems
- Creating an HACCP plan in the industry
- Implementation of the HACCP plan in the industry

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Food safety;
- b) Prerequisite programs;
- c) Good practices in the food industry;
- d) ISO 9001 and ISO 22000;
- e) Principles of the HACCP;
- f) Implementation of the HACCP;
- g) Maintenance of the HACCP plans;

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I</b>	Acquaintance with the industry, management, products, and food safety. <i>(1 practice day or 7 hours).</i>
<b>II</b>	Evaluate good hygiene practices, good manufacturing practices, sanitation standard operating procedures and list suggestions for improvement. Prerequisite programs in the industry, premises, personnel, raw materials/product. <i>(1 practice day or 7 hours).</i>
<b>III</b>	Evaluate waste management plan, pest control program, traceability and recall plan and list suggestions for improvement. Evaluate Quality Management Systems (ISO 9000 series), ISO 22000. <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Follow the prerequisite program decision tree to identify hazards managed by the prerequisite program. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Evaluate the HACCP application if it is applied for a product already. Choose a product in the industry to prepare an HACCP plan in cooperation with the supervisor. <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Obtain senior management commitment. Define the terms of reference/scope of the study, select the team, and describe the product and process. <i>(1 practice day or 7 hours).</i>
<b>VII</b>	Identify the intended use of the product, construct a process flow diagram, on-site confirmation of the flow diagram, list all potential hazards associated with each process step, conduct a hazard analysis, and determine the measures to control the identified hazards. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Determine the CCPs, establish critical limits for the control measures at each CCP, establish a monitoring system for each CCP, and establish a corrective plan for each CCP. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Perform validation, verification, and review activities, establish documentation and record keeping. <i>(1 practice day or 7 hours).</i>
<b>X</b>	Write the HACCP plan and discuss it with the supervisor. Training for workers if needed related to food safety. <i>(1 practice day or 7 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	

**Guideline for Case Study**, if selected in the respective module.

The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.

**Evaluation/assessment methods of practical training.**

based on:

-Written practice report (70%)

-PPT presentation (30%)

**Appendices: e.g., templates for the implementation** of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.



### 3.5. MEAT TECHNOLOGY

**Lectures:** *Ass. Dr. Arbër Hyseni*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [arber.hyseni@umib.net](mailto:arber.hyseni@umib.net)

#### **Summary and learning outcomes**

##### **Aim:**

Students acquire the necessary practical knowledge about meat and meat processing. Meat as a food product has its origin from different animals. Will gain knowledge of methods used to maintain the quality of raw meat. The nutritional value of meat and principles of meat processing technology for processed meat products is important to be practiced. To become familiar with the equipment used in the meat industry and their usage. To know the selection and grading of raw materials used in the industry. Role of unit operations in producing different products and their role in their safety. Methods used for testing meat products.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of food microbiology:

- Methods of sample taking and analysis of raw meat.
- Grading and initial processing of meat.
- Raw-fermented products.
- Raw-cooked products.
- Analysis of meat products.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Handling raw meat safely;
- b) Selection and initial processing of raw meat;
- c) Seasoning used in meat processing;
- d) Heat treatment;
- e) Fermentation;
- f) Meat processing hygiene;
- g) Meat products analysis;

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I</b>	Acceptance of raw meat, meat analysis, and deep-freezing storage. <i>(1 practice day or 7 hours).</i>
<b>II</b>	Melting of meat, initial processing (cutting/chopping/comminuting). <i>(1 practice day or 7 hours).</i>
<b>III</b>	Injection of seasonings (utilization of spices/non-meat additives). <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Heat treatment, cooling, stuffing/filling into casings or other containers. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Fermentation and drying, bone removal. <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Product packaging. <i>(1 practice day or 7 hours).</i>
<b>VII</b>	Pre-freezing, freezing. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Storage. Hygienic practice for meat. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Cleaning and sanitation in meat plants, meat products analysis. <i>(1 practice day or 7 hours).</i>
<b>X</b>	Implemented standards in the industry, ISO, HACCP. <i>(1 practice day or 7 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	
<b>Guideline for Case Study</b> , if selected in the respective module.	
The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.	
<b>Evaluation/assessment methods of practical training.</b>	
based on:	
-Written practice report (70%)	
-PPT presentation (30%)	
<b>Appendices: e.g., templates for the implementation</b> of the objectives, elaboration of situations/examples/case study from the farm/company and for the elaboration of the project work, if it has been chosen in the respective module.	

### 3.6. BASICS OF TOXICOLOGY

**Lectures:** *Prof. Asoc. Dr. Valdet Gjinovci*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [valdet.gjinovci@umib.net](mailto:valdet.gjinovci@umib.net)

#### **Summary and learning outcomes**

##### **Aim:**

Food is very important for health and there are many concerns related to its toxicological effect. Students will know the main contaminants in food. Contaminants can result in raw foods which are related to feed and agricultural practices. Food undergoes many treatments during processing, some of which harm its quality whereas some have a negative impact in creating dangerous substances which can be cancerogenic. Testing and analyzing these substances in food is important for population health. Students will gain practical knowledge in the basics of toxicology related to food and feed.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of toxicology:

- Feed and food toxicology.
- Residues in food and health impact.
- Testing methods.
- Monitoring of residues.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Analytical chemistry laboratory;
- b) Sample taking for analysis;
- c) Methods of testing;
- d) Analysis of residues in food using HPLC;
- e) Analysis of residues in food using GC;
- f) Interpretation of results;
- g) Discussion of health concerns related to residue;

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I</b>	Preparation of the national plan for residue monitoring. <i>(1 practice day or 7 hours).</i>
<b>II</b>	Sampling procedure, acceptance of samples. <i>(1 practice day or 7 hours).</i>
<b>III</b>	Sample preparation procedure for testing. <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Testing of samples with laboratory equipment. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Screening and confirmatory method for testing. <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Testing and working with HPLC equipment. <i>(1 practice day or 7 hours.)</i>
<b>VII</b>	Testing and working with the liquid gas chromatograph equipment. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Testing and working with the gas chromatograph equipment. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Interpretation of results. <i>(1 practice day or 7 hours).</i>
<b>X</b>	Evaluation and distribution of results from the laboratory. <i>(1 practice day or 7 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	
<b>Guideline for Case Study</b> , if selected in the respective module.	
The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.	
<b>Evaluation/assessment methods of practical training.</b>	
based on:	
<ul style="list-style-type: none"> <li>- Written practice report (70%)</li> <li>- PPT presentation (30%)</li> </ul>	
<b>Appendices: e.g., templates for the implementation</b> of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.	

### 3.7. PACKAGING AND STORAGE TECHNOLOGY

**Lectures:** *Prof. Asoc. Dr. Valdet Gjinovci*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [valdet.gjinovci@umib.net](mailto:valdet.gjinovci@umib.net);

#### **Summary and learning outcomes**

##### **Aim:**

Packaging and storage technology is necessary for most products. Practical knowledge is important for students interested in learning equipment and technologies used in different industries. Packaging technologies impact the shelf life of the products and play an important role in the safety of products. Paper and plastics are used widely in the food industry. Technologies developed for the packaging of foods are focused also on the quality of food products. Modified atmosphere packaging using different gases has advanced some food industries.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of food microbiology:

- Food packaging technologies.
- Equipment used in food packaging.
- Safety of packaging materials.
- Packaging of food products.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Introduction to the industry;
- b) Packaging material in the food industry;
- c) Characteristics of used packaging materials;
- d) Safety of packaging materials;
- e) Equipment used in packaging;
- f) Packaging of different foods;
- g) Advanced packaging technologies;
- h) Differences between packaging technologies;

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I</b>	Introduction, Importance of packaging of food products. <i>(1 practice day or 7 hours).</i>
<b>II</b>	Packaging materials, characteristics of basic packaging materials. <i>(1 practice day or 7 hours).</i>
<b>III</b>	Characteristics of paper, plastics for packaging. <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Packaging of milk and dairy products such as pasteurized milk, and UHT-sterilized milk. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Microbiological aspects of packaging materials, Hazards from packaging materials in food. <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Introduction, type package of potato chips. <i>(1 practice day or 7 hours).</i>
<b>VII</b>	Packaging of potato chips with nitrogen. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Packaging of potato chips with atmospheric nitrogen. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Packaging of potato chips with air. <i>(1 practice day or 7 hours).</i>
<b>X</b>	Packaging comparisons, differences, and packaging advantages. <i>(1 practice day or 7 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	
<b>Guideline for Case Study</b> , if selected in the respective module.	
The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.	
<b>Evaluation/assessment methods of practical training.</b>	
based on:	
<ul style="list-style-type: none"> <li>- Written practice report (70%)</li> <li>- PPT presentation (30%)</li> </ul>	
<b>Appendices: e.g., templates for the implementation</b> of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.	

### 3.8. WATER PREPARATION

**Lectures:** *Prof. Asoc. Dr. Mehush Aliu*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [mehush.aliu@umib.net](mailto:mehush.aliu@umib.net);

#### **Summary and learning outcomes**

##### **Aim:**

The main objectives of practical training gain practical knowledge about the preparation of drinking water, and its treatment processes, as well as to know the conditions that water must possess for the production of juices.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of water preparation:

- gain practical knowledge of the technological process of drinking water production,
- can perform experimental analyses of the physicochemical and microbiological parameters of water,
- selects the appropriate technology for water treatment based on water characteristics,
- gain practical knowledge of the technological process of juice production,
- can perform experimental analyses of the physicochemical and microbiological parameters of water used in juice production factories.

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Drinking water preparation technology;
- b) Physicochemical and bacteriological analysis of drinking water before treatment;
- c) Physicochemical and bacteriological analysis of drinking water after treatment;
- d) Sedimentation and coagulation of water;
- e) Water disinfection;
- f) Water preparation for industrial processes;
- g) Technological process of juice production;
- h) Physicochemical and microbiological parameters of water used in juice production factories.
- i) Treatment of impurities in soft drinks.

<b>Concrete situations/examples/case studies from the company/business</b>	
<i>Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.</i>	
<b>I-III</b>	Drinking water preparation technology including sedimentation, coagulation, and disinfection. <i>(3 practice days or 21 hours).</i>
<b>IV-V</b>	Physicochemical and bacteriological analysis of drinking water before and after treatment. <i>(2 practice days or 12 hours).</i>
<b>VI-VII</b>	Technological process of juice production. <i>(3 practice days or 21 hours).</i>
<b>IX-X</b>	Physicochemical and microbiological parameters of water used in juice production factories and treatment of impurities in soft drinks. <i>(2 practice days or 14 hours).</i>
<b>Learning methods: The methods of work-based learning must be described.</b>	
<b>Results/outcomes of the on-industry/company practice</b>	
<ul style="list-style-type: none"> <li>- Professional practice report</li> <li>- PPT presentation</li> </ul>	
<b>Guideline for Case Study</b> , if selected in the respective module.	
The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.	
<b>Evaluation/assessment methods of practical training.</b>	
based on:	
<ul style="list-style-type: none"> <li>- Written practice report (70%)</li> <li>- PPT presentation (30%)</li> </ul>	
<b>Appendices: e.g., templates for the implementation</b> of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.	



### 3.9. FRUIT AND VEGETABLE PROCESSING TECHNOLOGY

**Lectures:** *Prof. Ass. Dr. Bahtir Hyseni*

**Workload:** 3 ECTS, (2 weeks, 10 days or 75 hours practical training)

**Category:** B

**Semester:** VI

**Type:** Mandatory

**Study Program:** BSc “Food Engineering and Technology (FET)”

**Code:** 317.FET.I

**Lecture’s email:** [bahtir.hyseni@umib.net](mailto:bahtir.hyseni@umib.net);

#### **Summary and learning outcomes**

##### **Aim:**

Students will learn practices about activities of fruit and vegetable processing. Fruit and vegetable processing aims to supply various foods that are safe and suitable for consumers. Operations and their usefulness in post-harvest management of fruits and vegetables. Storage of fruits and vegetables is one of the most important aspects of post-harvest management. Know why low temperature helps increase storage life and tell the role of relative humidity in the maintenance of product quality.

##### **Objectives of the module:**

Students gain basic practical knowledge in the following areas of water preparation:

- Understand different operations in the handling of fresh fruits and vegetables.
- Learn the usefulness of these operations in maintaining quality
- Describe the role of heat application during processing and product preparation;
- Define types of heat applications;

#### **Topics of practical training**

Topics are related to the theoretical part of the module. The most important topics are explained in detail so that they can be understood not only by the students but also by the supervisors in the company/businesses:

- a) Post-harvesting management;
- b) Storage of fruits and vegetables;
- c) Heat processing;
- d) Bleaching;
- e) Drying and dehydration;
- f) Processing of different fruit and vegetable products: Juice and Beverages, jams, jellies, marmalade and other sugar-based products, pickling, etc.

**Concrete situations/examples/case studies from the company/business**

*Concrete situations/examples/case studies from the company where the student has carried out the practice, related to the contents of the practical training of the relevant module. A precise timetable for the work/solution of each situation/example should be in place.*

<b>I</b>	Receiving and storing fruits and vegetables. <i>(1 practice day or 7 hours).</i>
<b>II</b>	Post-harvest management (cleaning, selection, sorting, grading). <i>(1 practice day or 7 hours).</i>
<b>III</b>	Factors affecting storage life. <i>(1 practice day or 7 hours).</i>
<b>IV</b>	Processing by heat application. <i>(1 practice day or 7 hours).</i>
<b>V</b>	Adequacy of blanching of fruits/vegetables. <i>(1 practice day or 7 hours).</i>
<b>VI</b>	Drying and dehydration of fruits and vegetables. <i>(1 practice day or 7 hours).</i>
<b>VII</b>	Canning of fruits and vegetables. <i>(1 practice day or 7 hours).</i>
<b>VIII</b>	Extraction and preservation of pulps and juices: juice and beverages, jams, jellies, marmalade, and other sugar-based products. <i>(1 practice day or 7 hours).</i>
<b>IX</b>	Preparation of pickles, tomato products, and sauces. <i>(1 practice day or 7 hours).</i>
<b>X</b>	Analysis of fruits and vegetable products. <i>(1 practice day or 7 hours).</i>

**Learning methods: The methods of work-based learning must be described.**

**Results/outcomes of the on-industry/company practice**

- Professional practice report
- PPT presentation

**Guideline for Case Study**, if selected in the respective module.

The students should explain when preparing the case study for the professional practice as follows: identification of the case study topic, research questions or hypothesis, methodology, data collection and analysis, and working with the mentor and supervisor in the institution, results and discussion, conclusions and presentation of the written practice report and PPT presentation.

**Evaluation/assessment methods of practical training.**

based on:

- Written practice report (70%)
- PPT presentation (30%)

**Appendices: e.g., templates for the implementation** of the objectives, elaboration of situations/examples from the company and for the elaboration of the case study from institutions, if it has been chosen in the respective module.