



Dual Curricula - Study and Work Practice in Agriculture and Food Safety (DualAFS)

R A T I O N A L E

FOR THE REORGANISATION OF THE BACHELOR'S DEGREE PROGRAMME

“Livestock and Animal Product Safety (LAPS)”

INTO A DOUBLE BACHELOR'S DEGREE



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

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R A T I O N A L E

FOR THE REORGANISATION OF THE BACHELOR'S DEGREE PROGRAMME *"LIVESTOCK & ANIMAL PRODUCTS SAFETY - LAPS"* INTO A DOUBLE BACHELOR'S DEGREE.

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1. DESCRIPTION OF THE PROGRAM PROPOSED FOR REORGANIZATION.

1.1 Data on the study program.

The Bachelor program (BA) in "Livestock & Animal-source Product Safety – (BA in LAPS) study program was approved by order No. 406, Date 25. 07. 2019, of the Minister of Education, Sports and Youth (MoESY).

The current curriculum of this program, in terms of its objectives, responds well to the development trends of the livestock sector and the safety of primary livestock products in our country. It equips graduates of this program with competencies and skills to develop and direct/manage: (i) technologies of nutrition, genetic improvement and breeding of livestock farm animals, (ii) quality and safety in all aspects of production of livestock products within the farm (primary products, i.e. not in the further links of the chain related to their industrial processing and marketing), (iii) welfare and preventive measures for health and health disorders of animals/herds, related to technologies their feeding and breeding.

As a whole, the current curriculum is of the classic model and has a structure and ratio between theory and practice, which is within the legal criteria in force. Practical training is provided mainly in the form of practical lessons in the auditorium (exercises, laboratory work, demonstration practice, educational excursions), in addition to lectures. The form of professional practice in farms/businesses occupies a very small part in the curriculum structure with only 5 ECTS i.e. 5 teaching weeks. At the end of the studies, the final exam takes place, to which 5 ECTS are dedicated.

This study program, like some other programs in our university, is currently facing two problems: (i) the significant decrease in the number of graduates applying and students in this program, as well as (ii) the insufficient employment of graduates in the professional field for which they studied.

Demographic developments in our country have led to a very rapid decrease in the number of students and graduates, especially in districts and rural regions of the country. This is also reflected with a tendency to decrease the number of graduates who apply and register in some study programs, including the study program in question. In particular, there is a decrease in the number of students from the districts and rural areas of the country, where the majority of students should come from, whose motivation would probably be greater and they could be employed. more so, because they live in regions where there are livestock farms, livestock and other related businesses. On the other hand, flows from vocational high schools have decreased a lot, even though 9 vocational high schools have agriculture and animal husbandry programs and about 11 others have economy and tourism programs. And the reason for the latter is not only the average threshold, because this trend is also observed in 2-year post-secondary programs, in which there is no average grade threshold for admission. Perhaps for students from remote rural areas, the cost of living that students have in Tirana plays a role, while the tuition fee is almost negligible.

Another challenge is the labor market space created by the livestock sector and related sub-sectors, especially the links of the feed chain within the farm, agritourism, the impact of livestock on the environment and ecological livestock. The labor market space should be considered in both the private and public sectors.

a) *The labor market space in the private sector.* The livestock sector currently accounts for about 52% of agricultural production, compared to about 42% in 1992 and about 35% in the 1980s, which shows an increasing trend. The structure of entrepreneurship in this sector is dominated by small family farms. However, the number of medium and large farms is increasing, which is also being stimulated by the increase in financial support, internal and from EU funds. The increase in funds for agriculture and animal husbandry is an important premise for the increase in the size of farms (in the last 10 years it has increased by about 15%, a still low increase), their technological modernization, the increase in production and product safety, as well as other development directions related to this sector. Based on the experience of other countries, from the fact that this sector is the producer of animal products, which together with fishery and aquaculture products account for about half of human feed, as well as from the nutritional profile with a predominance of animal feeds (milk and its by-products, meat and its by-products, eggs and with a little fish) of the population of our country, it seems that the weight that this sector will occupy, within agriculture, will continue to grow. On the other hand, the activity of this sector is tangled, more and more, with the links of the chain and safety of primary animal products, with the feed industry and other inputs for livestock, agritourism, the environment, the economy of livestock production, as well as the activities of other banking financial investments related to livestock.

Based on all these trends in the development of the livestock sector, it seems that this sector has the potential to create a significant job market, which requires contemporary professional qualifications even at the Bachelor's level. In addition, this labor market in the private sector will be further consolidated along with the implementation, in the enterprises of this sector, of EU standards related to the evaluation and monitoring of quality, safety of products, the impact on the environment as well as those of financial support, for which farms and enterprises will need more the assistance of specialists who have a university education in the field of animal husbandry and the safety of primary livestock products. However, currently the labor market in the private sector, for this professional profile, is not structured to absorb a sufficient number of Bachelor level graduates. In general, the private sector is still not aware of the need for Bachelor level specialists. Even those large farms that exist require experts with Master degree. In our country, it is still not common for the head of a large or medium-sized farm to be qualified at the Bachelor's level (about 3% of farmers have a higher education, 34% have completed vocational secondary education, about 60% have basic or primary education). Also, there are still not enough incentives for young graduates at the Bachelor's level to create farms or other businesses in this sector.

b) *The space of the labor market in the public sector.* The alignment of the legal regulatory framework of our country with that of the EU in the field of agriculture, livestock, as well as quality and safety in all links of the feed chain have begun to have effects on the personal organics of the central, regional and local structures and institutions of management, inspection and expertise in the livestock sector and other related sub-sectors. This will lead to the expansion of the job market in the public sector for graduates in the field of animal husbandry and safety of primary livestock products. However, there are still significant inconsistencies and deficiencies in the current regulatory framework pertaining to this sector (especially in the livestock law, the Veterinary Service law, the rural development law, the feed law as well as the national list of professions), which have definitions not complete that affect the field of expertise of the graduates in this program.

For the long-term assessment of labor market development trends in this sector as well, the experience of the new EU countries can serve as a reference, since agriculture, livestock, the environment and feed security are the economic sectors/sub-sectors of our country that benefit and will benefit from the greatest financial support from the EU. The experience of EU countries with a size comparable to our country (e.g. Lithuania, Slovenia, Latvia) shows that the labor market in the private and public sectors

can absorb a moderate number of graduates in the first cycle and second university studies in zootechnics, which is of the scale of a teaching group of about 25 students/year.

1.2 Arguments for reorganization of BA in LAPS.

The trends discussed above for the flow of students and the scope of the labor market in the private and public sector related to animal husbandry, are guidelines for the adaptation of the academic offer in this direction of study, with the aim that graduates have the theoretical and practical professional training that the medium and long-term development of this sector requires, as well as for them to have the opportunity to be employed as early as possible in the professional field for which they have invested three years of university studies.

Many studies on the employment of graduates in our country and in other Balkan countries show that practical training is among the important indicators for employers in recruiting young people. For this reason, one of the important ways recommended for increasing the employment rate of graduates is the strengthening of practical training as well as the integration of young people during their studies in the labor market of the relevant field/sector. The National Education Strategy (Chapter: Higher Education) 2021-2026 (www.arsimi.gov.al/draft-strategjia-kombetare-e-arsimit-2021-2026), announced for public discussion, identifies the still high rate of unemployment of graduates in our country and the theory-practice gap in the formation of students that creates difficulties for the inclusion of students in the labor market (p. 58). This document considers the organization of student Practices through formalized agreements that higher education institutions develop with public institutions, agencies, businesses and private companies, as a guarantee for a better connection of study programs with the needs of society, the economy and labor market requirements (p. 58). In order to increase the quality and better orientation of university studies towards the requirements of the labor market, the Strategy defines two main objectives aimed at the reorganization of study programs (specific objective: C1, p. 90) as well as the connection of higher education with the labor market (specific objective C3, p. 91).

The models of university studies that better realize the connection of university studies in the classroom with practice, as well as are more successful in increasing the rate of early employment of graduates in the field of agriculture, are university studies integrated with practice, especially "Dual higher education" (as the most advanced form), where university training is the result of combining, almost equally, theoretical training with practical training directly in business. This model of higher university education is more developed in Germany, but it is also widespread in other European countries, especially in universities of applied sciences, such as Austria, Switzerland, Finland, Holland, Denmark, Slovenia, etc.

In order to find ways to increase the employment rate of graduates in the field of animal science, our University applied, together with two EU universities (University of Applied Sciences Nürtingen-Geislingen -NGU, Germany, as the leading university of the project, and Savonia University of Applied Sciences - Savonia UAS, Finland) as well as several Albanian universities ("F.S. Noli" Korce University, "H. Prishtina" University Prishtina, "I. Boletini" Mitrovica University), as well as 7 other partner institutions (as Work-life partner - WLP) from our country and Kosovo, who operate in the field of livestock, agribusiness and safety of livestock products in the Erasmus plus program, for the project "Dual Curricula - Study and Work Practice in Agriculture and Feed Safety / DualAFS", (Erasmus + Capacity building in the field of Higher Education 619178-EPP-1-2020-1-DE-EPPKA2-CBHE-JP). This project, which has been implemented since January 15, 2021.

The main objective of this Erasmus project is the reorganization of the current Bachelor's first cycle study program in "Livestock & Animal- source product safety " (BA in LAPS) at our University and the Bachelor's program "Agribusiness" at the University "F.S. Noli" of Korca, in the form of study programs integrated with practice, aligned with Dual professional higher education, based mainly on the experience of partner universities in the project, NGU and Savonia UAS, as well as some other universities (such as Hochschule Weihenstephan, Hochschule Dresden, Duale Hochschule Stuttgart, Germany; Aeres University of Applied Sciences and Van Hall Larensten University of Applied Sciences - Netherlands, University of Applied Sciences in Agriculture, Forestry and Feed, Bern, University of Applied Sciences Zürich- Switzerland, Universität Hohenheim , Germany, etc.).

Strengthening the training of students in Bachelor studies in the field of agriculture has begun to be reflected in the curricula of classical universities (research-based). One such model is that of the University of Hohenheim – Stuttgart, Germany (from which AUT has gained experience for many fields of study in the last 30 years). This university offers Bachelor studies with a common "trunk" of 3 semesters in agricultural sciences and profiling in semesters IV, V and VI in 12 different profiles (one of them is "Zootechnics"). This study program includes an option with 2 full semesters of professional in-farm/business practice, including the Bachelor's subject, for students who are more interested in applied studies on farms/businesses in the field of agriculture. Characteristic for studies in agricultural sciences in many countries is the professional practice on the farm, at least for one semester, before starting university studies or, at the latest, before profile deepening in the last two semesters (V+VI). Even in our country there are the first experiences of studies integrated with practice. The first experience is that of the University of Durrës in the field of bank and tourism management, where the practice occupies about 50% of all first cycle studies. The newest approved program is the Bachelor in "Banking and Applied Finance", of New York University Tirana approved by MoESY in July 2020. This program contains 2 semesters of professional practice in business out of 6 semesters in total, i.e. 60 ECTS professional practice in business + 120 ECTS theory in the auditorium.

The realization of this main objective of the reorganization of the program in this Erasmus project is supported by its other objectives which are capacity building, namely (i) the development of e-Learning capacities according to the experience mainly of Finland, (ii) the increase of academic capacities (staff training, development of didactic infrastructure) of academic units implementing the curriculum, (iii) exchange of students of the reorganized program, (iv) development and institutionalization of university cooperation with partners (farms, businesses, public institutions) - WLP) that contribute to the practical training of students, as well as (v) the development of Lifelong Learning (LLL) as well as other forms of HEI cooperation with farms and businesses in the livestock sector and related subsectors.

1.3. Objectives of the reorganization of the BA in LAPS .

The main goal of the reorganization of the program is to increase the quality of professional training, theoretical and practical, of the graduates, through its better orientation towards (i) the long-term trends of the development of the livestock sector and other sub-sectors related to of, as well as (ii) the needs of the labor market pertaining to them, both in the private and public sectors.

In view of this goal, the reorganization of the program is focused on strengthening practical training through the integration of the theoretical part with that of professional practice on the farm/business, without compromising the theoretical training required by the quality standards for the first cycle of studies.

Strengthening the practical training of students will be realized through:

1. Integrating part of the studies in the auditorium (theoretical curriculum) with practice on the farm/business (practical curriculum).
2. Adaptation of the theoretical curriculum, so that the theoretical knowledge and competences, which are acquired in the theoretical part, better respond to the standards of theoretical training at the Bachelor level, as well as being easily transferable / applicable in the real practice of the sector .
3. Significant increase in the ratio of professional practice in farm/business within the normal duration of 3 academic years of first cycle studies.
4. To organize the professional practice in such a way, that it achieves a solid practical training of the students, through the best possible transfer and application of the theoretical knowledge, acquired in the classroom, in the real practice of the farm, entrepreneurship/business livestock sector and related sub-sectors.

For this purpose:

- a) The professional practice in the farm/business is a guided practice and is organized in "*Practice modules*";
 - b) The practical module is realized on the basis of a detailed program with fields, which includes all the characteristic elements of the Syllabus (according to the regulatory acts in force - DCM, instruction);
 - c) The professional practice is mainly led by the academic staff of the department and, as far as possible, by the technical staff of the farm/business, as well as by the extension service specialists who advise the farms where the students develop the professional practice;
 - ç) The guidance of the students by the academic staff of the department during the period of professional practice is realized through the combination of the Distance Learning method with visits to the farm, as far as they are necessary. Distance Learning becomes an integral complementary part alongside the main method in the auditorium;
5. Application of the "***Project-based learning***" or independent learning method during professional practice, which aims to apply and deepen the theoretical knowledge of one or several modules in real practice, through independent individual or group work of students, under the guidance of lecturers and, if possible, the support of the staff of the farm or business where the student develops the practice.
 6. The guidance of the students by the lecturers for the preparation of the Project in the farm/business is realized through the combination of the ***Distance Learning method*** with the visits to the farm, as far as they are necessary.

The reorganization of the current curriculum will be carried out in accordance with the Law on Higher Education, by-laws in force (Decision of Albanian Government (DCM) no. 41, dated 24.01.2018, amended; Instruction no. 1, dated 14.01.2020, amended) as well as the Regulation of Faculty of Agriculture and Environment (FAE) and the Statute of AUT.

2. LEGAL BASIS FOR PROGRAM REORGANIZATION.

The reorganization of the program is carried out based on:

- Article 35, point 9, of law no. 80/2015 "On higher education and scientific research in higher education institutions in the Republic of Albania";
- Decision no. 41, dated 24.1.2018, of the Council of Ministers, "On the elements of study programs offered by higher education institutions", amended;
- Instructions of MoESY, No. 1, dated 14.1.2020, chapter IV, subsection "B", point 4, letter "e", "On the documentation and procedures for the opening, reorganization and closure of the institution of higher education, their branches, main units and programs of study, as well as for the division or merger of the institution of higher education";
- AUT Statute;
- AUT Studies Regulations;
- Regulations of Studies of the Faculty of Agriculture and Agriculture (FAE).

3. DESCRIPTION OF THE CHANGES IN THE RE-ORGANIZED CURRICULUM.

The main changes made to the existing curriculum are as follows:

1. The curriculum includes a workload of 180 ECTS, of which 140 ECTS are theoretical training and 40 ECTS practical training, which is carried out as a professional practice in the farm/business, including the Bachelor's thesis that is carried out during the in-farm practice professional.
2. The part of practical training increases from 5 ECTS to 32 ECTS, while 8 ECTS are provided for the Bachelor's thesis out of the 5 ECTS provided by the existing curriculum for the final exam (32+8=40 ECTS).
3. The list of modules, the volume of their teaching work, reports of lectures/exercises, laboratory work, seminars, as well as their content in the first year, semesters I and II, remain completely unchanged.

Below is the description of the changes made according to the years and semesters of the study program:

3.1. Comparison of the reorganized curriculum with the current one, according to the years of study.

3.1.1. Module list and workload of re-organised curriculum.

The reorganized curriculum is presented in the table below:

Table 1: Module list and workload

Nr	Module	Sem.	hrs/ wk.	Total hours			ECTS	Workload, hrs =ECTS x 25 h *
				Total	Lect	Pract		
	1st Study Year							
	Semestri I (15 weeks)							
1	Matemáticas	I	4	60	30	30	6	

2	Chemistry	I	3	45	30	15	4	
3	Physics & Metereology	I	4	60	30	30	6	
4	Botanincs	I	3	45	30	15	4	
5	Biology and Microbiology	I	6	90	45	45	7	
6	Foreign language	I	2	30	0	30	2	
	Total 1st semester			330	165	165	29	725
	Semester II (15 week)							
7	Botanics advanced (Systematic)	II	3	45	30	15	4	
8	Organic chemistry	II	3	45	30	15	4	
9	Informatics	II	3	45	15	30	4	
10	Introduction to economy	II	3	45	30	15	4	
11	Introduction to plant production	II	3	45	30	15	5	
12	Instrodution to animal production	II	3	45	30	15	5	
13	Sociology	II	2	30	15	15	3	
14	Foreign language	II	2	30	0	30	2	
	Total of semester II			330	180	150	31	775
	Totali of ECTS of 1st Study Year						60	1500
	2nd Study Year							
	Semester III (15 weeks)							
15	Animal Genetics	III	4	60	30	30	5	
16	Animal Breeding	III	5	75	45	30	6	
17	Ecology	III	3	45	30	15	4	
18	Introduction to Animal Anatomy & Physiology	III	5	75	45	30	6	
19	Introduction to Akuakulture	III	3	45	30	15	4	
20	Aplication of Biotechnolgy to Animal production	III	4	60	30	30	5	
	Total 3rd Semester		25	360	210	150	30	750
	Semester IV							
21	Animal feeding and product quality	IV	4	60	30	30	5	
22	Animal feeds, processing and conservation	IV	4	60	30	30	5	
23	Agric. policy and Extension service in livestock	IV	3	45	30	15	4	
24	Introduction to Animal Health management	IV	3	45	30	15	4	
25	Animal hygiene	IV	2	30	15	15	3	
26	Mechanization and housing in livestock farms	IV	4	60	30	30	5	
27	Introduction to Farm management	IV	3	45	30	15	4	
	Total for 4th Semester		23	345	195	150	30	750
	<i>Theory at university Auditor (10 weeks)</i>				195	45	20	500
28	<i>On-farm practice: „Practice 1“ (10 weeks)</i>	IV			0	105	10	250
	Total of ECTS, 2nd year						60	1500
	3rd Study Year							
	5th Semester (15 weeks)							
29	Ruminants production and product quality	V	5	75	45	30	6	
30	Monogastric production	V	5	75	45	30	6	
31	Poultry production and product quality	V	3	45	30	15	4	
32	Bee production and honey quality	V	2	30	15	15	2	
33	Animal product quality and safety	V	3	45	30	15	4	
34	Animal product processing	V	3	45	30	15	4	
35	Animal reproduction and artificial insemination	V	3	45	30	15	4	
	Total of semester V		24	360	270	90	30	750
	6th Semester (20 weeks)							
36	Module “Practice 2”	VI					4	100
37	Module “Practice 3”	VI					20	500
38	Bachelor thesis during Practice 3	VI					6	150

Total ECTS of 3rd study year						60	1500
Total: Study years I+II+III, weeks	100					180	4500
Theory (in auditorium), weeks	70					140	3500
In-farm Practice, weeks	30					40	1000

*according to the by-laws in force 1 ECTS = 25 working hours. For classroom lessons, contact hours should occupy no more than 50% of it. In the calculations presented in the table, for the calculation of Workload, 11.5-12 contact hours in the classroom/auditorium have been calculated for 1 ECTS.

3.1.2. Changes in the First Year of studies

- No change in the curriculum of the first academic year, which is the same for some FAE study programs.
- There is the possibility that all modules can be developed, as needed, together with other FAE programs that have the same General Curricula (or “*common trunk*”).

3.1.3. Changes in the 2nd Year of studies

a) The list of second year modules is kept as is. The module "Methods and applications in the animal biotechnology" is added to it, which is moved from the third year, semester V, to the second year, semester III.

b) Two modules (Animal Nutrition, Animal Genetics) that had a lecture/practice ratio of 45/30 (6 ECTS), become 30/30 (5 ECTS).

c) The calendar /time shedule of the teaching process of the **4rd semester** is reorganized.

c.1.) **Semester IV modules** belong to basic animal sciences which have programs that are applied to every livestock farm, regardless of the species. This includes the modules: Animal Feeds and Feeding; Hygiene and diseases of farm animals; Development policies and extention service in animal husbandry; Management of farms; Mechanization and constructions in livestock.

c.2) Since most of the practical lessons, planned in the auditorium, of these modules are easily applicable in any livestock farm, this semester is reorganized, in such a way that all the theoretical part of the lectures, seminars and laboratory works must be developed in 10 teaching weeks. The rest of the program of practical lessons of these modules are transferred to be carried out, during the period of professional in-farm practice (see module "Practice 1"), on livestock farms, it is enough that it has a medium size. The professional practice period "**Practice 1**" includes the remaining 5 weeks of the regular semester and continues for another 5 weeks, until the end of July (10 weeks in total).

To illustrate the concept, we are referring to the two modules "Animal nutrition" and "Feeds & their processing technology" of semester IV. Technologies of production, processing, preservation, quality and safety evaluation of feeds, their combination in rations, techniques of animal and economic optimization of feed rations of different species, feeding technologies and their impacts on the quality of livestock products that are produced, as well as in the elimination of nutrients (especially N, P, K) in the farms of different species of animals constitute the main practical part of the modules "Animal nutrition" and "Feed & their processing technology". Implementation of this practical part directly on the farm,

that is, in the concrete situation from the real practice of the livestock farm, is a qualitatively much higher level of training, not only practical but also theoretical, because the student realizes this practical part, by himself, with the hands of on the farm, on the basis of the knowledge acquired in the classroom, consulted by the pedagogues of the modules, compared to the situations simulated or simply demonstrated in the classroom, where the student is more observant. This can be done on any livestock farm. The same situation is with all the modules of this semester.

d) Professional practice is added, named Module "**Practice 1**", which lasts 10 weeks and has a teaching or training volume of 10 ECTS (1 ECTS = 25 hours of professional practice; 5 h/day or 5 x 5 = 25 hours of professional practice/week). Practice 1 includes the last 5 weeks of Semester IV and another 5 weeks until the end of July (5+5 = 10 weeks of professional practice on farms/businesses). The training volume of 10 ECTS also represents the part of the practical lessons of the modules of the 4th semester that is transferred from the theoretical part (in the auditorium) to be carried out directly on the farm (see the explanation above), there is this distribution according to the modules:

Practical part carried during in-farm practice according modules:	ECTS
Animal feeding and product quality	2
Animal feeds, processing and conservation	2
Agric. policy and Extension service in livestock	1
Introduction to Animal Health management	1
Animal hygiene	1
Mechanization and housing in livestock farms	2
Introduction to Farm management	1
Total	10
Project Work 1 in one of the modules of this semester.	

e) For the professional practice Module "**Practice 1**" students prepare a report (**Practice Report No. 1**) of 15 - 20 pages, in which the implementation of the practice program in the farm/business where the professional practice was carried out is presented. This report is evaluated by the department.

f) During the professional Practice (Practice 1) of the second year, students, in addition to the Practice program, also carry out a **Course Project (Project Work) 1**, which relies on the Project-based Learning and Independent Learning method. Through this project, students have the opportunity to deepen in one of the modules of the fourth semester, according to a detailed methodology and under the guidance of the lecturer. The amount of work the student needs to complete the project, the report (20-30 pages) that the student will prepare, as well as his exam with a PPT presentation (15 - 20 minutes), justify the in-depth study in a selected module. This creates an opportunity for the student, in the second year of studies, to realize his preferences to orientate/deepen in a field, which, if he/she wishes, he/she can continue to deepen further in the year of third, through another course project, as well as with the Bachelor's thesis.

g) At the end of the "Practice 1" professional practice period, the students take the IV semester exams and leave the farm only on the day of the exam. This experience is obtained from partner universities in the Erasmus project and other universities that develop studies integrated with practice.

h) In total, the reorganization in the 2nd study year changes 10 ECTS, which represent a part of the practical lessons of the IV semester modules that are transferred from the auditorium/classroom to be realized through professional practice directly on the farm.

There is the possibility to conduct joint lectures for part of the modules of semesters III and IV, which are also part of the curriculum of the other Bachelor program offered by DAS, "Zooveterinary Biotechnology".

3.1.4. Changes in the 3rd Year of LAPS curriculum

Third Year of the curriculum undergoes the main reorganization, which realizes the greatest integration of the theoretical part with the professional practice on the farm/business.

Third Year of the existing curriculum brings modules belonging to applied animal sciences, which focus according to the species of farm animals and poultry, their productivity and the quality and safety of livestock products.

Module list of former curricula of 3rd year of study.

	Modules	Sem.	hours	Total hours			ECTS
				Total	Lec.	Pract.	
1.	Cattle production	V	4	60	30	30	5
2.	Small ruminant production and product quality	V	4	60	30	30	5
3.	Poultry production and product quality	V	4	60	30	30	5
4.	Pig production and product quality	V	4	60	30	30	5
5.	Processing technology and traceability of livestock products	V	3	45	30	15	5
6.	Methods and applications in the animal biotechnology	V	4	60	30	30	5
	Total		23	345	180	165	30
1	Control of animal product quality	VI	3	45	30	15	4
2	Animal Reproduction	VI	4	60	30	30	5
3	Elective module	VI	3	45	30	15	4
4	Elective module	VI	3	45	30	15	4
5	Elective module	VI	2	30	15	15	3
6	Practice	VI		0			5
7	Final Exam	VI		0			5
	Total		15	225	135	90	30

The group of elective modules from which 3 modules are chosen:

1. *Management of rabbits and bees;*
2. *Products of the territory;*
3. *Horse Management;*
4. *Legislation, analytics and feed safety;*
5. *Agribusiness Management;*
6. *Marketing of livestock products.*

In the reorganized curriculum, all modules of the existing curriculum are kept, and the workload is not reduced.

The changes made in the 3rd study year are as follows:

The changes in 5th semester are as follows:

- a) 5th semester is intended to cover the entire volume of the theoretical part of the third year, in terms of lectures and practical laboratory lessons that are carried out in classroom.
- b) A part of the practical training of all modules of applied subjects is realized directly in the farm practice in the 6th semester.
- c) In 5th semester, all the existing modules are preserved, but, simply to not increase the number of modules in the semester, the four modules of cattle, small cattle, pigs and horses are grouped in species groups according to biological, physiological, zootechnical similarities and economic, this is the experience of almost all the curricula of this direction in the universities of other countries.
- d) The modules of ruminant species, namely cattle "Cattle Production" and that of small ruminants "Small ruminant production and quality of products", are approached in the module in the reorganized curriculum in the module "Ruminants production & product quality".
- e) The modules of monogastric species, namely the compulsory module "Pig production" and the optional module "Equine Management" are included in the reorganized curriculum in the module "Monogastrics production and product quality" (pigs, horses, rabbits). In this module, the necessary knowledge for the production of another monogastric species, rabbits, will be approached, which, in the current curriculum, is in the group of optional modules together with the bee "Management of rabbits and bees".
- f) Bee production, due to biological features and the place it takes in our animal husbandry, is planned as a special compulsory module "Bee production & quality of bee products".
- g) The module "Methods and applications in the animal biotechnology" has been transferred from 5th semester to 3rd semester.
- h) The "Animal Reproduction" module has been moved from semester VI to semester V, improving its name to "Animal Reproduction & Artificial Insemination of Animals", to better respond to the content of its current syllabus, as well as to better serve students if they will attend and be certified for the professional training category "Artificial insemination technician", which is recognized by the legal framework and has a job market in practice.
- i) The other module of semester VI "Control of products of livestock origin" has been moved to semester V.

The changes in Semester VI are as follows:

a) Semester VI will be reorganized as a semester of dual in-farm/business professional practice, which lasts a total of 20 weeks (March to July) or 100 days of practice on the farm and has a workload in credits of 30 ECTS. It has been calculated 6 hours of practice on the farm/day or a total of 600 hours of practical professional work directly on the farm. During this semester:

- "Practice 2" module with 4 ECTS;
- Module "Practice 3" with 20 ECTS;
- Bachelor thesis with 6 ECTS.

In this semester, students directly apply the knowledge gained in the theoretical part of the 5th semester modules as well as the previous semesters on the farm or businesses.

b) ***The "Practice 2" module*** starts at the beginning of March and includes a professional practice of 100 hours of practical professional work (4 ECTS) or about 4 weeks in central, regional and local public institutions that develop policies and manage the livestock sector. The main objective of Practice 2 is for

students to have the opportunity to apply the knowledge acquired especially in semesters III, IV and V, on the organization, operation and activity of public, central, regional and local institutions (also municipalities) of the agricultural sector (agency central, regional directorate of agriculture and rural development; agency/unit of the advisory service; directorate/ /inspectors/ safety laboratories of animal product and feeds, etc.), which direct and manage the development of livestock, feed safety for livestock, as well as other sub-sectors related to livestock. In carrying out Practice 2, the department closely cooperates with the specialists of public institutions, to whom the students will be attached for four weeks, especially the Regional Agricultural Extension Agencies.

c) **Module "Practice 3"** starts after Module "Practice 2" and includes professional practice of 500 hours of professional practical work (20 ECTS) (or about 16 weeks) directly on livestock farms. During this period of professional practice, students deepen their practical training in the modules of different species of livestock animals as well as the module of artificial reproduction & insemination of farm animals, according to the structure of the professional practice program on the farm, the chapters of which represent the objectives of practical training for the different modules. These objectives are realized by the students on the livestock farm by working on their own to develop and solve tasks in the form of analysis and reflection for the concrete situations of the farm where they carry out the practice, based on the theoretical-practical knowledge acquired in the auditorium in the 5th semester and through consultation with relevant lecturers (mainly through Distance Learning - lecturers organize online consultation hours with students according to modules).

During "Practice 3" students closely follow and get to know all the activity and functioning of a livestock farm, which gives them the basic practical knowledge and enables them for the technical management of any type of livestock farm, regardless of the species. While the deepening of practical knowledge in different species is realized in the form of "Integrated zootechnical and economic management of the livestock farm" of different species and is reflected in the professional practice program "Practice 3", in the form of separate chapters: a) Zootechnical and economic management of the cattle farm; b) Zootechnical and economic management of small ruminant farm; c) Zootechnical and economic management of the pig farm; ç) Zootechnical and economic management of the poultry farm; d) zootechnical and economic management of the bee farm; e) Zootechnical and economic management of the horse farm, as well as f) Reproduction and artificial insemination of animals in livestock farms.

For this purpose, it will be intended that students perform the professional practice "Practice 3" not on the same farm where they performed "Practice 1", so that they have the opportunity to gain experience in more species and types of livestock farms. In view of this goal, if it will be possible, the period of "Practice 3" can be divided and not carried out in two types of livestock farms. This alternation is potentially possible due to the limited number of students (about 25 students) who will be admitted to this program. However, this will depend on the regional distribution of medium and small livestock farms and the accessibility of students due to their place of residence. This optimization of the development of practice 3 in more than one livestock farm will increase from year to year.

d) For both "**Practice 2**" and "**Practice 3**" modules, students prepare a report (Practice Report No. 2) of 20 - 25 pages, which consists of two parts (Part I - "Practice 2" and Part II - "Practice 3") where they reflect the implementation of the Practice program implemented in the place of the professional Practice. This report is evaluated by the department.

e) **Course Project 2 (Project Work 2)**: Even in the 6th semester, students have the opportunity to delve deeper into a field or species through a Course Project (Project Work) 2, which focuses on "(integrated) zootechnical and economic management of a livestock farm ", where the student develops a management plan, which includes all management links, such as nutrition technology, breeding,

husbandry system, reproduction, production, quality and safety of the primary livestock product, environmental impacts as well as livestock production economics (cost analysis) that the farm performs. The student finalizes this project with a written report (25-30 pages) and a presentation (15-20 minutes) that is presented in the department.

f) **Bachelor's Thesis:** In Semester VI, i.e. during the Practice period on the farm, in addition to the Practice program 3, students realize and prepare the Bachelor's Thesis, which represents the first work with research elements that the student does in the Bachelor's university studies. The department announces the Bachelor's topics and leading scientific lecturers at the beginning of the third year of studies. Each student selects an applied topic related to the issue/activity of the farm/business where he/she develops professional practice. The Bachelor's thesis has a workload of 6 ECTS. It will be 30-35 pages long and will be defended through a PPT presentation (15-20 minutes) to the department. The workload of the work that the student will do for the thesis is 150 hours of independent work (6 ECTS x 25 h) for its writing, presentation and exam. The topic of the thesis can foresee simple research elements (eg monitoring of production indicators, reproduction, evaluation of feed and rations, etc.) they must be within the content of the professional practice program, which means that for the student does not need additional work on the farm. The thesis is presented for exam at the end of July or in a second season in September.

Total number of credits that change in the third year: In total, the reorganization of the third year changes 20 ECTS from the total 60 ECTS of this year. The professional practice increases from 5 ECTS to 24 ECTS, i.e. it adds 19 ECTS, while for the Bachelor's thesis, 1 ECTS is added in addition to the 5 ECTS contained in the existing curriculum (19 + 1 = 20 ECTS).

The total number of credits that vary across the program:

Credits that change in 2nd study year 10 ECTS

Credits that change in 3rd study year III 20 ECTS

The total number of credits that differ from the reorganization in the three years of studies of this program is 30 ECTS from the total of 180 ECTS or 16.7% of them.

4. THE CATEGORIES OF MODULES THAT CHARACTERIZE THE REORGANIZED PROGRAM.

The reorganized program curriculum will continue to offer:

Modules of basic disciplines (category A) take 20.7% of the curriculum and provide knowledge in basic natural and biological sciences, which serve for general education and mainly for the realization of general education competencies. They are disciplines that are approached for the entire "Agrarian Engineering" program in the first year and serve as a basis for basic and applied animal sciences, as well as other disciplines that are approached in the following semesters of studies.

Characterizing/profiling subjects (B) (54%), provide necessary theoretical and practical knowledge in (i) basic animal sciences; (ii) applied animal sciences related to breeding technologies and the quality of livestock products produced on farms of different species and categories of livestock animals; (iii) modules related to the processing of livestock products as well as their veterinary control; (iv) modules

related to veterinary hygiene, welfare and disease prevention measures in farm animals; as well as (v) modules of economy and business management in livestock farming as well as environmental standards in livestock farms. Based on DCM definition 41 (24.1.2018) for this category "Characteristic subjects, which are related to the features of the study program and provide a specific training, according to its characteristics;" and from the concrete features of this program, which integrates theory with practice in all the modules included in the five (i-v) groups mentioned above, mainly basic and applied animal sciences which are carried out during the second and third year of studies . Thus, the credits of these modules in the auditorium as well as the credits of the internship modules on the farm ("Practice 1" and "Practice 3" modules) are calculated in this category, because during these internship periods on farms/businesses, students really apply knowledge theoretical of the relevant modules developed in the auditorium, realize a part of the practical training program of these modules directly on the ground, as well as they deepen the knowledge in special modules through "Project-based Learning" and independent learning.

Interdisciplinary / integrative subjects (C) (12%), which include sub-disciplines, profiles and a group of elective subjects, will help the student to deepen further, especially in agricultural and livestock production as well as in the safety of primary livestock products.

Complementary subjects (D) (10%), which include foreign languages and computer and statistical knowledge. Professional practice in public institutions is also counted in this category (Practice Module 2). While practice on the farm is not counted in this category, but in category B since it is developed integrated with the theoretical part.

The final obligations (E) (3.3%), include the Bachelor's thesis which occupies 8 ECTS. The student prepares the thesis during the period of professional practice in the farm/business, and chooses an applied topic related to the problem of the farm/business where he/she develops the professional practice.

Modules	Category	ECTS (%) each category, (according DCM)	ECTS (%) for each category for BSc level
BASIC Disiplines – methodological preparation and general culture	A	15% - 20%	20,7%
CHARACTERISING/PROFILING DISIPLINES- preparation for the scientific discipline	B	50% - 55%	54 %
INTERDISCIPLINARY COURSES – subdisciplines, profiles and elective group	C	12% -15%	12 %
SUPPLEMENTARY COURSES – foreign languages, informatics and biostatistical knowledge.	D	10-15%	10%
FINAL OBLIGATIONS	E	3%-5%	3,3%

5. HUMAN RESOURCES AND DIDACTIC CAPACITIES FOR THE REALIZATION OF THE REORGANIZED PROGRAM.

This program is fully feasible with reference to the academic and infrastructural human resources of the department, meeting the criteria of Instruction No. 1, dated 14.01.2020 "On the documentation and procedures for the opening, reorganization and closure of the higher education institution, their branches, main units and study programs, as well as for the division or merger of the higher education institution". The academic staff of the Department of Animal Sciences, which will certainly carry the main workload, is of the 'Professor' category. The department also has all the necessary infrastructure to launch the new program. An integral part of DSHZ are two laboratories closely related to the field: the "Animal Biotechnology" laboratory, as well as the "Feed Quality and Safety for Livestock and Aquaculture" laboratory.

As explained above, the essence of the reorganization of this program lies in the integration of theoretical studies with professional practice in the farm/business as well as in the public institutions of the management of the livestock sector. The implementation of professional practice is the main objective of an Erasmus project for capacity building. Within this project, AUT cooperates closely with two partner universities of the EU countries as well as with actors of the labor market in our country.

Since the reorganization of the study program consists, first of all, in strengthening practical training through the integration of studies with direct practice on the farm/business, the organization and development of professional practice is presented in the attached appendix (see Appendix 1).

6. COMPETENCES AND SKILLS ACQUIRED BY STUDENTS.

The competencies and skills that students acquire in the reorganized program, where theoretical studies in the classroom are combined with professional practices on farms/businesses in the livestock sector, derive from the advantages of this model.

The experience of other countries has shown that theoretical studies in the auditorium combined with periods of professional practice in farms and businesses have a number of advantages, both for the quality of the theoretical and practical professional training of students, and for their early employment after graduation.

The main advantages of this model are:

- a) Familiarization of students with the farm, the business in the livestock sub-sector and their operation from the second year of studies. This is a completely unknown "world" for students coming from cities and high schools. Students who have completed vocational secondary schools of agricultural profiles are "at home", but if they continue their Bachelor's studies, they see the farm from a higher stage of theoretical knowledge acquired during their studies.
- b) Benefit of practical and professional skills in companies/farms/businesses in the livestock sector since the time of studies.
- c) Familiarity with the operation of the farm/business, starting with the simplest daily processes, up to aspects of zootechnical management.
- d) Familiarization with the farm/business and the sector makes the transition from university/university studies to work/profession easier and more natural.
- e) Very early employment of graduates and a much better perspective in the professional career.

- f) Graduates have a great advantage in interviews for employment during the application, because they are familiar with the farm/business and with the employers' requirements for technical staff, have good practical knowledge and technical communication language of the profession, which makes the employer save the usual training courses that apply to graduates (due to insufficient professional practical knowledge) and entrust much more competences, from the beginning, to newly recruited specialists (usually employers consider graduates of Dual studies as young professionals, who, from a practical point of view, are "at home" from the first day of work).
- g) It is expected that studies combined with practice in this program will better attract graduates/students from rural areas as well as farming families to get an education and then to inherit the farm/business from their parents.
- h) It is expected that studies combined with practice in this program will attract more graduates from the branches of agriculture and economics and tourism of vocational secondary schools. In total, this contingent is currently about 1,400 graduates, of which about 400 graduates belong to the branches of agriculture and animal husbandry of 8 vocational secondary schools.
- i) Students who complete Bachelor's studies combined with practice come to Master's studies with qualitatively higher requirements and motivation. They come with much higher requirements and with much better practical and theoretical knowledge, which will be an impetus for increasing the theoretical and practical level of the second cycle studies as well as for their better orientation towards the requirements of the labor market.
- j) The combination of theoretical studies in the auditorium with professional practice on the farm will remove the theoretical part of the studies from the theoretical overload of the Bachelor's curriculum (this is not a rare phenomenon, also due to the sequence after the load of classes). This will help to better realize the necessary hierarchy of theoretical and practical training in the first and second cycle of studies, according to international standards. On the other hand, I will help the curricula of this program in both cycles to better align with those of foreign universities for this field of study.
- k) This model of studies, through familiarization with the farm/business, develops entrepreneurial skills in students very early, which can help them create their own farms/businesses after studies, especially if they will be supported with grants or other incentives for the creation of new businesses by graduates in agricultural sciences.
- l) Based on the experience of universities in other countries, especially German ones, students who study in programs integrated with practice can benefit, in addition to the Bachelor's degree with its Supplement, also a professional certificate, which evidences the acquired practical training. This reorganized program, with such a theory/practice ratio (140 ECTS/40 ECTS), creates real opportunities to provide students, at the end of their studies, with a Vocational Training Certificate, which corresponds to a profession included in National List of Professions (LKP). The Law on Higher Education (80/2015), in Article 81, creates full scope for such an assessment of professional practice. This Professional Certificate, in addition to the Diploma with its Supplement, serves students not only in employment, but also in other cases when they create their own farm/business, etc. With the start of the implementation of the reorganized program, the concept for this additional professional qualification will be developed and finalized.

Farms and businesses in the field of livestock, which will contribute to the practical training of the students of this program, may have some benefits. Such are:

- Recognition during practice of the most motivated and prepared students, in order to recruit them or to receive their professional assistance when they start practicing the profession.
- The possibility of the continuous presence of young students in the farm/business, which also serves the image of the farm/business in the community and the region where it is located.

- The possibility of implementing students' ideas and projects in the farm/business, which can be interesting as products of the imagination of a new generation that grows up and is educated in a new "age" of information technology, digitization, etc. During the implementation of the professional practice program, the student intern analyzes concrete situations of the farm and, after consultation with the lecturers and the technical staff of the farm/business, reflects on them by proposing improvements, which the technical manager evaluates as to how implementable they are. In this way, a professional communication between the farmer, the farm staff, the student and the department is established for mutual benefit.
- Establish a qualitatively better cooperation of the department with practice, for the exchange of experiences, the transfer of knowledge as well as the development of research, development and innovation projects in farms/businesses that contribute to the practical training of students.
- These farms/businesses will be developed hand in hand as student training farms/businesses. In countries with experience in studies integrated with practice and in the Dual system, such farms/businesses enjoy a status recognized by the state (e.g. in Germany they are known as "Lehrbetriebe"), and, as such, benefit from those supports financial from the state for the contribution they give to the practical training of students and pupils.

The advantages of studies combined with practice in the reorganized program develop the following competencies in students:

- Competencies of general training* in basic biological natural sciences and those of basic interdisciplinary training.
- Professional competences* in animal sciences, basic and applied.
- Professional competence in the field of quality and safety of primary products* (without entering the processing process) that are produced by livestock farms and constitute the main feed for humans.
- Professional competences in the field of animal welfare and health protection.*
- Professional competences* in the field of enterprise management in livestock farming or sectors closely related to it, especially trading of livestock products, production, processing and trading of feed for livestock, etc.
- Professional competences* in the field of communication, including communication with the farmer, counseling and application/transfer of theoretical knowledge in the practice of the profession.
- Professional competences* in the field of impact of livestock on the environment and environmental assessment of livestock farms.
- Advanced practical skills* in general organization and daily management, as well as in zootechnical and economic management of livestock farms. Students acquire these competencies through practical work directly on the livestock farm/enterprise. They are evaluated and reflected in the diploma supplement.

- i) *Solid analytical competencies* developed and consolidated through the analysis of various technical and economic processes of the farm or business activity and finalized through practice reports, course assignments, presentations as well as the Bachelor's thesis.

7. EMPLOYMENT OPPORTUNITIES.

As it was underlined in section 3, the reorganization of the program is focused on strengthening the practical training through the integration of the theoretical part with that of the professional practice on the farm/business, without compromising even increasing the quality of the theoretical training required by the quality standards for the cycle first of studies.

Based on the advantages of the study model combined with practice, as well as the professional competencies and skills that students will acquire during the study cycle, they will have the following employment opportunities:

In the *private sector*, such as:

- a) Manager of his own farm or of a farm with another owner;
- b) Specialist in livestock, agricultural or agrotourism farms;
- c) Assistant Specialist in private livestock consulting offices;
- d) Specialist/expert or Assistant for nutrition and feed processing at animal feed companies;
- e) Specialist/expert or Assistant for genetic improvement in breed and breed material companies;
- f) Specialist/expert or Assistant for the quality of primary livestock products for farms and companies of the feed industry (in the units of evaluation of the quality of primary products in the collection phase);
- g) Specialist/expert or Assistant in domestic and foreign companies covering construction, mechanization and automation in livestock;
- h) Specialist/expert or Assistant in private quality laboratories of livestock products;
- i) Specialist/expert or Marketing Assistant in the marketing of livestock products and by-products;
- j) Specialist/expert or Assistant in non-profit organizations working in the field of animal husbandry, rural development and animal protection and welfare.

II) In the *public sector* as a specialist or Assistant-specialist with a Bachelor's degree in:

- a) Agristations (Agropika) and regional directorates of agriculture, food safety and inspectorates;
- b) Advisory departments/sectors in agriculture and animal husbandry;
- c) Food safety laboratories for the field of feed safety for livestock;
- d) Agricultural directorates/units/sectors of municipalities: for livestock farms and the safety of livestock products;
- e) Municipal and regional consumer protection directorates/units/sectors;
- f) Statistics sectors in local government units.

8. DATA ON ADMISSION CRITERIA TO THIS STUDY PROGRAM, FEES AND FINANCIAL MODALITIES FOR STUDENTS.

a) *The start of the implementation of the reorganized program:*

The reorganized program begins to be implemented in the academic year 2022-2023.

b) The criteria for admission to the study program remain unchanged.

As explained above, in this study program with a practical orientation, priority will be given to attracting several categories of graduates such as:

- high school graduates coming from rural areas with more livestock;
- graduates who come from families that have farms or businesses in agriculture, livestock, agro-tourism and other related businesses;
- graduates who completed secondary vocational schools in agriculture, animal husbandry, economy and tourism programs.

All other admission criteria that FAE applies to other programs in agricultural sciences apply to this program.

c) The maximum number of students to be admitted.

In this study program, the minimum allowable number for the formation of 1 teaching group of 25 students will be accepted. This closed number of admissions is determined by the nature of the study program combined with professional practice in farms/businesses, the number of medium and large farms/businesses where the professional practice will be carried out, as well as the large volume of work for the management department of students in the realization of professional practice. Usually study programs combined with professional practice are applied to study programs that have a small number of students.

d) Study fee.

The tuition fee remains unchanged and follows the policies followed by AUT for other first-cycle programs in agricultural sciences.

The reorganization of the program does not provide for special AUT costs for students' professional practices on farms. Therefore, one of the criteria for the distribution of students to farms will be the proximity to their place of residence, so that students' costs do not increase compared to what they currently have.

9. THE FORMAL ASPECT OF THE APPROVAL OF THE REORGANIZATION OF THE PROGRAM

In total, the reorganization of the program of the first cycle of Bachelor's studies in LAPS:

- a) It does not change the name of the study program.
- b) It does not change the total duration of the program. Studies are completed within 3 academic years.
- c) It does not change the total number of ECTS, so it remains 180 ECTS.
- d) Reorganizes the ratio between theory and practice in favor of increasing the latter.
- e) The reorganization changes a total of 30 ECTS or 16.7% of the total number of credits (180 ECTS).

- f) The reorganization maintains the ratio between categories and formative activities within the limits defined in the regulatory framework for Bachelor studies.

Based on the above, it results that the Reorganization of this program can be fully categorized as a Reorganization that complies with the definition of Chapter IV, letter B, point 4/e, of the MoESY Instruction, No. 1, dated 14.1.2020, according to which:

"e) in the case when the reorganization of the program takes place below 20% of the content expressed in credits, for accredited programs, the HEI files with the MoESY, the decision of the Academic Senate. MoESY is notified in writing by the institution of higher education about the changes made in the study programs no later than 6 months before the beginning of the academic year. Changes below 20% expressed in credits of the content of the study program should not change the name of the study program, but only profile changes. The HEI, if necessary, reflects the changes in the issued diploma".