

## Facultad de Veterinaria



## Universidad de Zaragoza



## Evaluation Report for EAEVE revisit

March 2010

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## Introduction

The present report describes the quantitative and qualitative improvements carried out in the teaching system of the Veterinary degree in the Veterinary Faculty of the University of Zaragoza (FVZ) since the second EAEVE Evaluation took place (February 2006). Throughout the past years, Category-I detected deficiencies have been properly corrected and some further measures have been addressed to overcome several Category-II deficiencies also observed by the Evaluation Committee.

However, prior to the description of the changes undergone by the Faculty, we would like to remark that in 2006, when the EAEVE Evaluation team visited the FVZ, the curriculum of the Veterinary Degree was “under development”, its implementation having started in the academic year 2002-03. Consequently, the visit took place when the first edition of the 4<sup>th</sup> year of the degree had been recently initiated and the 5<sup>th</sup> year had not been implemented yet. That period of transition from the old to the new curriculum caused an undesirable effect on teaching quality due to the overlap of activities in several subjects in the higher courses of the Degree that had been moved from one course to a different one. This was the origin of some misunderstanding regarding the real composition of the Degree and the accompanying activities, which, unfortunately, we failed to explain in depth. Now that a newer studies programme is about to start (2010-2011), we have learnt from the past experience and are ready to adopt the necessary mechanisms to avoid any problems in the coming years.

Thus, the present report also includes a description of the new Veterinary curriculum, a highly integrated study programme clearly oriented towards an “end-user” approach and the best guarantee to reach the required day-one professional skills.

Furthermore, a complete and detailed review of the teaching hours of each subject in each academic year of the curriculum has been made since, as mentioned above, some mistakes and misinterpretations were detected in our 2006 SER.

More importantly, during the past four years several improvements have been made, both in quantity and quality, in the teaching of clinical subjects as well as in other subjects, based on an important effort of our teaching staff and the decisive support from the University of Zaragoza.

To overcome the two Category-I deficiencies detected by the EAEVE Report in 2006, several action lines have been followed:

- to adjust the number of theoretical lectures and to increase our practical training.
- to specifically increase the number of clinical training hours to achieve the ratios required by the EAEVE.

- to improve the integration of production and animal health aspects in farm animal teaching in the Faculty.
- to increase our engagement in farm animal teaching with a stronger participation “in the field”.

Some of the improvements demanded by the EAEVE Report have driven us to the decision of modifying our new Veterinary curriculum, adapting it to the European Higher Education Area (Bologna process), and evolving towards an integrated, species-oriented and problem-solving approach.

## 1. Response to Category-I deficiencies

The expert group from EAEVE visited the Veterinary Faculty of the University of Zaragoza in February 2006. In the final report adopted by the Joint Education Committee of the EAEVE-FVE, two main suggestions were made which were considered “Category I suggestions”:

### 1.1. The amount of intramural hands-on clinical training in the core course must be increased (*Suggestion 4.6*)

The distribution of the curriculum hours taken by all students in the year 2005-06, when the FVZ was evaluated, compared to the current situation (2009-2010) can be seen in the following Tables:

**Table 4.1.1.:** General table of curriculum hours taken by all students (Year 2005-06)

	Training hours					
	Lectures	Practical work	Supervised work	Clinical work	Other	Total
1 <sup>st</sup> year	345	246.5	18		5.5	<b>615</b>
2 <sup>nd</sup> year	390	203	22			<b>615</b>
3 <sup>rd</sup> year	435	134	106	23	30	<b>728</b>
4 <sup>th</sup> year	375	120		134	71	<b>700</b>
5 <sup>th</sup> year	345	115.5	62.5		12	<b>535</b>
4 <sup>th</sup> -5 <sup>th</sup> years				60		<b>60</b>
<b>Total</b>	<b>1890</b>	<b>819</b>	<b>208.5</b>	<b>217</b>	<b>118.5</b>	<b>3253</b>

**Table 4.1.1.:** General table of curriculum hours taken by all students (Year 2009-10)

	Training hours					
	Lectures	Practical work	Supervised work	Clinical work	Other	Total
1 <sup>st</sup> year	274	201	12	3	54	<b>544</b>
2 <sup>nd</sup> year	309	157	33	8	25	<b>532</b>
3 <sup>rd</sup> year	343	86	43	76	76	<b>624</b>
4 <sup>th</sup> year	296	66	26	152	20	<b>560</b>
5 <sup>th</sup> year	273	89	73	66	19	<b>520</b>
4 <sup>th</sup> -5 <sup>th</sup> years				(150)		<b>(150)</b>
<b>Total</b>	<b>1495</b>	<b>599</b>	<b>187</b>	<b>305 (455)</b>	<b>194</b>	<b>2780 (2930)</b>

See **Annex I** for a detailed distribution in courses and subjects of curriculum hours taken by all students.

Taking into account these new figures we have recalculated the ratios that were presented in the 2006 SER, resulting in the following core subjects values:

$$RE = \frac{\text{Theoretical training}}{\text{Practical \& Clinical training}} = \frac{1495}{1285} = \frac{1}{\mathbf{0.86}} \quad (1/0.72 \text{ in } 2006)$$

$$RC = \frac{\text{Clinical training}}{\text{Theoretical \& Practical non clinical training}} = \frac{305}{2475} = \frac{1}{\mathbf{8.11}} \quad (1/14.0 \text{ in } 2006)$$

Thus, significant and positive changes can be observed in both indexes, with an increase of 19.4% for RE and a decrease of 42.1% for RC.

However, considering that, in order to guarantee that all students carry out their learning activities exclusively in clinical facilities, the subject "Stages" (Estancias) was modified two years ago, we consider that these hours can be included at present in the total amount of clinical hours. Consequently, these indexes could be calculated as:

$$RE = \frac{\text{Theoretical training}}{\text{Practical and clinical training}} = \frac{1495}{1435} = \frac{1}{\mathbf{0.96}} \quad (1/0.72 \text{ in } 2006)$$

$$RC = \frac{\text{Clinical training}}{\text{Theoretical \& Practical non clinical training}} = \frac{455}{2475} = \frac{1}{\mathbf{5.44}} \quad (1/14.0 \text{ in } 2006)$$

These new data show further significant changes in both indexes, with an increase of 33.3% for RE and a decrease of 61.1% for RC.

The main explanations for the evolution of these figures are the following:

- Reconsideration of some teaching activities that were wrongly categorized in the 2006 SER.
- Implementation of some new clinical activities in basic subjects of the first courses.
- Improvements in several clinical subjects and new clinical activities in the 4th course (with overlaped teaching in 2006) and in the 5th course (not implemented in 2006 yet).
- Increase in the clinical cases workload as a result of several agreements signed with private clinics, animal protection associations and farms to develop a clinical teaching in several species, and also due to an increase in the clinical activity in our Veterinary Hospital (number of cases visited and number of hospitalization days, in small animals and equine).
- Obligation for every student to complete 150 hours of core supervised external practices in the subject "Stages" (Estancias) in other facilities with clinical activity.
- Adjustment in the number of theoretical teaching hours.

Some of these improvements have been possible thanks to an increased economical support from our University in funding clinical activities inside and outside the Faculty and also to complementary funding through Educational Innovation Projects.

A more detailed list of the most relevant changes related to this Category-I suggestion follows:

1. **Increment of clinical hours** in the following subjects:

- **Animal and Plant Biology**: 3 hours
- **Animal Physiology**: 8 hours
- **Radiology**: 4 hours (now 12 hours in total)
- **Pharmacology, Pharmacy and Therapeutics**: 12 hours
- **General Pathology**: 7 hours
- **Medicine and Clinical Surgery**: 10 hours (now 40 hours in total)
- **Animal Production and Veterinary Hygiene**: 10 hours
- **Infectious Diseases**: 3 hours
- **Toxicology**: 7 hours

See **Annex II** for the detailed new teaching guides of these subjects.

2. **Adjustment of clinical hours** in the following subjects:

- **Clinical Propedeutics**: increment of 30 hours (misclassified in 2005-06)
- **Medical and Nutrition Pathology**: reduction of 2 hours
- **Clinical Work at Hospital**: reduction of 4 hours

3. **Reduction of theoretical hours**: Additionally, the total amount of theoretical hours has been reduced.

As a consequence of all these changes, the **total amount of clinical teaching hours grew from 217 to 305** (an increase of 40.6%), not including 150 hours of the subject “Stages”, and from 217 to 455 hours (an increase of 109.7%) if they are included.

On the other hand, a reduction in the amount of theoretical teaching hours, from 1890 (2005-06 academic year) to 1495 at present (2009-2010 year) can be observed. These figures represent a 20.9 % reduction in lectures.

A key factor in the increase of these clinical practice hours has been the increment in the clinical cases seen in the Veterinary Hospital of the FVZ (Table 1), as well as the opportunity to organize an integrated clinical assistance service in the Scooby centre, a canine shelter supported by Affinity company (see **Annex II** for details).

Although due to the general economic recession we had a 5% reduction in the small animals clinical cases received at the Veterinary Hospital, this was compensated by the clinical cases seen at the Scooby centre.

**Table 1.** Volume of Clinical cases seen in the Veterinary Hospital (FVZ)

Course	Pets		Horses	
	Cases	Variation	Cases	Variation
2005-06	6900		221	
2006-07	7164	3,8%	250	13,1%
2007-08	7530	9,1%	242	9,5%
2008-09	6554	-5,0%	308	39,4%

## **1.2. The Faculty engagement in farm animal teaching and clinical services must be improved (*Suggestion 4.14*)**

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To overcome this complex and broad deficiency, we have undertaken the following correction strategies:

- **Establishment of agreements** with commercial and governmental farms involving different animal species.

The Faculty has signed several agreements with private farmers in order to implement a practical teaching that allows a hands-on learning of students in an integrated clinical activity in the field, developing skills on production, clinical and health contents at the same time.

Some of these agreements are possible thanks to an economic compensation to farmers.

At present, we have active agreements with:

- Sheep commercial farm in La Muela (meat production, 1200 ewes)
  - Cattle commercial farm in Quinto de Ebro (dairy production, 135 cows)
  - Cattle farm in Aula Dei-CITA (meat production), depending on the Regional Government
- **Coordination of the practical contents** taught by the Associated Lecturers with external activity within the Animal Pathology Department and the Animal Production Department. New Associated Lecturers with external activity have been hired for a more specialized teaching.

The Governing Board of the FVZ has been working intensively to improve the coordination of our two swine Associated Lecturers, one from each of the cited Departments. All student groups rotate with both teachers, integrating in their activity production and clinical aspects of the swine industry, in both, farrowing and fattening herds.



The FVZ has hired two veterinary practitioners specialized on ruminants as Associated Lecturers, one in sheep medicine and the other one in bovine medicine. These two Associated Lecturers carry out their teaching activities in the two commercial farms cited in the previous paragraph (La Muela and Quinto de Ebro). Actually, both teachers are the clinical practitioners responsible of these farms. Although both Lecturers depend on the Animal Pathology Department, their activities integrate every aspect of production and clinical medicine and health in the ovine and bovine species.

The FVZ has also hired for the first time a veterinarian specialized on poultry industry for the Animal Pathology Department. The new Associated Lecturer comes to fill a gap on teaching clinical aspects of poultry science related to preventive medicine and health that complement and coordinate with the existing teaching of poultry production in the Animal Production Department.

We also have contracted the services of a veterinarian specialized on fish industry who is officially responsible of all private and governmental fresh fish farms in Aragon and other close regions. He is teaching Infectious Diseases and Epidemiology in the present curriculum, introducing topics on aquaculture and fish diseases in both subjects.

- **Application and development of educational innovation projects** from our University.

There are four different types of educational innovation projects: development of e-learning materials (PESUZ), promotion of teaching innovation (PIIDUZ) improvement of teaching promoted by Faculties (PMDUZ) and strategic innovations promoted by Faculties for new Degrees (PIECyT).

**Table 2.** Approved projects during the last four years in each call

Year	PESUZ	PIIDUZ	PMDUZ	PIECyT
2006-07	10	3	2	
2007-08	11	6	3	
2008-09	12	13	2	1
2009-10	9	15	3	2

Some of the most relevant projects are:

- “Integration of clinical and anatomopathological teaching of clinical cases and adaptation to the new Common European Area for Veterinary Learning” (PIIDUZ 2006-07)
- “Practical application of ECG to assess the health status of dogs in kennels” (PIIDUZ 2007-08)

- “ECG and heart auscultation in Medical Pathology, Clinical Propedeutics and Radiology: a specific experience to develop a model of integrated teaching” (PIIDUZ 2007-08)
- “Sheep as a teaching model to learning in clinical practice oriented to Veterinary pathology” (PIIDUZ 2008-09)
- “Use of animal models as a complement for teaching in General Pathology and Clinical Propedeutics in the Veterinary Faculty” (PIIDUZ 2009-10)
- “Integrated teaching on Ruminant Clinical Practice in the subject Nutritional and Medical Pathology” (PIIDUZ 2009-10)
- “Curricular design of the subject Integration in Equines, and coordination with the Equine Practicum in the new Veterinary Degree (Stage I)” (PIIDUZ 2009-10)
- “Methodological changes and implementation of new practical activities for the improvement of clinical skills in the Veterinary curriculum” (PMDUZ 2008-09)

A complete list of all projects is included in **Annex III** (in Spanish).

## 2. Response to Category-II deficiencies

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In the final report adopted by the Joint Education Committee of the EAEVE-FVE, several suggestions were made which were considered “Category-II suggestions”. The necessary measures have been taken in order to overcome the problems or deficiencies detected. Some of these measures have already been implemented and others have been taken into account in the design of the new Veterinary Degree.

In order to facilitate the comprehension of this part of the report, instead of answering each individual suggestion, the main fields of work are described, since each one can be related to more than one suggestion.

### 2.1. New Veterinary Syllabus.

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In our opinion, some of the Category-II Suggestions indicated in the 2006 EAEVE Report can only be properly addressed through the adoption of a completely new syllabus. The opportunity of a major change was associated to the Bologna process, in order to meet the requirements of the European Higher Education Area.

The new structure of the studies was designed by an Official Committee integrated by teachers, students and graduates from our Veterinary Faculty, as well as by external veterinary professionals and members of the Spanish Veterinary Association.

The resulting new curriculum was approved by the Veterinary Faculty Board and the Governing Board of the University of Zaragoza in 2009, and is presently under evaluation by the Spanish Education Ministry. It will hopefully be implemented next year (2010-11). See **Annex IV** for more details of its structure and contents.

This new study program presents the following main lines:

- a) A significant reduction in lectures and a proportional increase in practical supervised work (*Suggestion 4.5*).
- b) A significant reduction in teaching hours dedicated to basic sciences and animal production subjects, and a significant increase in practical clinical hours (*Suggestion 4.4*).
- c) A better coordination and integration of teaching, from the basic to the more specialized contents, directed towards an “end-user” approach based on day-one skills (*Suggestion 4.3*).
- d) A species-oriented organization of the subjects in the 4th year, integrating every aspect related to each species. As a consequence, a complete integration of production, clinical and health contents in food animal species has been adopted (*Suggestions 4.1, 4.10 & 4.11*).

- e) A novel Practicum in the final course, with a significant practical workload, that is aimed at equipping students with the skills they need for their professional activity in the main animal species and in the field of the veterinary inspection or in food science and technology (*Suggestions 4.3 & 4.11*).
- f) A change in the methodological approach that involves working with problem-oriented learning in smaller groups, especially in basic and preclinical subjects (*Suggestion 4.9*).
- g) An enrolment restriction system based on a limited amount of credits of non-passed subjects from previous courses to access the next courses (*Suggestion 5.2*).
- h) A demand for a specific access profile to enter the Faculty with emphasis in biology, chemistry, mathematics and physics, based on a national law change (*Suggestion 9.1*).

All the changes referred to above have been introduced with the aim of achieving the suggested “decompartmentalisation of the curriculum, to explicitly allow and encourage interdisciplinary teaching, and to facilitate or require active horizontal and vertical interlinking of content” (*Suggestion 4.1*).

## **2.2. New Quality Assurance System of the Syllabus.**

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A completely new Internal Quality structure has been proposed and approved by the University Governing Board. It is based on the following agents:

- a) A **Coordinator** of the Veterinary Degree. A tenure Lecturer of the degree designated by the Dean will be responsible of every aspect of contents, organization and learning results. He/she will propose an Annual Plan of measures in order to overcome any deficiency detected in the previous academic year through students’ results and evaluation questionnaires (*Suggestion 5.1*). This project will be based on the Annual Report made by the Evaluation Committee (see below).
- b) **Evaluation Committee**. It will be integrated by students, teachers and external advisors (specialized on professional and pedagogic issues). It will be responsible for the development of an **Annual Evaluation Report** detecting any malfunctioning of the Degree (*Suggestion 5.4*).
- c) **Quality Assurance Committee**. This Committee depends on the Faculty Board and is responsible for the quality control and verification of every improvement implemented.

This Quality System will allow the Veterinary Faculty to play a more sound and efficient role in regulating academic activities and contents of the Degree, and to direct, shape and integrate the contents taught by different Departments into a cohesive unit (*Suggestions 1.2, 2.1, 2.2 & 4.2*).

### **2.3. Masters Organization.**

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At present, and since the year 2007-08, four Masters are offered by the Faculty, their organization and contents being direct responsibility of the FVZ (*Suggestion 2.1*).

As for the Degree, our four postgraduate Masters are now under an Internal Quality System with one Coordinator for each Master, as well as an Evaluation Committee and a Quality Assurance Committee. This internal system will let the Faculty have a better control on postgraduate training (*Suggestion 1.2 & 2.1*).

On the other hand, access to PhD programmes is obtained through Master graduation, and the research period has been extended (*Suggestions 12.1 & 12.2*).

Our Veterinary Hospital also offers a Postgraduate training programme for Hospital residents' internships in two areas, Small Animal Medicine (to be developed in two academic years) and Equine Medicine (one academic year).

This programme has now an official consideration as Postgraduate Training Masters of the Veterinary Hospital and involves 21 graduates.

### **2.4. Finances.**

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In the last few years, we have seen an improvement in the funding of teaching activities through the general budget received from our University, since more money has been allocated for clinical teaching with animals in and outside the Faculty. This extra budget has made it possible the establishment of several cooperation agreements with commercial farms (*Suggestion 1.1*).

The Faculty has also made an effort to support clinical activities with its own budget, collaborating in the partial funding of the agreements with commercial farms and co-funding the activity with a feline shelter.

Significant extra funds have come from many Innovation projects (through annual calls for teaching improvement, see **Annex III** for more details) applied for individuals or groups of teachers as well as for the Dean Office (*Suggestion 3.1*).

### **2.5. Facilities and Equipment.**

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We are making a steady effort to improve our facilities and equipments. The availability of two new computer rooms (in the Zootecnia building) and better equipment in every classroom, including the computer rooms and seminars, are some of the results of this action. (*Suggestions 8.2 & 6.1*). .

We are also improving the facilities dedicated to horses in the Veterinary Hospital and open adjacent area (*Suggestion 6.5*).

## **2.6. Veterinary Hospital activity.**

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The personnel working in the equine area of the Hospital has been increased with a new full time clinical practitioner, and also the Hospital Direction has done an additional effort by contracting four veterinary clinicians for daily assistance (*Suggestions 6.4*) and promoting clinical involvement of academic staff (*Suggestion 10.2*).

There is also a greater involvement in clinical activities at the Hospital due to the participation of a growing number of teachers who carry out assistance tasks on clinical nutrition, infectious diseases diagnosis and alternative medicine (*Suggestion 6.6*).

## **2.7. Other measures.**

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An increment of practical hours in food hygiene has been included in the current syllabus with 12 hours dedicated to meat inspection in a slaughterhouse (*Suggestion 4.26*). A better balanced distribution of teaching hours has also been carried out in the subject "Hygiene, food inspection and control" (see **Annex I**) (*Suggestion 4.25*).

The University of Zaragoza has recently started a new programme to modify its staff structure based on a voluntary retirement strategy (*Suggestion 10.1*).

## Annex I: Distribution for courses and subject of curriculum hours taken by all students

### **First year**

#### **Year 2005-6**

Subjects	Hours of training					Total
	Lectures	Practical work (a)	Supervised work (b)	Clinical work	Other (c)	
Anatomy and Embryology	90	90				<b>180</b>
Biochemistry	60	32	8			<b>100</b>
Physics	30	10	10			<b>50</b>
Mathematics	30	20				<b>50</b>
Chemistry	30	20				<b>50</b>
Animal and Plant Biology	30	30				<b>60</b>
Ethology and Animal Protection and Ethnology	45	14.5			5.5	<b>65</b>
Biomedical language (German or English)	30	30				<b>60</b>
<b>Total</b>	<b>345</b>	<b>246.5</b>	<b>18</b>	<b>0</b>	<b>5.5</b>	<b>615</b>

(a) Includes: LABORATORY TRAINING, COMPUTER TRAINING

(b) Includes: PROBLEM-SOLVING SEMINARS

(c) Includes: FIELD CLINICAL WORK carried out outside the Faculty

#### **Year 2009-10**

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other*	
Anatomy and Embryology	71	90				<b>161</b>
Biochemistry	47	32			8	<b>87</b>
Physics	24	10			10	<b>44</b>
Mathematics	24	20				<b>44</b>
Chemistry	24	20				<b>44</b>
Animal and Plant Biology	24	21		3	6	<b>54</b>
Ethology and Animal Protection and Ethnology	36	8	12			<b>56</b>
Biomedical language (German or English)	24				30	<b>54</b>
<b>Total</b>	<b>274</b>	<b>201</b>	<b>12</b>	<b>3</b>	<b>54</b>	<b>544</b>

\* Resolution of problems, interactive seminars, visits, travels... in big groups

### **Second year**

#### **Year 2005-6**

Subjects	Hours of training					Total
	Lectures	Practical work (a)	Supervised work (b)	Clinical work	Other (c)	
Agronomy and Agrarian Economy	45	20				<b>65</b>
Cytology & Histology	60	45				<b>105</b>
Epidemiology	30	15				<b>45</b>
Animal Physiology	75	42	8			<b>125</b>
Genetics	45	16	14			<b>75</b>
Immunology	30	15				<b>45</b>
Microbiology	60	30				<b>90</b>
Parasitology	45	20				<b>65</b>
<b>Total</b>	<b>390</b>	<b>203</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>615</b>

### Year 2009-10

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other*	
Agronomy and Agrarian Economy	36	20				56
Cytology & Histology	47	40	2		3	92
Epidemiology	24		15			39
Animal Physiology	59	25	9	8	8	109
Genetics	36	16			14	66
Immunology	24	12	3			39
Microbiology	47	24	4			75
Parasitology	36	20				56
<b>Total</b>	<b>309</b>	<b>157</b>	<b>33</b>	<b>8</b>	<b>25</b>	<b>532</b>

\* Resolution of problems, interactive seminars, visits, travels... in big groups

### Third year

### Year 2005-6

Subjects	hours of training					Total
	Lectures	Practical work (a)	Supervised work (b)	Clinical work	Other	
Animal Breeding and Health	60	15	30			105
Pharmacology, Pharmacy and Therapeutics	75	22	18			115
Animal Nutrition	60	28	32			120
General Pathology	60	14	16			90
General Pathological Anatomy	45	15		15		75
Clinical Propedeutics	45				30	75
Radiology	30			8		38
Food Technology	60	40	10			110
<b>Total</b>	<b>435</b>	<b>134</b>	<b>106</b>	<b>23</b>	<b>30</b>	<b>728</b>

(a) Includes: LABORATORY TRAINING, COMPUTER TRAINING

(b) Includes: PROBLEM-SOLVING SEMINARS

(c) Includes: FIELD CLINICAL WORK carried out outside the Faculty

### Year 2009-10

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other*	
Animal Breeding and Health	47		15		30	92
Pharmacology, Pharmacy and Therapeutics	59	8	9	12	4	92
Animal Nutrition	47	16			32	95
General Pathology	47	7	16	7		77
General Pathological Anatomy	36	15		15		66
Clinical Propedeutics	36			30		66
Radiology	24		3	12		39
Food Technology	47	40			10	97
<b>Total</b>	<b>343</b>	<b>86</b>	<b>43</b>	<b>46</b>	<b>76</b>	<b>624</b>

\* Resolution of problems, interactive seminars, visits, travels... in big groups



**Fourth year****Year 2005-6**

Subjects	hours of training					Total
	Lectures	Practical work (a)	Supervised work (b)	Clinical work	Others (c)	
Medicine and clinical surgery	60	20		30	15	125
Obstetrics and reproduction	75	6		44	15	140
Special pathological anatomy	45	60				105
Medical and nutrition pathology	75			60	15	150
Animal Production and Veterinary Hygiene	90	19			26	135
Economics applied to the agrifood sector	30	15				45
<b>Total</b>	<b>375</b>	<b>120</b>	<b>0</b>	<b>134</b>	<b>71</b>	<b>700</b>

**Year 2009-10**

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other*	
Medicine and clinical surgery	47	8	2	40		97
Obstetrics and reproduction	59		6	44		109
Special pathological anatomy	36	49			6	91
Medical and nutrition pathology	59			58	2	119
Animal Production and Veterinary Hygiene	71	9	3	10	12	105
Economics applied to the agrifood sector	24		15			39
<b>Total</b>	<b>296</b>	<b>66</b>	<b>26</b>	<b>152</b>	<b>20</b>	<b>560</b>

\* Resolution of problems, interactive seminars, visits, travels... in big groups

**Fifth year****Year 2005-6**

Subjects	Hours of training					Total
	Lectures	Practical work (a)	Supervised work (b)	Clinical work	Others (c)	
Parasitological diseases	60	35	10			105
Deontology, legal medicine and veterinary legislation	30	7.5	7.5			45
Infectious diseases	90	25	15			130
Hygiene, food inspection and control	90	28	5		12	135
Preventive medicine and sanitary police	30	5	10			45
Toxicology	45	15	15			75
<b>Total</b>	<b>345</b>	<b>115,5</b>	<b>62.5</b>	<b>0</b>	<b>12</b>	<b>535</b>

(a) Includes: LABORATORY TRAINING, COMPUTER TRAINING

(b) Includes: PROBLEM-SOLVING SEMINARS

(c) Includes: FIELD CLINICAL WORK carried out outside the Faculty

**Year 2009-10**

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other*	
Parasitological diseases	47	28	11		6	92
Deontology, legal medicine and veterinary legislation	24	4	11			39
Infectious diseases	71	9	28	3	4	115
Hygiene, food inspection and control	71	36	4		5	116
Preventive medicine and sanitary police	24		15			39
Toxicology	36	12		7	4	59
Clinical work at Hospital**			4	56		60
<b>Total</b>	<b>273</b>	<b>89</b>	<b>73</b>	<b>66</b>	<b>19</b>	<b>520</b>

\* Resolution of problems, interactive seminars, visits, travels... in big groups

\*\* Training hours in the subjects Clinical work at Hospital may be completed now during class time period in 5<sup>th</sup> year.

**Fourth or Fifth year****Year 2005-6**

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Others	
Clinical work at Hospital (*)				60		<b>300</b>
Stages (*)				300		<b>300</b>
<b>Total</b>				<b>360</b>		<b>360</b>

(\*) The training hours in the subjects Clinical work at Hospital and Stages may be completed during class time period or non-class time periods in 4<sup>th</sup> and 5<sup>th</sup> year.

**Year 2009-10**

Subjects	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other	
Stages (*)				150		<b>150</b>
<b>Total</b>				<b>150</b>		

\* The training hours in the subjects Clinical work at Hospital and Stages may be completed during class time period or non-class time periods in 4<sup>th</sup> and 5<sup>th</sup> year.

## Annex II: Changes in clinical practical sessions (and new teaching guides)

### 1<sup>st</sup> Year

#### Animal and Plant Biology

##### Semen collection and evaluation in ovine species (3 hours) *New*

Every student spends 3 hours (in groups of two) working actively on collection and handling ovine sperm from rams kept at the facilities of the Animal Experimentation Support Service (SAEA-FVZ).

Students themselves carry out the animal manipulation procedures supervised by their teacher. Students collaborate in obtaining semen from four sires by means of an artificial vagina, and immediately analyze sperm quality in the lab.

First, students check and identify all the equipment to be used and do simulations with the computer program prepared for sperm evaluation. Every student evaluates by him- or herself sperm motility, concentration and viability evaluation using an Integrated Semen Analysis System and a fluorescence microscope, determining progressive motility, linearity, maximal amplitude of lateral head displacement, average path and curvilinear speed, straight linear speed and semen concentration.

Finally, students discuss the obtained results with their teacher.

### 2<sup>nd</sup> Year

#### Animal Physiology

##### Session 5: Determination of cardiovascular parameters in the dog (4 hours) *New*

This practical session is performed in groups of 12-14 students supervised by two lecturers in order to work on the concepts of electrocardiogram (ECG), arterial pulse and pressure (eco-Doppler) in dogs.

In the first part, students determine the arterial pulse by palpation of the femoral artery of a dog. Students also measure the systolic arterial pressure placing a blood pressure cuff around the upper part of the forelimb and an ultrasonic probe on the median artery. This probe is connected to a Doppler system and the results are recorded and analyzed in a computer. In the second part of the session, students take an electrocardiogram (ECG) in a dog. Students analyze the shape, duration and amplitude of the ECG waves (P, QRS and T) and calculate the heart rate, the cardiac axis and the cardiac angle.

Finally, students analyse several parameters of blood flow recorded in the median artery of a dog using the ultrasonic probe connected to the Doppler system.

The Doppler system was funded by a teaching innovation project of the University of Zaragoza and this practical activity has been edited in an educational publication.

### **Session 9: Intestinal absorption of glucose in rats. (3 hours) *New***

This experimental procedure allows students to determine the intestinal absorption of D-glucose in rat jejunum *in vivo*. For this purpose, the rat is anaesthetized and a 20 cm segment of the jejunum is cannulated at both ends and perfused twice during 10 minutes with a solution containing glucose either alone or in combination with phloridzin (inhibitor of SGLT1 transporter).

Students measure the D-glucose absorbed across the intestine in both cases and calculate the contribution of the different mechanisms involved in D-glucose absorption. At the end of the experiment the rat is euthanized.

This experiment has been approved by the Animal Use and Ethic Committee of the University.

### **Session 10: Evaluation of the Oestrus Cycle in rats (1 hour) *New***

The purpose of this practical session is to determine the different phases (proestrus, oestrus, metestrus and diestrus) of the oestrus cycle in the rat by means of vaginal cytology. Students collect vaginal secretion and after staining by the Pappenheim method of panoptic staining, they examine the smear at the microscope to determine the phase of the oestrus cycle.

## **3<sup>rd</sup> Year**

### **Pharmacology, Pharmacy and Therapeutics**

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*Adaptation to clinical context (use of live animals,...)*

- Routes of drug administration (4 hours)
- Pharmacokinetics in rabbits (8 hours)

### **General Pathology**

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*Adaptation to clinical context (use of live animals,...) in the first half of these 5 practical sessions:*

- Blood collection and haemogram (3 hours)
- Urine collection and analysis (3 hours)
- Electrocardiography (3 hours)
- Ruminal liquid collection and analysis (2 hours)
- Skin sample collection and dermatological diagnosis (3 hours)

### **Clinical Propedeutics**

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Already described in the Self Evaluation Report 2006

### **Radiology**

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X-Ray projections in horses (3 hours) *Extended*

X-Ray projections in pets (4.5 hours) *Extended*

Ultrasonography (4.5 hours) *Extended*

**Medicine and Clinical Surgery**

Anaesthesia and surgery in ruminants (8 hours) *Extended*

Surgical consultation in small animals (15 hours)

Clinical anaesthesia in small and large animals (12 hours) *Extended*

**General Surgery Workshop (5 hours) *New***

Basic surgery techniques on euthanized dogs from the CMPA (Municipal Centre for Animal Protection – Zaragoza City Council)

Every student spends 5 hours learning basic surgical techniques in small groups of 4 that are supervised by their teacher. Recently euthanized dogs (male and female) are used for live animal's similarity. Students do the surgical work by themselves.

This is the second year that this activity is performed, which has been possible as a result of an agreement with the City Council and a pedagogic innovation project from University of Zaragoza (PMDUZ\_08\_4\_38).

**Place:** Surgery theatres of the Veterinary Hospital of the FVZ

**Contents:**

- Patient, instrument and surgical field preparation
- Cutaneous sutures
- Laparotomy. Enteric tract and internal organs surgery.
- Bilateral orchidectomy (males)
- Ovariohysterectomy (females)
- Urinary bladder surgery



## Animal Production and Veterinary Hygiene

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### Rabbit production management (2 hours) *New*

Every student spends 2 hours learning basic aspects of rabbit production in groups of 12 that are supervised by two lecturers.

**Place:** Facilities of the Animal Experimentation Support Service (SAEA-FVZ)

**Contents:**

- General facilities and equipment
- Nutritional management and feed costs
- Economic management
- Reproduction management and control
- Preventive veterinary medicine (health programmes)
- General management of the farm and good hygiene practices

### Poultry production practices (4 hours) *New*

Every student spends 4 hours learning several aspects of poultry production. The session is structured in two parts:

- a) **Incubation:** In groups of 8 students that are supervised by their teacher.

**Place:** Animal Production laboratory

**Contents:**

- Differences between eggs at several incubation days: composition and structure
- Management of 1-day old broilers

- b) **Broilers production management:** Students in groups of 6 learn basic aspects of broilers production being supervised by their teacher.

**Place:** Facilities of the Animal Experimentation Support Service (SAEA-FVZ)

**Contents:**

- General facilities and equipment
- Nutrition management and feed costs
- Economic management
- Preventive veterinary medicine (health programmes)
- General management and good hygiene practices



## Pig production management (4 hours) *New*

Every student spends 4 hours learning basic aspects of pig production and their relationship with collective pathologies. This activity is structured in groups of 4 people that are supervised by a lecturer.

**Place:** Several pig farms near Zaragoza

**Contents:**

- General facilities and equipment
- Nutritional management and feed costs
- Economic management of the farm
- Reproduction management and control
- Usual (but no daily) routine management: tail docking, piglet castration...
- Preventive veterinary medicine (health programmes)
- General management of the farm and good hygiene practices

## 5<sup>th</sup> Year

### Infectious Diseases

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#### Collection of biological samples for diagnosis in sheep (3 hours).

*Adaptation to clinical context (use of live animals,...)*

**Place:** Facilities of the Animal Experimentation Support Service (SAEA) (FVZ)

**Contents:** Samples are later processed in the microbiology laboratory following direct diagnosis protocols and serologic diagnosis techniques (ELISA, Complement fixation, agglutination) (12 hours work in total).

### Toxicology

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#### Treatment in Emergency intoxications (7 hours) *New*

The aim of this practical is to train students on animal handling during acute intoxication. The students have to apply the knowledge acquired during lectures on how to carry out a general decontamination therapy, simultaneously to critical care and control of vital functions. For this purpose dog and cat cadavers from the municipal service of animal protection are used.

This is a multidisciplinary practice, in which several lecturers and technicians from the Anatomy and Toxicology units collaborate.

The activity consists of two parts. In the first one a teacher shows the fundamentals of a flexible endoscope, and with a video camera setup he/she performs a gastric and respiratory endoscopy on a dead dog. In this way, students not only learn how to perform an endoscopy, but also remember the anatomical basis of the respiratory and digestive systems that are going to be manipulated in the second part of the session.

In the second part, students are distributed in four groups (usually 8 students per cadaver) and carry out the procedures of decontamination following the established protocol.

**Place:** Anatomy dissection room.

*(continue in next page)*

**Contents:**

- Vital functions control, including:
  - i) endotracheal intubation with the help of a laryngoscope and tracheotomy;
  - ii) access to a vein, cephalic or saphenous, with the corresponding catheters, and dissection of it
  - iii) urethral sounding for renal function monitoring.
- Gastric decontamination by lavage, with orogastric intubation and administration of activated charcoal.

At the end of the session, students can voluntarily perform any other intervention in the cadaver using their own textbooks.

**Clinical Work at Hospital**

Internal Medicine consultation in Pets (12 hours)

Surgical consultation and surgery in Pets (9 hours)

Equine Medicine and Surgery (6.5 hours)

**Exotic Animal Practice** (3.5 hours) *New*

Students examine clinical cases of exotic species with an external Associate lecturer. The practical session is carried about in the private facilities of a specialist clinician, thus ensuring a higher number of clinical cases.

Students learn about exotic animals handling and exploration, deepening their knowledge of differential diagnosis and diagnostic methods, acting by themselves (in radiology, for example). The practice includes medical and surgical aspects of the most usual problems in daily clinics of exotic species (rodents, snakes, exotic birds, monkeys, lizards...)

**Place:** Alberto Cortes Clinic (private practice) in Zaragoza city

**Contents:**

- Basic handling and exploration of exotic pets
- Radiology
- Diagnosis and treatment



### **Castration of Live Stray Cats (3 hours) *New***

Every student spends more than 3 hours working actively on castration of male and female stray cats taken every week by a private association for cats' protection (Asociación 4 Gatos). Students themselves carry out the surgical procedures, being supervised by their teachers (two 4-students groups with one teacher each). Every week, 2-4 cats are castrated, depending on availability). Every student does by him- or herself one ovariectomy or one orchidectomy.

This is the second year that this activity is performed, as a result of an agreement between the FVZ and the private association. The FVZ and Veterinary Hospital financially supports part of the costs of this activity.

**Place:** Surgery theatres of the Veterinary Hospital (FVZ).

**Contents:**

- Patient sedation and anaesthesia.
- Field and instruments preparation
- Laparotomy and ovariectomy (females)
- Orchidectomy (males)

After reanimation and clinical monitoring by our students, the castrated cats are taken back to their original habitat.



## Rectal Palpation in Horse Cadavers (1 hour) *New*

Every student carries out a rectal palpation in a horse cadaver, specifically preserved for this practice, as an introduction to other clinical sessions with live animals.

The cadaver is placed in a stock in standing position, and preserved with a special solution to keep its natural properties. Before the practical session, the abdominal wall is dissected and removed, in order to allow students and lecturers to check the anatomical structures that are palpated by the rectal route.

Students are organized in groups of 6 students on average, supervised by a lecturer and a clinical instructor.

This practical session is an introduction to other activities of the course related to clinical cases,

This activity has been initially implemented and supported by a pedagogic innovation project of University of Zaragoza (PMDUZ\_08\_4\_38), and it has been awarded in the 16th International Congress of SECIVE (Spanish Society of Veterinary Surgery) in Caceres (2009).

**Place:** Teaching farm building

### **Contents:**

Each student must identify by rectal palpation and visual verification the following anatomical structures: caudal pole of left kidney, nephrosplenic ligament and spleen caudal border, descending colon, ventral taenia of caecum, urinary bladder, ovaries and uterus (mares) and internal inguinal ring (stallions).



### Diagnostic Anaesthesia & Arthrocentesis Workshop in Horse Legs (2.5 hours) *New*

Every student practices the main perineural anaesthetics and arthrocentesis indicated for equine distal extremity with a fore limb (sectioned at carpus level). Instead of an anaesthetic, students use different dyes. At the end of the session, students dissect the specimen in order to verify if dye has been injected correctly, and review the main anatomical structures of equine distal limb.

Students are organized in subgroups of an average of 6 students (1 leg for 2 students), supervised by a lecturer.

**Place:** Surgery Unit Laboratory

**Contents:**

- Digital distal anaesthesia (digital palmar) and digital proximal anaesthesia (sesamoid abaxial)
- Distal metacarpal anaesthesia (low four points)
- Bursocentesis of podothroclear bursa
- Arthrocentesis of distal interphalangeic and metacarpophalangeic joints
- Anatomic dissection, verification of dye injection place and review of main tendinoligamentous structures



### **Lameness Clinical Examination in Horses (1 hour) *New***

Using lame horses, students carry out a clinical examination and apply the main procedures related to static examination (visual inspection, pressing palpation and static mobilisation tests).

Students are organized in subgroups of 6 students on average (1 horse for 3 students), supervised by a lecturer and clinical instructors.

The dynamic examination is carry out in the second part of the same session (1 more hour), in which supervised students access to several selected lameness cases. For this purpose, simulation software is used to watch images, movies, anaesthesia results, radiological and ultrasonographic images from real cases treated in the Veterinary Hospital (<http://www.unizar.es/simuladores>). This software has been developed by the staff of the Equine unit with the support of an innovation project from the University of Zaragoza (PESUZ\_08\_4\_076), and has been recognized as a Special Quality Innovative Teaching Experience based in TIC during this course (PESUZ\_09\_7\_291).

**Place:** Lameness examination area and farriery facilities.

**Contents:**

Students carry out, interpret and code in a form the following tests and procedures:

- Visual inspection of musculoskeletal system
- Pressing palpation and hoof tester exploration
- Protraction and retraction of fore and hind limbs
- Carpus flexion
- Global digital flexion
- Digital hiperextension (Lungwitz test)
- Global hindlimb flexion

### **Equine Ambulatory Practice (3 hours) *New***

Students carry out this activity under the supervision of an Associated Lecturer (equine practitioner specialist), with a well-equipped mobile clinic (digital radiology, ultrasonography, horse dental equipment...).

This practical session is addressed to acquire equine clinical skills in a professional context, and to work with the most frequent problems seen in the ambulatory practice.

The stud farm, where this session is carried out, has signed an Agreement with the FVZ for learning purposes. A wide range of horse uses and the most representative Spanish equestrian disciplines are available in these facilities: selected breeding of PRE (Spanish Through Breed), commerce of saddle horses, show jumpers, dressages, endurance, pleasure, training equestrian school...)

**Place:** San Antonio Stud farm facilities (María de Huerva, Zaragoza) located 15 km from FVZ, with more than 150 horses.

**Contents:**

- Diagnostic procedures and treatments.
- Lameness and orthopaedics
- Medical urgencies
- Reproductive control and assisted reproduction
- Neonatology
- Tooth care and dentistry
- Health programmes (vaccination and deworming)
- Nutritional assessment

## Ovine Ambulatory Practice in meat sheep (6 hours) *New*

Every student spends 6 hours in an integrated clinical practice with the teacher (Associated Lecturer and clinician of the farm) and farmers. The students take a very active part in the clinical work under the supervision of their teacher.

This is the first year that these activities are programmed, which has been possible as a result of an economic agreement with the farm owners.

**Place:** Ovine meat herd located 25 km from the FVZ with 1200 sheep.

### **Contents:**

- General facilities and equipment (sheep comfort concept). Everyday work in the farm.
- General and nutritional management and feed costs (feedstuffs and rationing). (Semi-intensive production system).
- Economic management of the farm.
- Reproduction management and organization (production data analysis). Ram and ewe management. Oestrus control and insemination. Ultrasonic monitoring of pregnancy. Parturition and lambs management.
- Preventive medicine (health programmes, voluntary and compulsory vaccination schedules). (Parasitic and infectious diseases control). (Official eradication campaigns).
- Health status of the flock: clinical examination of the animals (adults and lambs), clinical diagnosis and treatment of diseased animals (when necessary).
- General management of the farm (administration and legal aspects, animal identification and registration, hygiene good practices). Veterinary drugs monitoring and prescription.



### **Bovine Ambulatory Practice in dairy cows (4.5 hours) *New***

Every student spends 4.5 hours in an integrated clinical activity with the teacher (Associated Lecturer and clinician of the farm) and farmer.

**Place:** Bovine dairy herd located 35 km from the FVZ with 135 milking cows.

**Contents:**

- General facilities and equipment (cow comfort concept).
- Nutritional management and feed costs (feedstuffs and rationing).
- Economic management of the farm.
- Reproduction management and control (production data analysis). Oestrus detection and insemination, rectal palpation by every student.
- Preventive medicine (health programmes, vaccination schedules, blood analysis).
- Health status of the herd: clinical examination of the animals (calves, heifers, cows), clinical diagnosis and treatment (when necessary). Every student carries out the clinical inspection on a routine way: temperature, auscultation, etc.)
- Clinical evaluation of pre- and post-parturition animals (ketosis control, faeces and urine analysis, vaginal examination, etc.)
- Milking procedures (milking parlour and machine, procedures, udder and teat inspection, pre- and post-dipping disinfection). Mastitis control: subclinical and clinical mastitis detection, milk sampling and treatments (lactation and dry period), CMT.
- General management of the farm (administration and legal aspects, animal identification and registration, hygiene good practices). Veterinary drugs monitoring and prescription.



### **Avian Practice: avian handling and pathology (4 hours) *New***

This integrated aviculture practice is supervised by an aviculture veterinarian specialist (Associated Lecturer).

**Place:** Teaching farm building

**Contents:**

- Students handle poultry individuals and acquire practical knowledge on avian identification and handling, blood and faeces collection, sex identification and clinical examination of live animals. They also learn about egg incubation and fertility.
- The practice activity also includes learning necropsy techniques and identification of lesions, as well as identifying the cause of death.
- Sample collection for diagnosis and diagnostic procedures are also reviewed.

## Scooby dog shelter (30 hours) *New*

This activity is organized jointly by the FVZ with the College of Veterinary Medicine of The Ohio State University (USA). During the last 2 years, 25 students per year have participated for 1 week (6-7 students/week) in clinical activities of a dog shelter equipped with facilities for surgery. Every week, a group of students from each University carry out their clinical activity supervised by a Lecturer from FVZ and a Lecturer from OSU.

Scooby is a leading association dealing with the rescue of Galgo dogs (Spanish greyhounds) in Spain being the largest shelter in the country (with capacity for more than 850 dogs). It also houses other species such as cats, donkeys, sheep, and exotic animals.

**Place:** Scooby dog shelter, Medina del Campo (Valladolid)  
(<http://www.scoobymedina.com/>).

### **Contents:**

- Castration of dogs and cats (males and females).
- Diagnosis and treatment of diseased animals in shelter.
- Treatment of injuries and bites.
- Collection of samples and diagnosis for infectious and parasitic diseases (Leishmaniasis, Ehrlichiosis, Anaplasmosis, Filariasis...).
- Image diagnosis by ultrasonography.



## Annex III: Projects on Pedagogic Innovation

This is a list of approved and developed projects related to pedagogic innovations in the Veterinary Degree and funded by the University of Zaragoza during the last 4 years.

R: Responsible Lecturer; D: Applicant Department.

### PESUZ - Programa de Enseñanza Semipresencial de la Universidad de Zaragoza

Course	2006-07	2007-08	2008-09	2009-10
<b>Number of projects</b>	10	11	12	9

#### CURSO 2006-07

- Anatomía y Embriología - Patología Quirúrgica II  
R: Jesús Pedro Laborda Val  
D: Anatomía, Embriología y Genética Animal
- Dermatología Clínica Veterinaria  
R: María Teresa Verde Arribas  
D: Patología Animal
- Diseño de un escenario de enseñanza-aprendizaje basado en CSCL con la plataforma SYNERGEIA  
R: Ana Isabel Allueva Pinilla  
D: Matemática Aplicada
- Herramientas Informáticas en Ciencias Experimentales  
R: José Luis Alejandro Marco  
D: Matemática Aplicada
- Introducción a la Homeopatía Veterinaria  
R: Olivia Gironés Puñet  
D: Patología Animal, y Farmacología y Fisiología
- Medicina Preventiva y Policía Sanitaria - Epidemiología y Medicina Preventiva en Sanidad Animal y Salud Pública Veterinaria  
R: Carmelo Ortega Rodríguez  
D: Patología Animal
- Microbiología  
R: Carlos Lara Gargallo  
D: Patología Animal
- Patología Médica y de la Nutrición  
R: Antonio Fernández Casanovas  
D: Patología Animal
- Propedeútica Clínica  
R: Juan José Ramos Antón  
D: Patología Animal
- Uso de metodologías activas en la aplicación de un protocolo TIC en Anatomía  
R: Julio Constancio Gil García  
D: Anatomía, Embriología y Genética Animal

#### CURSO 2007-08

- Agronomía y Economía Agraria  
R: Olivia Barrantes Díaz  
D: Agricultura y Economía Agraria
- Alimentación y Cultura  
R: Amado Antonio Millán Fuertes  
D: Psicología y Sociología
- Anatomía y Embriología  
R: Julio Constancio Gil García  
D: Anatomía, Embriología y Genética Animal
- Fisiología Animal - Fundamentos de Fisiología Animal - Fisiología  
R: María Pilar Arruebo Loshuertos  
D: Farmacología y Fisiología
- Medicina Preventiva y Policía Sanitaria  
R: Carmelo Ortega Rodríguez  
D: Patología Animal
- Nutrición Animal  
R: José Antonio Guada Vallepuga  
D: Producción Animal y Ciencia de los Alimentos
- Patología Médica y de la Nutrición  
R: Antonio Fernández Casanovas  
D: Patología Animal
- Técnicas instrumentales de Análisis  
R: María Isabel Sanz Vicente  
D: Química Analítica
- Tecnología de la formulación y fabricación de piensos  
R: Antonio de Vega García  
D: Producción Animal y Ciencia de los Alimentos
- Tecnología de los Alimentos  
R: Ignacio Álvarez Lanzarote  
D: Producción Animal y Ciencia de los Alimentos
- Toxicología Medioambiental  
R: Carmen Martínez Bordenave-Gassedat  
D: Anatomía Patológica, Medicina Legal y Forense y Toxicología



## CURSO 2008-09

- Curso Cero de Química: Nuevas Tecnologías en la preparación Química para estudiantes de Veterinaria y C.T.A. (PESUZ\_08\_1\_047)  
R: M<sup>ª</sup> Angeles García Gimeno  
D: Química Analítica
- Curso cero en Red de Matemáticas para primeros cursos universitarios (PESUZ\_08\_1\_111)  
R: Marcos Domingo Baguer  
D: Matemática Aplicada
- Desarrollo de una herramienta interactiva enfocada al diagnóstico artro-osteológico de la displasia de cadera en perro (PESUZ\_08\_2\_036)  
R: Miguel Gimeno Dominguez  
D: Anatomía, Embriología y Genética Animal
- Desarrollo de material practico virtual en la docencia de la Microbiología (PESUZ\_08\_2\_065)  
R: Carlos Lara Gargallo  
D: Patología Animal
- Guía audiovisual de disección del aparato locomotor del perro (PESUZ\_08\_2\_074)  
R: Pedro Muniesa Lorda  
D: Anatomía, Embriología y Genética Animal
- Portal de recursos para la docencia de Alemán como lengua extranjera (PESUZ\_08\_2\_142)  
R: Luis Méndez Moreda  
D: Filología Inglesa y Alemana
- Osteología 3D en el gato mediante autoestereoscopia (PESUZ\_08\_3\_035)  
R: Julio Gil Garcia  
D: Anatomía, Embriología y Genética Animal
- Simulador multimedia para la mejora del aprendizaje del diagnostico de cojeras en caballos (PESUZ\_08\_4\_076)  
R: Antonio Romero Lasheras  
D: Patología Animal
- Aplicación de los mandos de respuesta a las clases teóricas de Propedéutica clínica (PESUZ\_08\_5\_064)  
R: Joaquín Pastor Meseguer  
D: Patología Animal
- WinEpi: una plataforma para el aprendizaje de competencias en Epidemiología Veterinaria (PESUZ\_08\_6\_097)  
R: Ignacio de Blas Giral  
D: Patología Animal, y Matemática Aplicada
- La asignatura "Herramientas Informáticas en Ciencias Experimentales" de la titulación de Veterinaria impartida en un entorno virtual de trabajo colaborativo (PESUZ\_08\_6\_101)  
R: José Luis Alejandro Marco  
D: Matemática Aplicada

- Manual sobre los procedimientos para la modelización de la inactivación microbiana por distintas tecnicas de conservación de los alimentos (PESUZ\_09\_2\_177)  
R: Javier Raso Pueyo  
D: Producción Animal y Ciencia de los Alimentos

## CURSO 2009-10

- Apoyo multimedia a la docencia de Inglés Biomédico para Veterinaria (PESUZ\_09\_2\_517)  
R: Mercedes Jaime Sisó  
D: Filología Inglesa y Alemana
- Desarrollo de una herramienta interactiva enfocada al estudio de la ED (Displasia de Codo) en Perro (PESUZ\_09\_3\_147)  
R: Miguel Gimeno Domínguez  
D: Anatomía, Embriología y Genética Animal
- Osteología 3D del conejo mediante autoestereoscopia (Rabbit's 3D osteology by mean selfstereoscopy). (PESUZ\_09\_4\_142)  
R: Julio Gil Garcia  
D: Anatomía, Embriología y Genética Animal
- Dermatología Veterinaria: aprendizaje a través de la resolución de casos clínicos (PESUZ\_09\_4\_425)  
R: Maria Teresa Verde Arribas  
D: Patología Animal
- Búsqueda de la Legislación Española y Comunitaria en el ámbito Veterinario (PESUZ\_09\_4\_496)  
R: María del Carmen Martínez Bordenave-Gassedat  
D: Anatomía Patológica, Medicina Legal y Forense y Toxicología
- Uso de herramientas TIC con alumnos repetidores en Anatomía (PESUZ\_09\_5\_148)  
R: Jesús Laborda Val  
D: Anatomía, Embriología y Genética Animal
- Simulador del control genético de capas en caballos: una nueva metodología interactiva para el aprendizaje de las bases de herencia (PESUZ\_09\_5\_474)  
R: Clementina Rodellar Penella  
D: Anatomía, Embriología y Genética Animal, y Patología Animal
- Incorporación de recursos educativos digitales para la consulta de casos clínicos por parte de los estudiantes que realizan prácticas en el Hospital Veterinario de la Universidad de Zaragoza (PESUZ\_09\_6\_352)  
R: Sylvia García-Belenguer Laita  
D: Patología Animal
- Simulador de cojeras de caballos: una herramienta docente innovadora para aprender a diagnosticarlas (PESUZ\_09\_7\_291)  
R: Francisco José Vázquez Bringas  
D: Patología Animal

## PIIDUZ - Programa de Incentivación de la Innovación Docente en la Univ. de Zaragoza

Course	2006-07	2007-08	2008-09	2009-10
Number of projects	3	6	13	15

### CURSO 2006-07

- Experiencia de Integración de las asignaturas de Matemáticas y Herramientas Informáticas en el curriculum veterinario para su adaptación al proceso de convergencia europeo  
R: Ana Isabel Allueva Pinilla  
D: Matemática Aplicada
- Integración de las enseñanzas clínica y anatomopatológica en casos clínicos y adaptación de las mismas al nuevo espacio europeo de enseñanza veterinaria  
R: Juan José Ramos Antón  
D: Patología Animal
- Realización de una publicación web tipo revista especializada para Ciencia y Tecnología de los Alimentos  
R: Ignacio Álvarez Lanzarote  
D: Producción Animal y Ciencia de los Alimentos

### CURSO 2007-08

- Aplicación práctica del electrocardiograma en la valoración del estado sanitario de perros alojados en régimen colectivo  
R: Faustino Manuel Gascón Pérez  
D: Patología Animal
- El electrocardiograma y la auscultación cardiaca en la Patología Médica, en la Propedéutica y en la Radiología: una experiencia concreta de desarrollo de un modelo de docencia integrada  
R: Pablo Gómez Ochoa  
D: Patología Animal
- Experiencia de Integración de las asignaturas de Matemáticas y Herramientas Informáticas en el currículo veterinario para su adaptación al proceso de convergencia europeo  
R: Ana Isabel Allueva Pinilla  
D: Matemática Aplicada,
- Integración curricular de las asignaturas de Epidemiología y Herramientas Informáticas como estrategia de adaptación al proceso de convergencia europea en la Licenciatura de Veterinaria  
R: Ignacio de Blas Giral  
D: Patología Animal, y Matemática Aplicada
- Preparación de material gráfico sobre las actividades realizadas en la Planta Piloto de Ciencia y Tecnología de los Alimentos de la Facultad de Veterinaria  
R: Javier Raso Pueyo  
D: Producción Animal y Ciencia de los Alimentos

- Realización de una publicación Web tipo revista especializada para Ciencia y Tecnología de los Alimentos (consolidación del proyecto)  
R: Ignacio Álvarez Lanzarote  
D: Producción Animal y Ciencia de los Alimentos

### CURSO 2008-09

- Red interdisciplinar de formación para la Orientación a la profesión (PIIDUZ\_08\_1\_176)  
R: María Teresa Verde Arribas  
D: Patología Animal
- Aplicación de nuevas tecnologías al estudio y análisis de la actividad vascular en seres humanos y animales (PIIDUZ\_08\_2\_165)  
R: M. Divina Murillo López de Silanes  
D: Farmacología y Fisiología
- Evaluación de competencias en farmacología veterinaria (PIIDUZ\_08\_2\_199)  
R: Maria Jesus Muñoz Gonzalvo  
D: Farmacología y Fisiología
- La oveja: un modelo docente para el aprendizaje de la práctica clínica en patología veterinaria (PIIDUZ\_08\_2\_211)  
R: Juan Jose Ramos Anton  
D: Patología Animal
- Adaptación de prácticas de Tecnología de los Alimentos al EEES (PIIDUZ\_08\_2\_216)  
R: Ignacio Alvarez Lanzarote  
D: Producción Animal y Ciencia de los Alimentos
- Uso de metodologías activas con herramientas TIC, para repetidores en Anatomía (PIIDUZ\_08\_2\_223)  
R: Jesús Laborda Val  
D: Anatomía, Embriología y Genética Animal
- Prácticas de anatomía en animal vivo (PIIDUZ\_08\_2\_289)  
R: María Climent Aroz  
D: Anatomía, Embriología y Genética Animal; y Patología Animal
- Diseño de una práctica interdisciplinar que englobe contenidos de las asignaturas Física, Matemáticas y Química, en el marco del EEES, para Veterinaria y Ciencia y Tecnología de los Alimentos (PIIDUZ\_08\_3\_293)  
R: Chelo Ferreira González  
D: Mat. Aplicada; Física Aplicada; y Química Analítica
- Valoración del efecto de la distribución de la docencia presencial sobre el aprendizaje práctico de los alumnos en Propedéutica Clínica (PIIDUZ\_08\_4\_236)  
R: Araceli Loste Montoya  
D: Patología Animal

- Estudio diferencial de la obtención de niveles de competencia alcanzados por estudiantes de dos titulaciones distintas ante un trabajo específico, con contenidos comunes contextualizados adecuadamente (PIIDUZ\_08\_4\_279)  
R: Chelo Ferreira González  
D: Matemática Aplicada
- Estudio comparativo de los estilos de pensamiento de los alumnos de nuevo ingreso en el curso 2008-2009, y los egresados en el curso 2007-2008 en la Universidad de Zaragoza: implicaciones educativas en el proceso enseñanza-aprendizaje (PIIDUZ\_08\_4\_315)  
R: Jose Emilio Mesonero Gutierrez  
D: Farmacología y Fisiología
- Aprendizaje basado en problemas en Farmacología Veterinaria (PIIDUZ\_08\_5\_195)  
R: Ana Rosa Abadía Valle  
D: Farmacología y Fisiología
- La WebQuest como herramienta de integración curricular: Experiencia desarrollada conjuntamente con las asignaturas de Matemáticas, Epidemiología y Herramientas Informáticas en Ciencias Experimentales en la titulación de Veterinaria (PIIDUZ\_08\_5\_301)  
R: Ana Isabel Allueva Pinilla  
D: Matemática Aplicada; y Patología Animal
- Registro del movimiento de los ojos mediante un electrooculograma (PIIDUZ\_09\_2\_116)  
R: M<sup>a</sup> Jesús Rodríguez Yoldi  
D: Farmacología y Fisiología
- Desarrollo de actividades interactivas para la asignatura de Tecnología de los Alimentos (PIIDUZ\_09\_2\_216)  
R: Ignacio Álvarez Lanzarote  
D: Producción Animal y Ciencia de los Alimentos
- Aprendiz de cirujano. Las bases para desenvolverse en el quirófano (PIIDUZ\_09\_2\_252)  
R: José Rodríguez Gómez  
D: Patología Animal
- Aplicación de nuevas tecnologías al estudio de la absorción intestinal en las diferentes asignaturas del área de Fisiología (PIIDUZ\_09\_2\_299)  
R: Laura Grasa López  
D: Farmacología y Fisiología
- Evaluación del trabajo en equipo de los estudiantes en Farmacología Veterinaria (PIIDUZ\_09\_2\_310)  
R: María Jesús Muñoz Gonzalvo  
D: Farmacología y Fisiología
- Docencia integrada de la Clínica de Rumiantes en la asignatura de Patología Medica y de la Nutrición (PIIDUZ\_09\_2\_329)  
R: Manuel Gascón Pérez  
D: Patología Animal

### **CURSO 2009-10**

- Red interdisciplinar de formación para orientación a la profesión (PIIDUZ\_09\_1\_206)  
R: Juan José Ramos Antón  
D: Patología Animal
- Utilización de modelos animales como complemento en la docencia de Patología General y Propedéutica Clínica en Veterinaria (PIIDUZ\_09\_2\_007)  
R: Araceli Lose Montoya  
D: Patología Animal
- Analisis de bases de datos de mejora genetica y presentacion de los resultados en congresos de estudiantes (PIIDUZ\_09\_2\_032)  
R: Luis Varona Aguado  
D: Anatomía, Embriología y Genética Animal
- Actividades complementarias de aprendizaje integrando experiencias de la actividad profesional (PIIDUZ\_09\_2\_050)  
R: M<sup>a</sup> Teresa Muiño Blanco  
D: Bioquímica y Biología Molecular y Celular
- Utilización de diversos materiales y actividades para el aprendizaje de quimioterapia en Veterinaria (PIIDUZ\_09\_2\_078)  
R: Ana Rosa Abadía Valle  
D: Farmacología y Fisiología
- La clínica digestiva en animales de compañía (PIIDUZ\_09\_3\_255)  
R: José Rodríguez Gómez  
D: Patología Animal
- Diseño curricular de la asignatura Integracion en Equidos y coordinación con el Bloque Practicum de Equidos en el nuevo Grado en Veterinaria (Fase I) (PIIDUZ\_09\_3\_504)  
R: Francisco José Vázquez Bringas  
D: Patología Animal; Producción Animal y Ciencia de los Alimentos; Anatomía, Embriología y Genética Animal; y Farmacología y Fisiología
- Evaluación inicial, diagnóstico de problemas y elaboración de material de apoyo con soporte informático en las asignaturas de matemáticas de primer curso de las titulaciones de Veterinaria y Grado en Diseño Industrial (PIIDUZ\_09\_4\_523)  
R: Chelo Ferreira González  
D: Matemática Aplicada
- Divulgación del estudio de incorporación de las nuevas metodologías a la docencia de Propedéutica Clínica en veterinaria. (PIIDUZ\_09\_5\_026)  
R: Juan José Ramos Antón  
D: Patología Animal

## PMDUZ - Programa de Acciones de Mejora de la Docencia

Course	2006-07	2007-08	2008-09	2009-10
Number of projects	2	3	2	3

### CURSO 2006-07

- Acciones encaminadas a la mejora del rendimiento académico (asignatura Cría y Salud)  
R: Juan Altarriba Farrán  
D: Anatomía, Embriología y Genética Animal
- Programa para facilitar la integración académica, en estructuras y servicios, del estudiante de nuevo ingreso en la Facultad de Veterinaria  
R: Faustino Manuel Gascón Pérez  
D: Decanato

### CURSO 2007-08

- Cursos de formación para estudiantes de nuevo ingreso  
R: Jesús García Sánchez  
D: Decanato
- Estimación de ECTS en las Licenciaturas en Veterinaria y CTA  
R: Ignacio de Blas Giral  
D: Decanato
- Taller de emprendedores empresariales en el ámbito de Veterinaria y CTA  
R: Ignacio de Blas Giral  
D: Decanato

### CURSO 2008-09

- Estrategias de búsqueda de salidas profesionales y mejora de la responsabilidad personal (PMDUZ\_08\_1\_364)  
R: José Emilio Mesonero Gutiérrez  
D: Decanato
- Cambios metodológicos e implantación de nuevas prácticas para la mejora de la adquisición de competencias clínicas en Veterinaria (PMDUZ\_08\_4\_384)  
R: Pablo Gomez Ochoa  
D: Patología Animal; y Anatomía, Embriología y Genética Animal

### CURSO 2009-10

- Proyecto tutor en la Facultad de Veterinaria (PMDUZ\_09\_1\_365)  
R: José Emilio Mesonero Gutiérrez  
D: Decanato
- Estrategias de búsqueda de salidas profesionales en Veterinaria (PMDUZ\_09\_1\_369)  
R: José Emilio Mesonero Gutiérrez  
D: Decanato
- II Taller de emprendedores empresariales en el ámbito de Veterinaria y Ciencia y Tecnología de los Alimentos (PMDUZ\_09\_1\_403)  
R: Ignacio de Blas Giral  
D: Decanato

## PIECyT - Programa de Innovación Estratégica de Centros y Titulaciones

Course	2008-09	2009-10
Number of projects	1	2

### CURSO 2008-09

- Curso de formación al ADD para profesores del grado de Ciencia y Tecnología de los Alimentos (PIECyT\_08\_1\_430)  
R: Rafael Pagán Tomás  
D: Decanato

### CURSO 2009-10

- Curso de formación al ADD para profesores del grado en Veterinaria (PIECyT\_09\_1\_479)  
R: Chelo Ferreira González  
D: Decanato
- Curso de formación al ADD para profesores del grado en Veterinaria (PIECyT\_09\_1\_479)  
R: José Emilio Mesonero Gutiérrez  
D: Decanato

## Annex IV: Schedule of the new Veterinary curriculum (from 2010-11 course)

### Type of contents

Type		ECTS
Basic Contents ( <i>compulsory</i> )	BC	61
Compulsory Contents	CC	215
Electives	EI	12
Extramural practice	EP	6
Degree Thesis	DT	6
<b>Total</b>		<b>300</b>

### Modules

Module		ECTS
Common Basic Contents	CBC	95
Clinical Sciences and Animal Health	CSAH	105.5
Animal Production	AP	33.5
Hygiene, Food Technology and Safety	HFTS	22
Supervised Practices and Degree Thesis	SP-DT	30
Others	O	2
Electives	E	12*
<b>Total</b>		<b>300</b>

\* To select from an offer of 30 ECTS

### Elective Subjects.

Subject	ECTS
Biomedical English for Veterinarians	6
Animal Experimentation I	3
Animal Experimentation II	3
Informatics for Veterinarians	3
Wildlife Animals	3
Ecology and Environment	3
Veterinary History	3
External Morphology and Evaluation and Identification	3
Honeybee Production and Health	3

### 1<sup>st</sup> course

Semester	Subjects	Type	ECTS	Contents	Module	ECTS
1 <sup>o</sup> -2 <sup>o</sup>	Cytology and Histology	BC	8	=	CBC	
1 <sup>o</sup> -2 <sup>o</sup>	Biology and Biochemistry	BC	9	Biology Biochemistry	CBC	3
1 <sup>o</sup> -2 <sup>o</sup>	Ethnology and Animal Welfare	CC	9	Ethnology Animal Welfare ( <i>with Ethology</i> )	CBC	4,5
1 <sup>o</sup> -2 <sup>o</sup>	Epidemiology and Biostatistics	CC	6	Epidemiology Biostatistics	CSAH CBC	4 2
1 <sup>o</sup> -2 <sup>o</sup>	Modern English (B1 Level)	CC	2	=	O	
1 <sup>o</sup>	Basic Sciences for Veterinarians	BC	6	Physics Mathematics Chemistry	CBC CBC CBC	2 2 2
1 <sup>o</sup>	Embryology and Anatomy I	BC	7	=	CBC	
2 <sup>o</sup>	Embryology and Anatomy II	BC	7	=	CBC	
2 <sup>o</sup>	Economy and Business Management	BC	6	Economy Business Management	AP CBC	3 3
	<b>Total</b>		<b>60</b>			

## 2<sup>nd</sup> course

Semester	Subjects	Type	ECTS	Contents	Module	ECTS
3 <sup>o</sup> -4 <sup>o</sup>	Animal Physiology	BC	12	=	CBC	
3 <sup>o</sup> -4 <sup>o</sup>	Microbiology and Immunology	CC	9	General Microbiology	CBC	3
				Immunology	CBC	3
				Microbiological Diagnosis	CSAH	3
3 <sup>o</sup>	Agronomy	CC	6	General Agronomy	CBC	2
				Special Agronomy	AP	2
				Pasture Production	AP	2
3 <sup>o</sup>	Genetics	BC	6	=	CBC	
3 <sup>o</sup>	<i>Elective 1</i>	EI	3/6	=	E	
3 <sup>o</sup>	<i>Elective 2</i>	EI	3	=	E	
3 <sup>o</sup>	<i>Elective 3</i>	EI	3	=	E	
4 <sup>o</sup>	Animal Nutrition	CC	6	=	AP	
4 <sup>o</sup>	Quantitative and Molecular Genetics and Animal Breeding	CC	6	=	AP	
	Parasitology	CC	6	General Parasitology Parasitological Diagnosis	CBC CSAH	3 3
<b>Total</b>			<b>60</b>			

### 3<sup>rd</sup> course

Semester	Subjects	Type	ECTS	Contents	Module	ECTS
5 <sup>o</sup> -6 <sup>o</sup>	Pharmacology and Pharmacotherapy	CC	9	Pharmacology and Pharmacy Pharmacotherapy	CSAH	4
5 <sup>o</sup> -6 <sup>o</sup>	Surgery and Anaesthesia	CC	7	=	CSAH	5
5 <sup>o</sup> -6 <sup>o</sup>	Image Diagnosis	CC	6	=	CSAH	6
5 <sup>o</sup> -6 <sup>o</sup>	General Anatomopathology	CC	8	General Anatomopathology Necropsy and Lesions Identification	CBC	5
5 <sup>o</sup>	Toxicology	CC	6	=	CSAH	3
5 <sup>o</sup>	General Pathology and Propedeutics I	CC	6	General Pathology I Propedeutics I	CBC	2
6 <sup>o</sup>	General Pathology and Propedeutics II	CC	6	General Pathology II Propedeutics II	CSAH	4
6 <sup>o</sup>	Deontology, Veterinary Legislation and Bioethics	CC	6	=	CBC	2
6 <sup>o</sup>	Reproduction and Obstetrics	CC	6	=	CSAH	4
	<b>Total</b>		<b>60</b>			



**4<sup>th</sup> course**

Semester	Subjects	Type	ECTS	Contents	Module	ECTS
7 <sup>o</sup> -8 <sup>o</sup>	Integration in Ruminants	CC	14	Ruminants Production Medicine and Health of Ruminants	AP CSAH	5 9
7 <sup>o</sup> -8 <sup>o</sup>	Integration in Companion Animals	CC	14	Medicine and Health of Companion Animals	CSAH	14
7 <sup>o</sup> -8 <sup>o</sup>	Integration in Poultry and Rabbits	CC	8	Poultry Production Medicine and Health of Poultry Rabbit Production Medicine and Health of Rabbits	AP CSAH AP CSAH	3 3 1 1
7 <sup>o</sup> -8 <sup>o</sup>	Integration in Aquatic and Exotic Animals	CC	6	Aquaculture Fish Pathology Medicine and Health of Exotic Animals	AP CSAH CSAH	1 3 2
7 <sup>o</sup> -8 <sup>o</sup>	Integration in Equine	CC	7	Equine Production Medicine and Health of Horses	AP CSAH	1 6
7 <sup>o</sup> -8 <sup>o</sup>	Integration in Swine	CC	8	Swine Production Medicine and Health of Swine	AP CSAH	3.5 4.5
7 <sup>o</sup>	<i>Elective 4</i>	EI	3		E	
	<b>Total</b>		<b>60</b>			

### 5<sup>th</sup> course

Semester	Subjects	Type	ECTS	Contents	Module	ECTS
9 <sup>o</sup> -10 <sup>o</sup>	Food Technology	CC	12	Food Technology Practicum on Food Technology	HFTS SP-DT	10 2
9 <sup>o</sup> -10 <sup>o</sup>	Hygiene, Food Inspection and Control	CC	14	Hygiene, Food Insp. and Control Practicum on Hygiene, Food Inspection and Control	HFTS SP-DT	12 2
9 <sup>o</sup> -10 <sup>o</sup>	Clinical Practicum in Equine, Companion and Exotic Animals	CC	8	Clinical Practicum on Equines Clinical Practicum on Companion Animals Clinical Practicum on Exotic Animals	SP-DT SP-DT SP-DT	2 5.5 0.5
9 <sup>o</sup> -10 <sup>o</sup>	Clinical Practicum in Food Animals	CC	6	Practicum on Post-Mortem Diagnosis Practicum on Ruminants Practicum on Swine Practicum on Poultry and Rabbits	SP-DT SP-DT SP-DT SP-DT	2.5 1.5 1 1
9 <sup>o</sup>	Zoonosis, Preventive Medicine and Sanitary Policy	CC	8	Zoonosis Preventive Medicine and Sanitary Policy	CSAH CSAH	3 5
10 <sup>o</sup>	Extramural Supervised Clinical Practice	PE	6	Extramural Supervised Practice	SP-DT	6
10 <sup>o</sup>	Degree Thesis	CC	6	=	SP-DT	
	<b>Total</b>		<b>60</b>			