



Standard 10

Research programmes, continuing and postgraduate education

10.1. Factual Information

10.1.1. Description of how the research activities of the Establishment and the implication of most academic staff in it contribute to research-based undergraduate veterinary education.

One of the 3 main duties of any Academic Staff (AS) are teaching, research and extension-assistant. For promotion (see Standard 9) AS has to carry out research activities within the scientific field of her or his **AoK**. **UM** has settled an internal system to join professors/research staff (pre and post doctoral, research contracts...) into Research Groups (RG), coding with and E, number of the Department (based on alphabet order) and a number of order within the Department. Most of the RG are based at the same Department and **AoW**, but this RG are open to interdepartmental organisation looking for the interdisciplinary. Also, the RG can join national or international members. Currently the academic staff of **FVETUM** are integrated into 17 RG (<http://www.um.es/web/veterinaria/contenido/investigacion>) and the entire tenure staff hold a PhD Degree and has a Research Leader, either the oldest tenure or the most productive in research. Every year **UM** launch a call to provide a "Complementary Aid for Research" (CAfR) where all scientific publications (JCR papers, congresses presentation or posters, research grants from European, National or Research calls, research or assistance contracts with enterprises...) that based on a balanced scale approved by the Research Commission of the University score and ranking the RG that also receive an economic support based on research production. As an indicative of the research activities of **FVETUM** groups, 3-5 of them are usually ranked top 20 and half of them are ranked top 50 out of the 330 RG of the University. Another recent indicator is the **Shanghai Subject Ranking list** (<http://www.shanghairanking.com/Shanghairanking-Subject-Rankings/veterinary-sciences.html>), where in "Veterinary Sciences" **UM** has been ranked number 36 within the top 200 worldwide (number 3 in Spain after Barcelona and Madrid), and just to mention that there is only one Veterinary Faculty at **UM**. As can be read, AS is well based on research activities and education of students in Veterinary Sciences is research-based in different ways that will be described in section 10.1.3. Regarding **gross scientific production**, **FVETUM** affiliated **publications in peer reviewed scientific journal** (JCR indexed journals) was 454 for the period 2014-2016 (time considered by CAfR call for grating, and the last one available). For details please see **Appendix 5**. Another important indicator is the **capacity for research training**, and as in the last 3 years, an average of 20 students/year receiving financial support to conduct their PhD training, and 22 PhD thesis/year have carried out their PhD Thesis under the direction/supervision of any **FVETUM** AS. If we talk about research incomes or grant from research the total amount is difficult to be precise, because the projects cover as an average 3 years, but in many cases the time lapse is longer or shorter. Again, as a gross figure, the income for research obtained by the RGs at **FVETUM** in the last 3 years (2014-2016) is of 6,289,322 € (**Table 10.1.1**).

Table 10.1.1.- List of the major funded research programmes in the Establishment which were on-going during the last full academic year prior the Visitation (2016).

Research programmes	Scientific topic	Number of projects	Length of time	Grant/year (euros)
European Commission				
	Food science	2	4	418,467
	Preclinical Science ⁽¹⁾	1	5	991,492
	Clinic Science ⁽²⁾	2	3	1,455,951
	Subtotal			2,865,910
Spanish National Science Ministry (MINECO)				
	Food science	4	2-3	487,950
	Preclinical Science ⁽¹⁾	5	3	622,050
	Clinic Science ⁽²⁾	10	2-3	614,655
	Subtotal			1,724,655
Regional Programmes				
	Food science	1	8	136,148
	Preclinical Science ⁽¹⁾	2	3	283,400
	Clinic Science ⁽²⁾	4	1-4	217,315
	Subtotal			636,863
Transfer Technologies to Innovative enterprises and Collaborative Projects (University – Enterprises)				
	Food science	17	1-4	442,600
	Preclinical Science ⁽¹⁾	17	1-2	143,502
	Clinic Science ⁽²⁾	28	1-5	475,792
	Subtotal	62		1,061,894
Total				6,289,322

⁽¹⁾ Preclinical Science: Biochemistry, Anatomy, Physiology, Animal Production

⁽²⁾ Clinic Science: Animal Health, Pathology, Surgery, Reproduction, Toxicology and Pharmacology

10.1.2. Description of how the postgraduate clinical trainings of the Establishment contribute to undergraduate veterinary education and how potential conflicts in relation to case management between post- and undergraduate students are avoided

The current number of Specialists and Diplomates of the European Colleges among our academic staff is 19, and the number of teachers accredited by the Spanish Small Animal Veterinarians Association (AVEPA) is 14 (**Appendix 1**). The number of postgraduates on clinical trainings at VTH nowadays is 12 (2 in Residency Programs and 10 Internship, (**Table 10.1.2**). Currently, there are two approved Residency training programmes by European Board of Veterinary Specialisation (EBVS), one by the European College of Veterinary Internal Medicine in Cardiology-Companion Animals, and the other by the European College of Veterinary Diagnostic Imaging.

Postgraduates collaborate in the practical training of undergraduate students in different subjects during degree, especially in the 5th academic year during clinical rotations at **VTH**. No conflict is produced between post- and undergraduate students in relation to clinical cases management.

Table 10.1.2.- Number of students registered at postgraduate clinical training

Training	2014/2015	2015/2016	2016/2017	Mean
Interns:				
• Companion animals	8	7	8	7,66
• Equine	2	4	2	2,66
• Production animals	--	--	--	--
• Others (<i>specify</i>)	--	--	--	--
Total	10	11	10	10,33
Residents:				
EBVS disciplines (<i>specify</i>)				
• Diagnostic Imaging	-	2	1	1
• Internal Medicine- Companion Animals Cardiology		1	1	0,66
Total	-	3	2	1,66
Others (<i>specify</i>)				
• Scholarships and pre-doctoral contracts (clinics)	10	8	8	8,66
Total	10	8	8	8,66

* The last full academic year prior the Visitation

10.1.3. Description of how undergraduate students:

-) are made aware of the importance of evidence-based medicine, scientific research and lifelong learning;

Undergraduate students are exposed to evidence-based medicine and scientific research along the Veterinary Degree in different years:

- During the **1st year** students are trained to search and analyse critically the content of lectures, textbooks and scientific articles. This material is used regularly by students for study, work in seminars, clinic cases...
- At the **3rd year** students begin with clinical rotations and they use the evidence-based medicine to study clinic cases in supervised self-learning.
- During VTH Practicum (**5th year**), students perform clinical case reports, to demonstrate the use of evidence-based medicine. In fact, practicum evaluation is based partially on the marking criteria on the use of current and relevant literature in the chosen clinical area.
- All veterinary students actively participate in research through their graduation thesis project (Veterinary Degree Final Thesis), which includes an experimental research, either a laboratory experiment, a clinical study, an analytical activity or a critical review.

Nowadays, students become aware of the importance of scientific research and lifelong learning. So, other activities related to the dissemination of science organized by the **UM** where the **FVETUM** participates are the **National Science Week** (every in November) and the **European Researchers Night** (last week of September). These activities are organized annually, and one of the most welcome workshop by the public is **Anatomy Plastination**.

-) are initiated to bibliographic search, scientific methods and research techniques, and writing of scientific papers (e.g. through a graduation thesis);

On a general basis, students are taught and aware of the resources and methodology related to **bibliographic search**. Every academic year in September, during the **FVETUM** Welcome Week for the freshmen students, a conference is delivered by library staff to explain the operation and resources of the scientific library of the **UM**. This information is put in practical all along the years putting in practice at the different research-based activities (**see previous section 10.1.3**). Also, during the academic year and periodically, the library runs free course on bibliographic search methods for graduate and undergraduate students, aiming to increase students confidence in the use of the main web-based scientific databases (e.g. PubMed, Scopus and ISI web of knowledge).

One applied and specific integration of the skills and acknowledge on the use of **bibliographic search, scientific methods and research techniques, and writing of scientific papers**, is the **Graduation Thesis**. Since 2014 is a mandatory based on the legal regulation (ORDEN ECI/333/2008 https://www.boe.es/diario_boe/txt.php?id=BOE-A-2008-2675) that as

a part of the curriculum that students have to defend a **scientific Graduation Thesis** (6 ECTS) as part of the End of Degree Work. It includes an experimental research part, either a laboratory experiment, a clinical study, an analytical activity, or a critical review. Each student, under the supervision of an AS (1 or 2), put in practice their skills and acknowledge to search and handle scientific work, interpret the result and draw conclusions. An evaluation committee integrated by 3 AS, score the academic thesis after their defense in a public act. The oral presentation of the dissertation in front of an evaluation committee represents the final step for any undergraduate student to officially become a Veterinary Graduate. Topics and general guidelines are provided on the website (<http://www.um.es/web/veterinaria/contenido/estudios/grados/veterinaria/2016-17/trabajo>).

-) are offered to participate to research programmes on a non-compulsory basis

Several non-compulsory research programs are offered to ungraduated student:

- Most of our teachers are actively working both as teachers and as researchers in their research projects. Each year the departments offer places for **internal students** (one place/research staff <http://www.um.es/web/estudios/contenido/guia-tramites/alumnos-internos-departamentos>). The selected students participate in research project and their collaboration is recognized as elective ECTS (CRAU). The student can be integrated in this program **from the 1st year of Degree**, and more than 60 students/year participate in research activities.
- **Collaboration scholarships**. The Ministry of Education, Science and Sport annually calls fellowships **for the last year Degree students**. The aim of this scholarship is to facilitate to the of students to engage into research activities/training within the University Departments, in a manner compatible with their studies, in order to initiate research tasks and facilitate their future professional decision (<http://www.um.es/web/consejo-social/becas-colaboracion>). The average of Collaboration scholarships granted to the Departments of the **FVETUM** in the last three years has been 5 per year.
- During undergraduate studies, students may elect to **internships at research centres (EPT)**, either in **5th year degree or extracurricular practices** in any year of their undergraduate studies. In the last 3 academic years, 180 student have selected this option
- In addition, **UM** also has its Own Research Program, with several funded programs for undergraduate research training (<http://www.um.es/planpropio/index.php?ano=2016&id=2>)
 - **Undergraduate scholarships to participate in RDI** (research, development and innovation) activities. The research groups finance students to complete their academic training by conducting internships in the field of RDI. In the last 2 academic years, 9 ungraduated students have hold this scholarship within **FVETUM** research groups.
 - **Research Initiation Grants**. To aware students interested in pursuing a research career, the possibilities offered in different areas by the University of Murcia, as well as to introduce the beneficiaries in the knowledge of current scientific problems and the methods used to solve them. This grant comprises two types of aid:
 - A: Students of last year and graduated from the University of Murcia
 - B: Those who are in possession of the official title of Degree or equivalent by the University of Murcia and Master by the University of Murcia.

In the last 2 academic years, the **UM** has financed 11 students in the **FVETUM** by this program,

10.1.4. Description of how the continuing education programmes provided by the Establishment are matched to the needs of the profession and the community.

Four Official Master Programs (OMP) are taught at **FVETUM** by academics with a **researcher profile** (accredited by the Research National Accreditation Agency, ANEP) and **professionals with extensive experience** (practitioners, health science and animal science veterinarians, enterprise managers,...) (**Table 10.1.3**):

- **Msc in Biology and Biotechnology of the Reproduction in Mammals (BBRM)**
From a multidisciplinary point of view this Master is aimed at giving the students a broad and deep knowledge on the most relevant topics related with the professional and scientific fields of the Biology and Technology of Mammals' Reproduction (including Humans).
- **Msc in Nutrition, Technology and Food Safety (NTFS)**
This Master's Degree proposes an advanced scientific training and multidisciplinary in the field of Human Nutrition, Food Technology and Food Safety.
- **Msc in Wild Life Management (WLM)**
In this Master the students are trained to develop their professional activity in the biological and sanitary management of animal species of free life (wild).
- **Msc in Small Animal Medicine (SAM)**
This Master Degree provides the most advanced knowledge and skills in the following specialties: clinical pathology and oncology, diagnostic imaging, anaesthesia, reproduction and obstetrics, ophthalmology, endocrinology, nephrology, neurology, traumatology, soft tissue surgery, cardiorespiratory medicine, dermatology, urgency and veterinary intensive care.

Table 10.1.3.- Number of students registered at postgraduate research training

Type of students	2014/2015	2015/2016	2016/2017	Mean
VTH				
• Interns	10	11	10	10,33
• Residents	0	3	2	1,66
Total				
Master programmes				
• MSc in Biology and Technology of Reproduction in Mammals	21	21	26	23
• MSc in Wildlife Management	27	28	25	18
• MSc in Small Animal Medicine	20	19	12	17
• MSc in Human Nutrition, Food Technology and Safety	28	24	29	23
Total Master programmes	96	92	92	81
PhD programmes*				
• PhD Programme in Veterinary Sciences	57	43	18	39
• PhD Programme in Biology and Technology of Reproductive Health	30	23	11	21
• PhD Programme in Food Technology, Human Nutrition and Food Science	34	23	10	22
• Another PhD Programmes*	3	11	18	11
Total PhD programmes	124	100	57	94

* Students enrolled in old PhD Programmes that will become discontinued by 2017 due to changes in Nacional Education Regulations

In Spain, Nacional Education Regulations for doctoral studies were changed in 2011. As a result, in 2013 the **UM** created the International School of Doctorate (EIDUM www.um.es/web/eidum). Since, it is responsibility of the EIDUM the management of programs and doctoral students. At the moment the Doctoral Programs developed mainly in the **FVETUM** are: PhD Program in Veterinary Science, PhD Program in Biology and Technology of Reproductive Health and PhD Program in Food Technology, Nutrition and Food Science (**Table 10.1.3**). (<http://www.um.es/web/eidum/contenido/estudios/doctorados>).

In addition, the OMP **BBRM** research group is leader of Rep-Biotech. Rep-Biotech **Joint Doctoral project is a Marie-Sklodowska Curie Innovative Training Network** funded by the European Commission under the Horizon 2020 Program. It is composed of 12 leading academic research groups and 3 companies from 9 different countries: Spain, France, Ireland, Italy, Belgium, Germany, USA, Japan and The Netherlands. This program finances 15 PhD positions. The network started on November 1st 2015 and will end on October 31st 2019 (<http://www.um.es/rep-biotech/>).

FVETUM has a close relationship with public and private veterinary institutions and associations, such as cultural associations, Professional Board and National Health Service. One of the objectives of these relationships is the organization of continuing education seminars and seminars for postgraduates (**Table 10.1.4**) attended by a significant number of students. (**Table 10.1.5**). Members of the teaching staff are frequently called for the organization of Continuing education courses. Examples of those can be checked at the web section "Divulgación" (<http://www.um.es/web/veterinaria/contenido/divulgacion>).

Table 10.1.4. Number of students registered at other postgraduate programmes (including any external/distance learning courses).

Courses:	2016/2017	2015/2016	2014/2015	Mean
Seminar Companion Animal Nutrition (15 h)	107	110	114	110
Conference on Science and Food Technology (15 h)	150	193	106	149
Course of Breeding, Maintenance and Pathology of Exotic Animals (40 h)	-	50	50	50
Course of Aquarius (25 h)	-	-	30	30
Seminar Postgraduate Course Sheet Plastination P-40 & E-12 Techniques (22h)	8	6	14	9
Seminar Postgraduate Course Silicone Plastination Technique, Technique S-10 (22h)	9	8	14	10
Course Application of Hazard Analysis and Critical Control Points in the Food Industry (13h)	22	-	23	22
AVAFES-VEDEMA Course: Exotic Species (10h)	25	25	25	25

Table 10.1.5.- Number of attendees to continuing education courses provided by the Establishment.

Courses:	2016/2017	2015/2016	2014/2015
Course of Basic Beekeeping (113h)			25
Course of Commissioner of Ring (50h)	50	-	-
Course of Caprine Tuberculosis (8h)	-	-	40
Seminar "Epigenetics in Reproductive Biology" (30h)	-	24	-
Practical Course of Management of Ofidios, Crocodiles, Saurios and Quelonios (30h)	-	40	-
Anatomic Seminars: To Science Through Art (5h)	40	-	-
Workshop: Dissection on Wildlife VEDEMA (8h)	-	-	15

Workshop: Clinic in Ferrets VEDEMA (12h)	30	-	-
Workshop: Wildlife Tracking VEDEMA (8h)	30	-	-
Workshop on Fever Q, Risk Assessment and Management, Animal Health and Public Health (4h)	50	-	-
Extensive Sheep Days in the Mediterranean: transhumance, product quality and sustainability (16h)	50	-	-
Working Day Intega-Zoetis "Strategic Drugs in the First Ages And Their Cost" (8 h)	-	-	20
Congress of Veterinary Teaching Vetdoc (16h)	-	-	59
Congress of the Spanish Society of Evolutionary Biology (20h)	-	72	-
Congress of New Clinical Technologies Companion Animals (12 h)	-	-	170
XXII International Congress of SECIVE (16h)	100	-	-
I Conference on Challenges in Wildlife Management (10h)	50	-	-
Hill's Multi-Thematic Veterinary Conference (15h)	100	-	-
Annual Symposium of Avedila (12h)	70	-	-
Symposium of Rabbit Breeding (ASESCU) (16h)	75	-	-

10.1.5. Prospected number of students registered at postgraduate programmes for the next 3 academic years

As in the Veterinary Degree, in the Master's Degree and PhD Programs the number of students admitted per year is limited. The number of places to be offered is established in the official document of the UMU Master's Degree approved by ANECA (ENQA member).

OMS **BBRM**, **WLM** and **NTFS** are extremely popular and oversubscribed (**Table 10.1.2**). In these OMS we expect to continue with the current trend. In addition, the **BBRM** and **WLM** are among the 5 best in Spain in the areas of Veterinary and Food, and Environment Management, respectively in the 2017 (<http://www.elmundo.es/especiales/mejores-masters>). The OMS of **SAM** has been the last to be implanted. Actually, 50% of the places offered are covers, and we expect that the 20 places offered for the master's degree will be covered in the coming years. For the future

10.1.6. Description of how and by who research, continuing and postgraduate education programmes organised by the Establishment are decided, communicated to staff, students and stakeholders, implemented, assessed and revised.

The **FVETUM** has a dedicated Vice-Dean of Postgraduate Studies, Research and Innovation who is member of the **Academic Commissions and Committees** of the postgraduate education programme and tracks the different activities. The Academic Commissions of OMP and PhD Programs are constituted by AS of the program, students of the program and stakeholders (representatives of the enterprises):

- **OMP Academic Commission.** It is responsible for the definition and updating of the Master. Annually, manage the student's admission process, the courses coordination and the application of the Quality Assurance System.
- **PhD programme Academic Commission.** It's mission is to evaluate the research plan and the activities of their PhD students, and carry out an integral follow-up of the performance of the student during their whole PhD training. Annually, it is in charge of the student's admission process, the coordination of the activities and the application of the Quality Assurance System.
- **Research Committee:** It consists of members of the Dean Team and departments of **FVETUM**. Among its competences is the development of scales and the evaluation of candidates for Awards for the best doctoral thesis every academic year.
- **Postgraduate Committee:** It consists of members of the decanal team, the coordinators of different OMP of **FVETUM**, students and other academic staff. Its functions are to manage all the issues related to postgraduate studies.

Besides, each PhD and OMP has a Quality Assurance Committees that every year review the progression and results of the Thesis (PhD or master). These Committees are also part of the **FVETUM** QA System, and report to the QA Committee of the **FVETUM**. Periodically, regional and national Quality Agencies evaluate our official postgraduate programmes.

10.2.- Comments.

- We believe that research is a strong and consolidated pillar of **FVETUM** based on the impact into international and national repertories and rankings. However, research is not even in all **AoK** and it has to be included in the strategic plan the encouragement of all areas.
- All areas are awarded of the meaning of the research-based education of veterinarians and we believe that it is covered all over the curriculum.
- The **FVETUM** also believes that currently there are significant opportunities for undergraduate students to participate in research within the curriculum.

- Regarding post-graduate's studies **FVETUM** covers all relevant areas to achieve a Master or PHD Degree. However, there is some gap in the continuous education. There a desire to build a School of Professional Education and Training with the Professional Veterinary Colleges (COLVEMUR for instance) but since 2011 the National General Council of Veterinary Colleges of Spain that is working on a specialization/accreditation in equine, and companion animals with professional associations.
- Also, **FVETUM** may need to implement specialized course within the **UM** self-programs of specialization.

10.3.- Suggestions for improvement.

- Although masters and PhD are very demanded, and after several years of success, it is time to review and update the profile and syllabus, and even some of them (*NTFS* for instance can be split into more specific ones: Food Safety, Food Technology or Human Nutrition). Also, another aspect on debate is the convenience or not to increase the number of ECTS up to 90 or 120 to harmonise with most of the European standards for Masters Programs.
- There is also a demand to train veterinary technicians (in equine as well as in animal companion) and that can be an opportunity to begin activities on a Professional School.
- It is also critical to implement the strategic plan for training, promoting or hiring diplomates on the more demanded clinical areas to warranty the sustainability of the clinical undergraduate education and permanent training of postgraduates.
- Internationalization of masters.
- On research, there is a need to encourage scientists to aggregate and cooperate to build scientific strategies. As part of this activities from the Faculty will be promoted the recovering the research institute or centre for food science and health so called VITALIS, within the frame of the RICE. Other initiatives will be discussed like the animal health institute.