



Technical University of Lisbon



Faculty of Veterinary Medicine

Self-Evaluation Report

2002-2003

Conselho Nacional de Avaliação do Ensino Superior
European Association of Establishments for Veterinary Education

PREAMBLE

This self-evaluation report has been prepared for the visit to FMV of the proposed expert team assigned by EAEVE/FVE and CNAVES, as follows:

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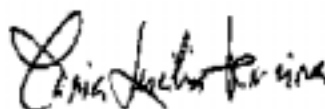
The visit will take place from the 3rd to the 7th of May 2004. Professor J. E. Silveira Matos, from the Azores University, has accepted to be the Liaison Officer for the visit.

This report was prepared by a group of representatives of the administration, teaching staff, students and non-teaching staff of FMV. This was a collective work, coordinated by a Committee assigned by the Dean for that purpose. The Self-Evaluation Committee asked for and gathered the information and gave shape to the report, starting a year before the visit and interacting with almost every member of FMV, under the coordination of Professor Armando Louzã, supported by Dr. Mário Melo. The members of the Self-Evaluation Committee were:

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The task of producing this report required a laborious period of reflection, analysis and synthesis, diligently participated by every department, every administrative, teaching and research unit of FMV, all contributing for the final document, approved by the Dean's Office, the Scientific Council and the Assembly of Representatives. For this, and to each of the contributors, the appreciation and gratefulness of FMV are justly due.

The Dean,



M.ª. Lucília Ferreira

Abbreviations used in this Report

ACIVET	- NGO, non-profit association for the development of Veterinary Sciences
ACVT/CCFV	- Advisory Committee on Veterinary Training
ADUL	- Associação das Universidades de Lisboa (Association of Public Universities of Lisbon)
AEFMV	- Associação de Estudantes da Faculdade de Medicina Veterinária (Students Union of FMV)
CIISA	- Centro de Investigação Interdisciplinar em Sanidade Animal (Centre for Interdisciplinary Research in Animal Health)
CML	- Câmara Municipal de Lisboa (Lisbon County Authority)
CNAVES	- Conselho Nacional de Avaliação do Ensino Superior (National Council for Evaluation of Higher Education Institutions)
CRASPEM	- Monsanto Ecological Park
CU	- Credit unit
DC	- Departamento de Clínica (Department of Clinics)
DEMOC	- Departamento de Morfologia e Clínica (Department of Morphology and Clinics)
DE TSA	- Departamento de Sanidade Animal (Department of Animal Health)
DGV	- Direcção Geral de Veterinária (General Directorate of Veterinary Services)
DMF	- Departamento de Morfologia e Função (Department of Morphology and Function)
DPA	- Departamento de Produção Animal (Department of Animal Production)
DPASA	- Departamento de Produção Animal e Segurança Alimentar (Department of Animal Production and Food Safety)
DSA	- Departamento de Sanidade Animal (Department of Animal Health)
EAEVE	- European Association of Establishments of Veterinary Education
ECTS	- European Credit Transfer System
EU	- European Union
EZN	- Estação Zootécnica Nacional (National Animal Production Station)
FA	- Faculdade de Arquitectura (Architecture Faculty)
FCT	- Fundação para a Ciência e Tecnologia (Science and Technology Foundation)
FMH	- Faculdade de Motricidade Humana (Human Kinetics Faculty)
FMV	- Faculdade de Medicina Veterinária (Faculty of Veterinary Medicine)
FTE	- Full-time equivalent
FUP	- Fundação das Universidades Portuguesas (Foundation for the Portuguese Universities)
GAPTEC	- UTL Liaison Office
GNR	- Guarda Nacional Republicana (The National Horse-Mounted Police)
ICBAS-UP	- Instituto de Ciências Biomédicas Abel Salazar (Biomedical Institute, University of Porto)
IICT	- Instituto de Investigação Científica Tropical (Institute of Tropical Research and Development)

IHMT	- Instituto de Higiene e Medicina Tropical (Tropical Medicine and Hygiene Institute, New University of Lisbon)
INIA	- Instituto Nacional de Investigação Agrária (National Institute for Agriculture Research)
INSA	- Instituto Nacional de Saúde (National Institute of Health)
IPIMAR	- Instituto de Investigação das Pescas e do Mar (Marine Research Institute)
ISA	- Instituto Superior de Agronomia (Institute of Agriculture)
ISCSP	- Instituto Superior de Ciências Sociais e Políticas (Social and Political Sciences Institute)
ISEG	- Instituto Superior de Economia e Gestão (Economics and Management Faculty)
IST	- Instituto Superior Técnico (Technical Engineering Institute)
LNIV	- Laboratório Nacional de Investigação Veterinária (National Laboratory of Veterinary Research)
MCES	- Ministério da Ciência e do Ensino Superior (Science and Higher Education Ministry)
OMV	- Ordem dos Médicos Veterinários (Portuguese Veterinary Chamber)
PIDDAC	- Programa de Investimentos e Despesas de Desenvolvimento da Administração Central (Investment program from the Central State Administration)
PSP	- Polícia de Segurança Pública (Police)
SAS	- Social Services of UTL
UE	- Universidade de Évora (Évora University)
UISEE	- Unidade de Investigação e Serviços de Epidemiologia Económica (Veterinary Epidemiology and Economics Research Unit)
UTAD	- Universidade de Trás-os-Montes e Alto Douro (Trás-os-Montes e Alto Douro University)
UTL	- Universidade Técnica de Lisboa (Technical University of Lisbon)

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INTRODUCTION

FMV and its University context

The Faculty of Veterinary Medicine (Faculdade de Medicina Veterinária – FMV) is the oldest school of the Technical University of Lisbon (Universidade Técnica de Lisboa – UTL). FMV was founded in 1830 and joined the UTL at its creation from the merging of four higher education schools: FMV, Institute of Agriculture (Instituto Superior de Agronomia, ISA, founded in 1852), Institute of Economics and Business Administration (Instituto Superior de Economia e Gestão, ISEG, founded in 1869) and Institute of Engineering (Instituto Superior Técnico, IST, founded in 1911).

Later, UTL was enriched with the joining of Institute of Political and Social Sciences in 1961 (Instituto Superior de Ciências Sociais e Políticas, ISCSP, founded in 1906) and of the Faculty of Human Kinetics in 1976 (Faculdade de Motricidade Humana, FMH, founded in 1940 as the National Institute for Physical Education). The last school to be integrated in UTL in 1979 was the Faculty of Architecture (Faculdade de Arquitectura, FA), which was formed after the separation of the Department of Architecture of the Higher School of Arts, founded in 1911.

The humanistic and artistic studies developed in the three newer members of UTL added an extra dimension that made UTL richer and more complete as a University.

Figure 0.1 - Old premises of FMV



UTL is one of the four largest Portuguese Universities: 1900 teaching staff (of which more than 65% have PhD Degrees), 20000 undergraduates and 3000 post-graduate students. UTL's overall budget is of nearly 180 million Euro and it provides 231 different higher education degrees, of which 50 first-degree courses. Despite its size, UTL has always adopted a decentralized organisational model. All Faculties have full administrative, financial, pedagogical and scientific autonomy. UTL is also the

Portuguese University with the largest number of international indexed scientific publications as recognized in the report of EU Commissioner Busquin.

The Rector, the Senate and the University Assembly are central bodies of UTL as a whole and they have a fundamental, but largely coordinating, role to play in the management of UTL. The Rector is elected by the University Assembly for a four-year term of office, which can be renewed once. The coordinating role of the Rector is played through a team of four to six professors: the Rector and three Vice-Rectors to whom can also be joined, at Rector's invitation, two or more Pro-Rectors. The Rector's Office has an administrative and technical staff of around 70 people. Both the Senate and the Assembly, presided by the Rector, are composed by representatives of the different Faculties, including teaching staff, students and administrative staff. The Advisory Council of UTL is composed of former Rectors of UTL, of Counsellors (proposed by the Faculties and elected by the Senate) and representatives of professional, social and economic organizations related to the specific fields covered by the University.

Students are organized in Student Unions, generally very active, assuming a direct but not exclusive part in the representation of students in the governing bodies of UTL. They are also engaged in promoting scientific and cultural events, having their own theatrical, music and sports groups, and also play a very important role in the integration of first year students (freshmen).

Among the highlights of the recent history of UTL, is the creation of the University Campus at Ajuda, in Lisbon, next to the ISA, where the new buildings of FA, FMV, FMH (a multipurpose sport centre) and ISCSP and the Social Services Catering Unit have already been constructed. The next phase is the construction of new premises for student's residences. The schools that remained in their original premises, such as IST, ISA ISEG and FMH, were the object of major investments in the extension and renewal of their scientific and teaching infrastructures.

The expansion of UTL also includes a major involvement in the Science and Technology Park project, TagusPark, covering about 400 acres in the Lisbon Metropolitan area. The UTL services there will mainly be used for research and post-graduate education in an environment of interface with private companies, banks and the industry. The construction of student residences is also planned for TagusPark. FMV joined the TagusPark project from its beginning, planning teaching (post-graduation courses) and research activities. Besides this important link with industry and society, UTL created an autonomous Liaison Office (GAPTEC) in association with all the Faculties and some private and public companies,

which strives to bring together academic know-how and economic activities, through interdisciplinary applied research.

The Social Services of UTL (SASUTL) aim to provide assistance and to promote successful attendance at the University to all its students, with positive discrimination in favour of those in financial need or who are living away from home, by guaranteeing that they are not excluded from UTL due to insufficient financial resources. These objectives have been pursued by granting financial assistance to students. This assistance can be given directly, in the form of grants and emergency assistance, or indirectly, by provision of food, accommodation, health services and other educational assistance, plus support for sporting and cultural activities. A University choir, theatre and dance groups complement similar initiatives at Faculty level. There are sports facilities in three of the seven schools.

In such a diversified University context, FMV benefits from the interactions with other areas of knowledge and expertise, widening its scope and area of realizations. Besides several research projects and expert services, carried out in association with other schools of UTL, FMV collaborates in Master and Post-Graduate Courses coordinated by the UTL, involving other schools. Also, in the last academic year, a Degree in Zotechnical Engineering is offered by the UTL, through a joint organization of FMV and ISA.

The fact that FMV is one of the smallest schools of UTL has not hindered its participation in the life of UTL and its ruling. Several professors of FMV have been Vice-Rectors or Pro-Rectors of UTL and are members both of working parties of the University in Scientific and Post-Graduation boards, or joining other cultural activities (ex. chorus, theatre group). Nevertheless, the specificities and needs of Veterinary Education in the Third Millennium claimed by FMV are somewhat diluted and underrated in the context of a University dedicated to such different areas of higher education as UTL is.

FMV in the last ten years

The scenario of Portuguese Veterinary Education has substantially changed in the last decade. From the situation of being the only Veterinary school of the Country, FMV saw the continuous opening of four Veterinary courses in several Portuguese Universities: Trás-os-Montes e Alto Douro (UTAD), Porto (ICBAS-UP), Évora (UE) and finally, a private University in Coimbra (Universidade Vasco da Gama). This fact did not change the attraction potential of FMV towards students seeking Veterinary Education, since 100% of FMV's *numerus clausus* have been filled year after year with fresh students.

The level of students entering FMV is very high, with a minimum mark of 17,44 out of 20 in the last few years and a slight increase in 2003/2004. FMV has tried to maintain its status of quality reference among its peers.

In terms of European Veterinary Education, FMV is a founder member of the European Association of Establishments of Veterinary Education (EAEVE). In the sequence of this option, FMV has volunteered for evaluation, as a pilot experiment of the system. Hence, FMV prepared an auto-evaluation report and was visited by a team of experts from the 7th to the 10th of November 1989, as follows: Chairman - F. Orozco (Spain-Clinical Subjects), A. Gobetto (Italy-Basic Sciences), M. Fontaine (France-Animal Production), L. Langele (Belgium-Food Hygiene), accompanied by the secretary of ACVT/CCFV (Advisory Committee on Veterinary Training), S.T. Allman. The liaison officer was Professor M.C. Domingos da Lage of LNIV (National Laboratory of Veterinary Research).

Dr. Orozco subsequently visited FMV in 2000, to ascertain whether or not the recommendations produced by the visiting experts team had been implemented to a satisfactory level, which was reported favourably to the EAEVE and CCFV. Therefore, FMV was included in the EAEVE Approved List of European Veterinary Schools.

FMV was also evaluated at a National level, by the competent body (the Evaluation Council of the Foundation of Portuguese Universities), in a process that was concluded in 1999. The process involved the production of a self-evaluation report and the visit of an expert team to FMV. The team was composed of the following members: Prof. M.C. Ramalho Ribeiro from EZN (INIA); Prof. M. C. D. Lage, from LNIV; Prof. Irene Silveira from the University of Coimbra; Prof. J.E.S. Matos, from the University of Azores and Prof. A. Figueiredo Nunes, from the University of Evora. The liaison officer was Prof. J.H. Duarte Correia from FMV.

Both evaluation processes proved to be important forces of change and improvement of FMV structure and performance at various levels. It can be said that the trend of FMV's evolution has been powerfully influenced by the diagnostic workout and recommendations of each of the former evaluation teams.

The profile of teaching staff has changed towards a more fully dedicated professorial body (more than 90% of Faculty members are exclusively dedicated to teaching) and the teaching staff level of qualifications has also increased (more than 80% have a doctorate degree).

Retirement of technical and administrative staff within public service has not been compensated over the years because of the government policy of blocking

access to public service careers. This fact has led to the hiring of services and contracting personnel through the private budget of FMV. The salaries of this staff, which are now indispensable to the functioning of FMV, are entirely supported by revenue earned by FMV and not by public funding. Of the total number of non-teaching staff (117), only 51,3 % are public servants.

Since financial resources from public funding have become increasingly scarce to support the developments in teaching and research, FMV management has placed a significant effort in stimulating and supporting services offered to the public in the different areas of expertise of its staff. This policy aimed at two major targets: attracting clinical and analytical material to be used in the training of students and in the development of their problem-solving abilities in face of real situations and, in complement, assuring a financial base for re-investment in those activities, both in staff and equipment. In the research front, FMV has organized itself by creating, in 1991, a research centre that congregates the whole of its teaching staff and some of non-teaching staff, directed to the development of research activities. This centre, the Centre for Interdisciplinary Research in Animal Health (Centro de Investigação Interdisciplinar em Sanidade Animal – CIISA) has been the research face of FMV in the last twelve years, applying successfully for pluri-annual research funding from the relevant government institution, the Foundation for Science and Technology (Fundação para a Ciência e Tecnologia - FCT). CIISA supports, among others, research projects associated with the career progression of FMV's junior teaching staff, namely PhD research projects, which are not funded directly by FCT. CIISA also promotes the publication of research results and the presentation of communications of its researchers in scientific meetings, supporting the expenses of travelling, registration and accommodation. An international panel evaluated the activities of CIISA last year and the score was "Very Good", which enables our research centre to pursue and widen its goals.

In the last two decades of the 20th century, the unsuitability of the facilities of FMV in the centre of Lisbon to house the changing academic population and support the necessary modernization of teaching and research, has been the major concern of the institution. The challenge of planning, following the project and execution of construction of new premises occupied extensively the Dean's office and faculty members for almost a decade.

Finally, in the Fall of 1999, FMV moved its main teaching and research activities to the new site, at Alto da Ajuda Technical University Campus, where we are now.

Figure 0.2 - New premises of FMV



The new premises have been planned for a population of students of around 80 per year and comprehend a well dimensioned Veterinary Hospital for companion and large animal species, including dormitories for students and clinical staff, teaching and research laboratories, audio-visually equipped amphitheatres, teaching staff offices, animal housing facilities, an administrative building that also houses a spacious and modern library, an auditorium with 250 seats, ample Student Union quarters, computer network facilities and the necessary maintenance workshop and other support structures.

However, moving the main premises of FMV to the new Campus happened under the least favourable circumstances: the budget for equipment was progressively cut by the government to a point that hindered the planned allocation of the sufficient equipment to make the buildings functional. Also, the dimensions of the facilities implied a substantial increase in costs of cleaning, electricity, telecommunications, safe disposal of dangerous residues, gas and water, as well as security. As the budget originating from public funding decreased around 15% in 2000, due to a Ministry of Education imposed policy, FMV had to spend its funds to the last penny, in order to render the adaptation to the new physical reality of the institution the best way possible.

In such circumstances, the main problems faced by the management of FMV were:

- The maintenance of the three structural premises of FMV: The Gomes Freire site, the Ajuda main site and the TagusPark site, still under development.
- The necessary adaptations and repairs of the Ajuda facilities, since several building problems were detected because of poor quality of the construction. Infiltrations in several areas, as well as inadequate floor surfaces for large animal circulation and housing, associated with other functional inadequacies, such as absent darkening devices for projection in classrooms, and

sun shading of offices for teaching and administrative staff and laboratories, had to be corrected with utmost urgency.

- Since a structured computer network had been installed during the construction of the facilities, access to documentation and information had to be guaranteed to students, as well as teaching, technical and administrative staff. This was done by acquiring and installing working stations in the library, offices, laboratories, hospital premises, classrooms and students computer rooms.
- Access to farms, slaughterhouses, fishing docks and meat plants was still a priority, considering the urban location of the Campus. Therefore, buses and mini-buses, as well as vehicles for animal transportation and support to the ambulatory clinics had to be purchased by FMV.
- Clinical training of FMV students has long been recognized as a major priority of the institution. Therefore, a substantial investment was also put towards the functioning of the veterinary hospital and its support structures, namely: radiology, ultrasound and endoscopy; diagnostic laboratories and inpatient wards.
- Hiring staff for the critical units in order to render them functional. Teaching staff was hired almost exclusively for the clinical areas. Clinicians (residents) and support staff for the hospital and animal housing units, were also hired.

In order to face these situations, critical for the development and full realization of the potential of the new premises of FMV, the management of the Faculty, counting on the support of its entire staff, searched for resources in several fronts:

- Celebrating protocols and partnerships with public and private institutions, so as to facilitate access and support of extra-mural student training.
- Intensifying the collaboration with FMV's private partner, ACIVET, a non-profitable association aiming at the improvement of research and development in Veterinary Sciences.
- Applying for alternative funding entities, namely in modernization and improvement of the quality of teaching (PRODEP 2.3 project).
- Applying for annual funding for extramural clinical training of last semester students (PRODEP-Training).

- Increasing and diversifying the services offered to the outside community, namely in clinical, analytical and consultancy areas, so as to increase the revenues of FMV.
- Participating and organizing post-graduation and continuing education courses for veterinarians, laboratory technicians and nursing staff.
- Stimulating the submission of research projects outside the CIISA, to increase the revenues through research project overheads.
- A continuous lobbying effort upon the Rector's Office of UTL and the Ministry of Higher Education, in order to highlight the specificities of Veterinary Education and its consequent different ratios and higher costs, when compared to other University degrees.

Although FMV has oriented its curriculum according to the EAEVE recommendations and guidelines, the need for the modernization of the course and for some adjustments has been felt for a long time. This is particularly important in what concerns optional subject areas and curricular time allocated to student involvement in Hospital and ambulatory clinics. A curricular revision has been under preparation for the last few years and, although not implemented yet, has reached a matured stage and produced the basis of the new departmental organization of FMV, which has legal existence since November 2003.

From the structural organization consisting of three departments congregating the teaching and research activities of FMV, we moved towards a better-balanced four-department structure, whose organization in terms of areas of knowledge, teaching and research interests might prove to be more adequate to the future attaining of the institution's objectives.

Figure 0.3 - TagusPark



Chapter 1 - OBJECTIVES

1. FACTUAL INFORMATION

The Faculty of Veterinary Medicine of Lisbon through its Scientific Council, firstly adopted the general objectives stated in the definition of the ACVT – Advisory Committee on Veterinary Training, *in*: “Evaluation of Veterinary Schools, Essential Requirements” 1998, for veterinary training institutions as follows:

“The general objectives of the Veterinary Faculty of Lisbon are to provide adequate, research-based veterinary training which enables veterinary students to examine and treat sick animals, contribute to animal production whilst maintaining the animals' health and welfare, protect humans from zoonoses and ensure high-quality food products of animal origin for human consumption”. These institutional objectives are pursued in several fronts, as follows:

- Promotion of the academic, scientific, technological and ethical development of Veterinary Surgeons, as well as their cultural and humanistic dimension.
- Assurance of a level of Veterinary Education adequate to the demands of modern world, founded in updated scientific research and solid technical basis.
- Development of undergraduate students skills necessary to proficient responses to the issues of: protection, promotion and maintenance of the health and welfare of animals; food technology, hygiene and safety; animal production; stimulating the willingness to pursue solutions for concrete problems of society, by achieving professional performances at the level imposed by globalisation.
- Provision of high-quality continuing education assurance, by the organization of post-graduate courses: academic degrees (Master and Doctorate) and other types of courses (up-dating and specialization courses), especially in the clinical area, following the scientific policy of the Faculty, structured since the Law of University Autonomy, by the directives of FMV's Scientific Council.
- Attainment of satisfactory qualitative and quantitative indicators, required by the entities evaluating Veterinary Education, both at National and European levels.

- Provision of conditions for a permanent improvement in the qualifications and proficiency of FMV's teaching and non-teaching staff.
- Stimulation and provision of conditions for the execution of fundamental and applied research projects within the scope of Veterinary Sciences.
- Provision of the surrounding community with high quality services, in a perspective of mutual benefit and progress.
- Promotion of cultural, scientific and technical exchange with national and foreign peer institutions, in the perspective of globalisation.
- Contribution for international cooperation and the closeness between countries.

Furthermore, following a two-year debate in small groups and general meetings, FMV complemented those general objectives with a list of competencies and aptitudes (or specific objectives), which every student at graduation should master. These competencies were approved by the Scientific Council in May 2000 and later ratified by the Consultive Council. The educational objectives are:

1. Basic training and competencies

- 1.1.1. To have the general knowledge to understand applied biomedical sciences.
- 1.1.2. To recognize topics related with biomedical sciences.
- 1.1.3. To be able to access bibliographic data and to use updated information technologies to obtain scientific information.
- 1.1.4. To be able to critically evaluate a scientific article.
- 1.1.5. To be able to write a technical/scientific report.
- 1.1.6. To understand the social, economic, environmental and ethical implications and responsibilities that result from the use of new technologies.

1.2. Social background

- 1.2.1. To understand the ethical issues to the exercise of the veterinary profession.
- 1.2.2. To acknowledge communication skills as a key instrument for social relationship.
- 1.2.3. To maintain and to promote an adequate relationship with other interface professionals.

1.2.4. To develop and practice the principles of working in multidisciplinary teams.

2. Technical and clinical competencies

The following technical competencies intend to make sure that the training given to the students covers all areas of intervention of veterinarians, namely in clinics, herd health, inspection, technology and animal production, including competencies of multidisciplinary spectrum.

- 2.1. To be proficient in the evaluation of animal health status, especially of farm and companion animals.
- 2.2. To be proficient in the evaluation of abnormal behaviour, in the recognition of the indicators of animal stress and in the application of ethical and legal principles of animal welfare.
- 2.3. To master the techniques for identification, handling, restraining and transporting of animals.
- 2.4. To be able to plan and execute a clinical exam including:
 - 2.4.1. To have practice in obtaining relevant information related to the health and environmental conditions of animals.
 - 2.4.2. To be proficient in the methods of clinical examination and sample collection such as :
 - 2.4.2.1. Implementation of the most common and essential methods;
 - 2.4.2.2. Collection, preparation and preservation of samples for laboratory analysis;
 - 2.4.2.3. Interpretation of diagnostic tests.
 - 2.4.3. To perform the appropriate necropsy techniques of different animal species.
- 2.5. To be able to recognize the OIE List A and national notifiable diseases and other most common animal health problems of Portugal and the European Union (EU).
- 2.6. To identify and evaluate animal and herd reproductive parameters.
- 2.7. To understand the potential of reproduction technologies and applying the most common.
- 2.8. To be able to prevent and treat the most frequent diseases and other animal health problems in the country, including:
 - 2.8.1. To master and apply the principles of medical prophylaxis;
 - 2.8.2. To prescribe drugs and other medication, considering its side effects and public health

constraints;

- 2.8.3. To be able to perform the most common surgical interventions including field preparation, anaesthetic protocols, individual asepsis and equipment sterilisation, surgical approaches and technical procedures, as well as post surgical follow-up;
- 2.8.4. To be able to identify and evaluate diagnostic failures, through clinical observations and/or necropsy findings.
- 2.9. To be able to formulate prognosis, taking in consideration the evolution of clinical cases.
- 2.10. To be familiar with the application of euthanasia techniques, based on ethical principles of animal welfare.
- 2.11. To master and apply the basic principles of descriptive and analytical epidemiology.
- 2.12. To be able to perform epidemiological data collection, processing and analysis related to follow up and surveillance activities for the prevention, control or eradication of transmissible diseases.
- 2.13. To be aware and to be able to identify, evaluate and prevent the risks related to the import of animals and animal products.
- 2.14. To be familiar with methodological planning and execution of animal health programmes.
- 2.15. To be able to apply the Portuguese and EU animal health legislation, in particular the notification of OIE and national listed diseases.
- 2.16. To be able to analyse and execute EU and national legislation concerning:
 - 2.16.1. Identification of animals and products of animal origin for human consumption;
 - 2.16.2. Movement and transport of live farm animals, especially to slaughter;
 - 2.16.3. Inspection of live animals, of animals during the slaughter process and of carcasses, based on the current national and european legislation;
 - 2.16.4. To evaluate infrastructures, equipment, personal and hygiene conditions involved in the slaughtering process and to recommend procedures to correct detected deficiencies;
 - 2.16.5. To apply the basic principles of preservation and distribution of food products of animal origin, both fresh and transformed.
- 2.17. To be familiar with the most common methods of processing and preservation of food animal products.

- 2.18. To know and to apply the fundamentals of pro-active systems of food safety assurance such as the HACCP methodology.
- 2.19. To be familiar with the basics of state veterinary services interventions.
- 2.20. To know the nutritional and dietetics quality parameters and relative economic value of products of animal origin.
- 2.21. To be identified with general official process of certification of food animal products.
- 2.22. To recognize the morphological and productive characteristics of native and main introduced breeds of different species.
- 2.23. To know how to generate, collect and evaluate the main productivity indexes and use them to assess production systems efficiency.
- 2.24. To know the principles and applications of animal genetics and selection.
- 2.25. To know how to collect feed samples, choose the appropriate analytical methods and interpret the results of the analysis, in order to evaluate the nutritional value and sanitary conditions of animal feed.
- 2.26. To comprehend the main animal feeding techniques and how to formulate and prepare rations.
- 2.27. To plan proper feeding protocols, for the different species, and prevailing production systems.
- 2.28. To understand the most common agricultural practices utilized in forage crops production and preservation.
- 2.29. To plan and establish adequate management systems, including infrastructure requirements, reproductive and nutritional management as well as animal health programmes.
- 2.30. To know the ecological implications of animal production systems, with emphasis on the relationship between animal waste and environmental contamination.
- 2.31. To know the basic principles of production, maintenance and use of animals for experimentation and other scientific purposes and to apply the animal welfare legislation.
- 2.32. To know the methods and techniques of environmental protection related to the proper disposal of animals and other by-products of the animal industry.
- 2.33. To know the quality parameters and the economic value of animal products.
- 2.34. To master the concepts for the design of animal installations.
- 2.35. To have knowledge of the legal requirements for animal production activity.
- 2.36. To know how to act in public emergency situations caused by natural or man-made disasters.
- 2.37. To be aware and to be able to act in sanitary emergencies in accordance with EU and national contingency plans.
- 2.38. To have basic concepts of economic management of a veterinary practice.

2. COMMENTS

It was current opinion amongst teaching staff that the present curriculum was out-dated and needed urgent renewal. Along the past decade the focus on small animal clinics has greatly increased and the clinics of farm animals has been substantially improved mainly in herd health and population medicine. To update the curriculum with these modifications some minor changes were introduced along a time frame, but those adjustments, although solving some constraints, did not solve the inadequacy of the curriculum as a whole.

The reasons for that will be explained in Chapter 4, together with the description of the new proposal.

The general objectives stated above and the competencies listed have been extensively used as a guide to design the new curriculum, which is at the final stage of the approval process. We believe that, in terms of objectives, we have a complete, well-balanced and realistic set, although knowing that adaptations will be needed. Each time a new competence is added, the Scientific Council should make sure that one of the subjects will take the responsibility of covering the scope of that new competence or create a new discipline, bearing in mind that the work load on the students should not be increased.

As the Faculty has moved on to the new campus in Alto da Ajuda, there was a profound change of working conditions for everybody involved. The new facilities allowed the improvement of the quality of teaching and research efforts with obvious advantages for students. The new Hospital, the student's laboratories, the computer rooms and the library created a new impetus for the learning process, both for students and teaching staff.

Up to 12 years ago most of the faculty efforts were concentrated on lecturing. Presently we have to recognise that an environment of research, and practical "hands-on" experience, has been

established and that gradually the formal lectures are becoming just a part of that new environment.

Main strengths:

- the high qualification and experience of the teaching staff;
- the high education level of students that apply for the course;
- a rise in scientific and research activities and the associated financial support;
- the access to outside facilities, such as slaughterhouses, National Animal Production Station, National Horse-Mounted Police and numerous farms around Lisbon, mainly for clinical work.

Main weaknesses:

- gradually reduced budget from the state regardless of quality;
- an officially imposed and inadequate teaching staff:student ratio;
- the high running costs of the new facilities;
- the lack of an experimental farm belonging to the Faculty;
- difficulties in the admission of technical and administrative personnel;
- absence of a parallel research career.
- absence of a parallel hospital career (interns and residents).

3. SUGGESTIONS

Public funding is allocated by the use of a complex formula, that takes into account the teaching staff: student ratio, the standard cost of graduation and MSc students, and the number of such students in the institution. The assumption of a more adequate ratio could, *de per se*, increase the resources of FMV.

Provided that the lobbying efforts of FMV executive board next to the Ministry of Science and Higher Education will produce the desirable acknowledgement of the specific needs of Veterinary training, especially of a maximum teacher:student ratio of 1:7.5, instead of the 1:9 currently allowed by the Ministry, the public funding of FMV will improve.

In light of the present panorama of Higher Education funding, FMV is also trying to subscribe programme-contracts with the Ministry, in order to support critical areas of development, namely the Veterinary Hospital and other clinical training activities. These were already submitted.

Alternative sources of funding, such as research projects on demand, provision of services to the community and post-graduation and continuous education courses, will be actively supported and stimulated.

Chapter 2 - ORGANISATION

1. FACTUAL INFORMATION

Details of the establishment

Name of the establishment: Faculdade de Medicina Veterinária (FMV)

Address: Rua Prof. Cid dos Santos

Pólo Universitário

Alto da Ajuda

1300-477 Lisboa

Telephone: (351) 213652800

Fax nº (351) 213652810

Website: www.fmv.utl.pt

Title and name of head of the establishment: Professor Maria Lucília Ferreira (Dean)

Lisbon Veterinary Faculty is integrated in the Technical University of Lisbon (UTL)

University address:

Reitoria da Universidade Técnica de Lisboa

Palácio Centeno

Alameda Sto. António dos Capuchos, 1

1169-047 LISBOA

Telephone (351) 21 8811900

Fax nº (351) 21 8811990

e-mail: rutl@reitoria.utl.pt

website: www.utl.pt

Competent authority overseeing the establishment:

Ministério da Ciência e Ensino Superior (MCES)

Palácio das Laranjeiras

Estrada das Laranjeiras, 197-205

1649-018 LISBOA

Telephone (351) 21 7231000

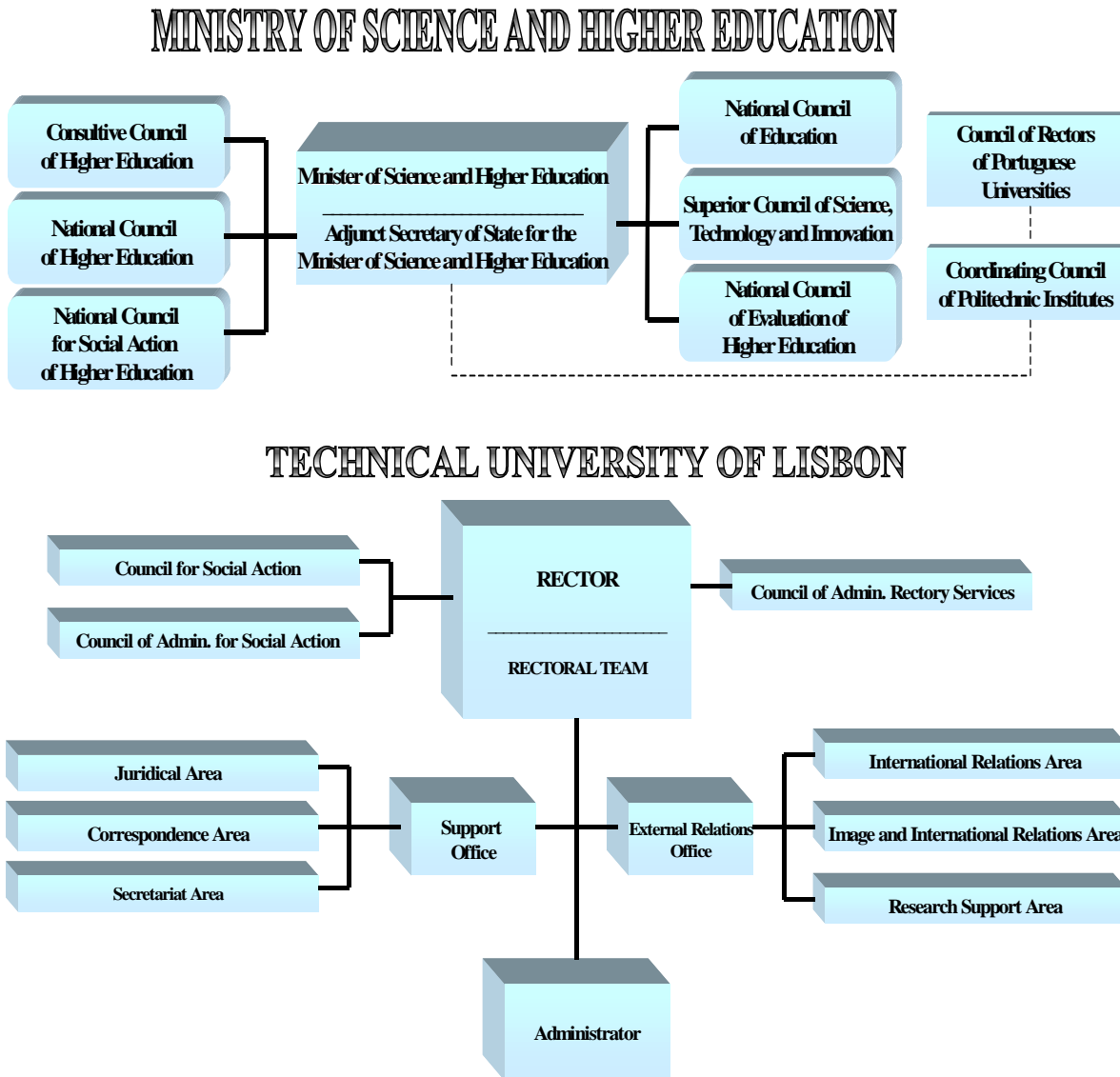
Fax nº (351) 21 7231160

e-mail: mces@mces.gov.pt

website: www.mces.gov.pt

Diagrams of the administrative structure of FMV in relation to the MCES and UTL are presented in **Figures 2.1.** and **2.2.**

Figure 2.1 - Administrative Structure of MCES and UTL



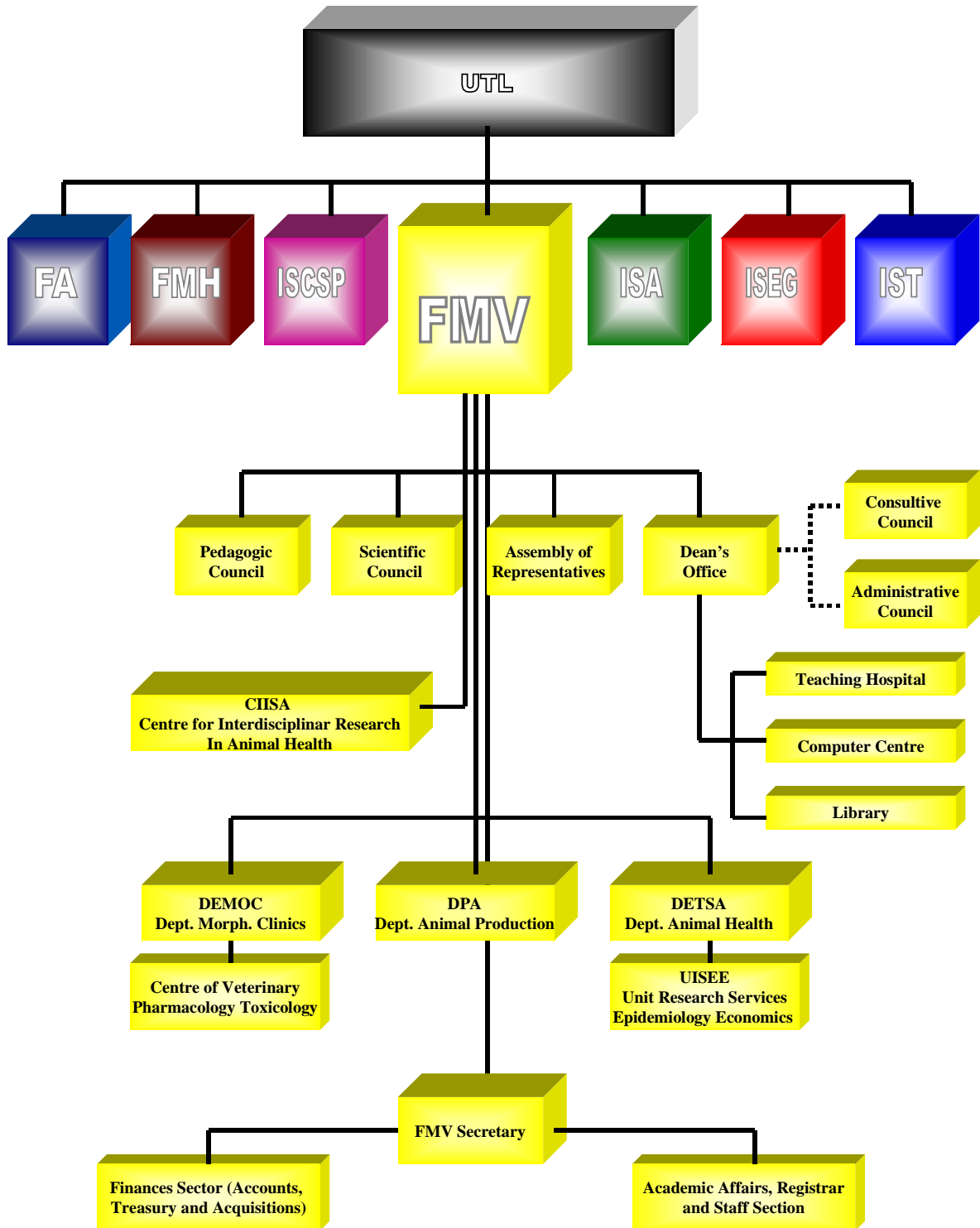
The Faculty of Veterinary Medicine is the oldest school of the Technical University of Lisbon. It has full statutory, administrative, financial, pedagogical and scientific autonomy.

Faculty Boards

The organisation of public universities and other High Education institutions are ruled by a law passed in 1976 and confirmed in 1988 (University Autonomy law) which gives a general and common framework to all university governing boards.

FMV has the following executive boards: The Assembly of Representatives, the Directive Council (Dean's Office), the Scientific Council, the Pedagogic Council and the Administrative Council. All these boards are elected and composed by representatives of teaching members, students and staff, with the exception of the Scientific Council, which is exclusively formed by Professors and the Administrative Council, which is composed by the Dean, the Faculty Secretary and the Responsible for the Financial Sector. FMV also has its own Consultive Council.

Figure 2.2 - Administrative Structure of FMV



The Assembly of Representatives is an elected body of 39 members, representing students (15), technical and administrative staff (5) and teaching staff (15) and also the Dean, the President of the Scientific Council and two Representatives of the Students Association. Representatives from each of the four different bodies are elected by their peers. Whenever there is more than one list for a given body, the Hondt method is used to calculate the number of representatives from each list. This election takes place every two years for the representatives of the

students and every three years for the representatives of teaching and non-teaching staff. Its main functions are the approval of the school statutes, the evaluation and consequent approval of the annual report of activities and the annual plan of activities for the following year, both prepared by the Dean's Office. The Assembly of Representatives is also responsible for the supervision of the activities of the Dean's Office.

Three representatives of the teaching staff, three representatives of the students and one representative of the non-teaching staff are elected by their peers to form the Dean's Office. The Dean and the Vice-Dean are the 1st and the 2nd of the teaching members in the list presented for the election. This council has to produce an annual report and to prepare the annual plan of activities and the financial budget. The Dean's Office is responsible for:

- The general management of the Faculty;
- The fulfilment of the rules and the regulations concerning the administration of the school;
- The implementation of some directives from the Scientific and Pedagogic Councils;
- The connection with the Rector, the Ministry of Science and Higher Education and all the outside authorities.

The Dean's Office has nominated several committees and support structures that assist the Dean in the execution of FMV's policies, in association with the councils and departments of the institution. It is the case of the Technical Support Team, the External Relations Office, the Bioethics Committee, the Planning Group, the Computing Affairs Committee, and the Self-Evaluation Committee.

The administrative structure of FMV is composed of a Chief Administrator, so-called the Secretary of FMV, who assists the Dean in all aspects of administration and under whom the Sector of Academic Affairs, Staff and Registrar and the Sector of Finances work. Each of these sectors has a Chief, who responds directly to the Secretary of FMV. The Sector of Staff, Students and Academic Affairs is divided in its constituting Sections and the Sector of Finances is divided in the Accountancy, Treasury and Provisions/Acquisitions Sections.

All the full time lecturers with a PhD or equivalent compose the Scientific Council. At present it has 58 members. Every 3 years, the President and the Vice-President of the Scientific Council are elected in a plenary session. The council works in plenary sessions for matters like curriculum development, departmental reorganization and the recruitment of teaching staff. For most of its activities, it works on a restricted group, the Coordination Committee. This Committee comprises the President of the Scientific Council and, as members, the Dean, the Vice-President of the Scientific Council, the President of the Pedagogic Council, the Presidents of the Departments and one representative from each Department.

The Scientific Council is responsible for the definition and implementation of teaching and scientific research strategies. It plays the leading role in

deciding on matters such as: career development, planning disciplines and courses to be taught, the approval of master and doctorate candidates.

In a straight dependence of the Scientific Council, there are several committees of professors, dealing with specific areas of responsibility of this board, and reporting directly to its Coordination Committee: the Final year curricular Training Committee, the Degree Equivalence Committee, the Socrates-Erasmus Office, the Merit Scholarship Committee and the Post-Graduation Committee.

The Pedagogic Council is elected every 3 years and is composed of 6 members, 3 teachers and 3 students. Their peers elect each of these two groups as a list. Again, if there is more than one list the Hondt method is used. The President is the 1st full time professor of the winning list. The Pedagogic Council is an advisory board that cooperates with the other Councils in the planning and current operation of the teaching duties of the Faculty. Besides this role, the Council is also actively engaged in the implementation of institutional interactions that can contribute to the quality of the teaching/learning of the different subjects in the curricula. It is also engaged in planning student voluntary interventions in animal husbandry and laboratories and extra-mural activities. Furthermore, the Pedagogic Council nominates every three years the Library and Documentation Sector Coordinating Professor.

Up to November 2003, the Faculty was divided into 3 Departments: Department of Animal Production, Department of Food Technology and Animal Health and Department of Morphology and Clinics. Every 3 years, the members of each department elect the respective President and the second representative of the department in the Coordinating Committee of the Scientific Council. Departments work in plenary sessions and have an Executive Committee of three elements responsible for routine affairs. The main responsibilities of departments are the organization of teaching and research, as well as the offer of services to the community in their respective fields of expertise.

FMV was recently restructured in four departments, more balanced and adequate to the functioning of the teaching and research activities in their areas of influence: Department of Morphology and Function, Department of Animal Production and Food Safety, Department of Animal Health and Department of Clinics.

In Tables 2.1 and 2.2. is shown how FMV permanent teaching staff is distributed before and after departmental restructure.

Table 2.1 – Faculty of Veterinary Medicine (2002-2003)

Departmental Organization in 2002-2003

DEMOC (Departamento de Morfologia e Clínica - Department of Clinics and Morphology)

Head: Prof. E. Marques Fontes

DE TSA (Departamento de Sanidade Animal - Department of Animal Health)

Head: Prof. Armando Louzã

DPA (Departamento de Produção Animal - Department of Animal Production)

Head: Prof. Tito Fernandes

Depart.	Subjects	Teaching staff
DEMOC	Pharmacology and Toxicology	A Jorge Silva (<i>Full Prof.</i>) E Marques Fontes (<i>Full Prof.</i>) Anabela Moreira (<i>Assist. Prof.</i>) Berta São Braz (<i>Assist.</i>)
	Anatomy	Graça Pires (<i>Assist. Prof.</i>) João Afonso (<i>Assist. Prof.</i>) Júlio Cavaco Faisca (<i>Assist. Prof.</i>) Luísa Jorge (<i>Assist.</i>) Fernando Ferreira (<i>Assist.</i>)
	Histology and Pathology	Maria Lucília Ferreira (<i>Full Prof.</i>) Conceição Peleteiro (<i>Full Prof.</i>) Fernando Garcia e Costa (<i>Assoc. Prof.</i>) José Ferreira da Silva (<i>Assist. Prof.</i>) Mário Pinho (<i>Assist. Prof.</i>) Fernando Afonso (<i>Assist. Prof.</i>) Jorge Correia (<i>Assist.</i>)
	Parasitology	Isabel Fazendeiro (<i>Full Prof.</i>) José Meireles (<i>Assist. Prof.</i>) Luís Carvalho (<i>Assist. Prof.</i>) Isabel Fonseca (<i>Assist. Prof.</i>)
	Clinics	J H Duarte Correia (<i>Assoc. Prof.</i>) M Saraiva Lima (<i>Assoc. Prof.</i>) M Manuela Rodeia (<i>Assist. Prof.</i>) Armando Serrão (<i>Assist. Prof.</i>) Teresa Villa de Brito (<i>Assist. Prof.</i>) M Constança Féria (<i>Assist. Prof.</i>) Paula Tilley (<i>Assist.</i>) George Stilwell (<i>Assist.</i>) Nuno Felix (<i>Assist.</i>)
	Surgery	A Limão de Oliveira (<i>Full Prof.</i>) Pedro Alcântara (<i>Full Prof.</i>) António Ferreira (<i>Assoc. Prof.</i>) J. Sales Luís (<i>Assoc. Prof.</i>) José Limão Oliveira (<i>Assist. Prof.</i>) Sandra Jesus (<i>Assist.</i>) Esmeralda Delgado (<i>Assist.</i>) Miguel Carreira (<i>Assist.</i>)
	Reproduction and Obstetrics	J Robalo Silva (<i>Full Prof.</i>) Luís Costa (<i>Assoc. Prof.</i>) Luísa Mateus (<i>Assist. Prof.</i>)
DE TSA	Biochemistry	José Prates (<i>Assist. Prof.</i>) José Dias Correia (<i>Assist. Prof.</i>) Mário Quaresma (<i>Assist. Prof.</i>)
	Microbiology and Immunology	Luís Tavares (<i>Full Prof.</i>) Ana Cristina Vilela (<i>Assoc. Prof.</i>) Ana Duarte (<i>Assist. Prof.</i>)

DE TSA (cont.)	Infectious Diseases	Carlos Martins (<i>Assoc. Prof.</i>) Virgílio Almeida (<i>Assoc. Prof.</i>) Fernando Boinas (<i>Assist. Prof.</i>)
	Sanitary Inspection	Fernando Bernardo (<i>Assoc. Prof.</i>) Gabriela Veloso (<i>Assist. Prof.</i>) Miguel Cardo (<i>Assist.</i>)
	Technology of Animal Products	António Barreto (<i>Assoc. Prof.</i>) Marília Ferreira (<i>Assist. Prof.</i>) Maria João Fraqueza (<i>Assist.</i>)
	Veterinary Public Health	Armando Louzã (<i>Full Prof.</i>) Yolanda Vaz (<i>Assist. Prof.</i>)
	Bio-statistics, computers, and documentation	Isabel Neto Fonseca (<i>Assist. Prof.</i>)
DPA	Vegetal Biology, Agriculture and Environment, Nutrition and Feeding	Luís Ferreira (<i>Full Prof.</i>) Tito Fernandes (<i>Full Prof.</i>) Carlos Andrade Fontes (<i>Assist. Prof.</i>) José Pedro Lemos (<i>Assist. Prof.</i>)
	Genetics and Animal Breeding	Jorge Antunes Correia (<i>Full Prof.</i>) Vitor Alves (<i>Assist. Prof.</i>)
	Physiology	Hugo Gil Ferreira (<i>Full Prof.</i>) Graça Ferreira Dias (<i>Assoc. Prof.</i>) António Baptista (<i>Assist. Prof.</i>) António Freitas Duarte (<i>Assist. Prof.</i>)
	Zootechny and Animal Production	Rui Caldeira (<i>Assoc. Prof.</i>) Marina Fraústo da Silva (<i>Assist. Prof.</i>)
	Economics	Francisco Avillez (<i>Full Prof.</i>) Magda Aguiar (<i>Assist. Prof.</i>)
	Animal Behaviour and Welfare	Ilda Rosa (<i>Assist. Prof.</i>)

Table 2.2 – Faculty of Veterinary Medicine (2003-2004)

Departmental Organization in 2003-2004

DMF (Departamento de Morfologia e Função - Department of Morphology and Function)

Head: Prof. J. Antunes Correia

DSA (Departamento de Sanidade Animal - Department of Animal Health)

Head: Prof^a. Isabel Fazendeiro

DC (Departamento de Clínica - Department of Clinics)

Head: Prof. E. Marques Fontes

DPASA (Departamento de Produção Animal e Segurança Alimentar - Department of Animal Production and Food Safety)

Head: Prof. Tito Fernandes

Depart.	Subjects	Teaching staff
DMF	Anatomy	Graça Pires (<i>Assist. Prof.</i>) João Afonso (<i>Assist. Prof.</i>) Júlio Cavaco Faisca (<i>Assist. Prof.</i>) Luísa Jorge (<i>Assist.</i>) Fernando Ferreira (<i>Assist.</i>)
	Histology	Fernando Garcia e Costa (<i>Assoc. Prof.</i>) José Ferreira da Silva (<i>Assist. Prof.</i>) Mário Pinho (<i>Assist. Prof.</i>)
	Biochemistry	José Prates (<i>Assist. Prof.</i>) José Dias Correia (<i>Assist. Prof.</i>) Mário Quaresma (<i>Assist. Prof.</i>)

DMF (cont.)	Physiology	Graça Ferreira Dias (<i>Assoc. Prof.</i>) António Baptista (<i>Assist. Prof.</i>) António Freitas Duarte (<i>Assist. Prof.</i>)
	Genetics	Jorge Antunes Correia (<i>Full Prof.</i>)
DSA	Bio-statistics, computers, and documentation	Isabel Neto Fonseca (<i>Assist. Prof.</i>)
	Microbiology and Immunology	Luís Tavares (<i>Full Prof.</i>) Ana Cristina Vilela (<i>Assoc. Prof.</i>) Ana Duarte (<i>Assist. Prof.</i>)
	Parasitology	Isabel Fazendeiro (<i>Full Prof.</i>) José Meireles (<i>Assist. Prof.</i>) Luís Carvalho (<i>Assist. Prof.</i>) Isabel Fonseca (<i>Assist. Prof.</i>)
	Pathology	Maria Lucília Ferreira (<i>Full Prof.</i>) Conceição Peleteiro (<i>Full Prof.</i>) Fernando Afonso (<i>Assist. Prof.</i>) Jorge Correia (<i>Assist.</i>)
	Infectious Diseases	Carlos Martins (<i>Assoc. Prof.</i>) Virgílio Almeida (<i>Assoc. Prof.</i>) Fernando Boinas (<i>Assist. Prof.</i>)
DC	Pharmacology and Toxicology	A Jorge Silva (<i>Full Prof.</i>) E Marques Fontes (<i>Full Prof.</i>) Anabela Moreira (<i>Assist. Prof.</i>) Berta São Braz (<i>Assist.</i>)
	Clinics	J H Duarte Correia (<i>Assoc. Prof.</i>) M Saraiva Lima (<i>Assoc. Prof.</i>) M Manuela Rodeia (<i>Assist. Prof.</i>) Armando Serrão (<i>Assist. Prof.</i>) Teresa Villa de Brito (<i>Assist. Prof.</i>) M Constança Féria (<i>Assist. Prof.</i>) Paula Tilley (<i>Assist.</i>) George Stilwell (<i>Assist.</i>) Nuno Felix (<i>Assist.</i>)
	Surgery	A Limão de Oliveira (<i>Full Prof.</i>) Pedro Alcântara (<i>Full Prof.</i>) António Ferreira (<i>Assoc. Prof.</i>) J. Sales Luís (<i>Assoc. Prof.</i>) José Limão Oliveira (<i>Assist. Prof.</i>) Sandra Jesus (<i>Assist.</i>) Esmeralda Delgado (<i>Assist.</i>) Miguel Carreira (<i>Assist.</i>)
	Reproduction and Obstetrics	J Robalo Silva (<i>Full Prof.</i>) Luís Costa (<i>Assoc. Prof.</i>) Luísa Mateus (<i>Assist. Prof.</i>)
DPASA	Sanitary Inspection	Fernando Bernardo (<i>Assoc. Prof.</i>) Gabriela Veloso (<i>Assist. Prof.</i>) Miguel Cardo (<i>Assist.</i>)
	Technology of Animal Products	António Barreto (<i>Assoc. Prof.</i>) Marília Ferreira (<i>Assist. Prof.</i>) Maria João Fraqueza (<i>Assist.</i>)
	Veterinary Public Health	Armando Louzã (<i>Full Prof.</i>) Yolanda Vaz (<i>Assist. Prof.</i>)
	Vegetal Biology, Agriculture and Environment, Nutrition and Feeding	Luís Ferreira (<i>Full Prof.</i>) Tito Fernandes (<i>Full Prof.</i>) Carlos Andrade Fontes (<i>Assist. Prof.</i>)

DPASA (cont.)		José Pedro Lemos (<i>Assist. Prof.</i>)
	Animal Breeding	Vítor Alves (<i>Assist. Prof.</i>)
	Zootechny and Animal Production	Rui Caldeira (<i>Assoc. Prof.</i>) Marina Fraústo da Silva (<i>Assist. Prof.</i>)
	Economics	Francisco Avillez (<i>Full Prof.</i>) Magda Aguiar (<i>Assist. Prof.</i>)
	Animal Behaviour and Welfare	Ilda Rosa (<i>Assist. Prof.</i>)

The Consultive Council assumes the interface between the public and the Faculty. Informal contacts between the members of different Councils and representatives of Veterinary Profession, official veterinary services, industry, and animal production occur frequently, allowing for a good perception of extra-mural reality. Representatives of all sectors of veterinary activity compose the Consultive Council. They are asked to give their opinion on matters such as the future competencies of the veterinary graduates and the curriculum development.

There are regular meetings (3 to 4 per year) between the five veterinary courses of the country and the OMV (Portuguese Veterinary Chamber) for exchange of ideas about veterinary teaching and professional needs.

Students Association

The Students Union of the Faculty of Veterinary Medicine (Associação de Estudantes da Faculdade de Medicina Veterinária - AEFMV) is a non-profitable organization, independent from all FMV boards or any other organization. AEFMV is the oldest students association in Lisbon Universities and was founded 93 years ago, as a means of gathering students opinions and with the purpose of making their needs heard. Its goals are to promote the unification of its members, to organize events in a wide range of areas, from sports to science and culture. The association's main role is to be an interface both between the students and the Faculty Councils and between students and professional organizations.

FMV supports AEFMV through financial grants (5,000 € in 2003, although much higher in the past), provision of free transportation for events and use of the Auditorium and other facilities for courses and symposia. Furthermore, the Dean's Office supports the costs of maintenance of the two Catering and Cafeteria units run by AEFMV.

In its history, AEFMV has learnt to cooperate with the different veterinary organizations and nowadays it is one of the most active voices within the veterinary profession. Once a year, AEFMV organizes an annual symposium, which is a ground for graduated professionals and students to find new ways to enhance their knowledge, since the subjects changes every year, giving this event a timeliness that

increases its interest. Apart from the annual symposium, various other activities organized by AEFMV take place, such as:

- Workshops and one-day conferences by well known speakers, sometimes with the sponsorship of companies related to the veterinary field.
- Cultural activities.
- Edition of AEFMV's own scientific magazine (*Revista de Medicina Veterinária*), twice a year, which has the support of the nacional Science and Technology Foundation (FCT).

AEFMV is a founder member of the National Association of Veterinary Students, which gathers all veterinary students associations in Portugal. AEFMV is also a member of the International Veterinary Students Association.

Social Services

The UTL Social Services Department (SAS) serves the entire University and strives to assist students, some of them foreign, mainly by providing accommodation, meals and financial support. Some faculties have SAS catering units, where meals are served at very low prices. Some students are eligible for grants and loans provided by SAS. Room availability at the SAS is rather limited – about 540 beds for the total of UTL students – but efforts are being made to expand the quantity and quality of all the services provided.

In the case of FMV building, there is no SAS catering unit but meals at a low price are provided by the Catering and Cafeteria units, allocated to AEFMV. However, the main catering unit of UTL of the Alto da Ajuda university campus is located very close to FMV.

2. COMMENTS

The above described organisational structure is heavy but assures a truly democratic ruling of the institution, because each of the elements of the system can collaborate and intervene in the management of the school. It also creates a sense of

responsibility in the construction and development of the objectives of the institution and allows full interaction between its constituting bodies: teachers, non-teaching staff and students.

Conversely, it could be argued that a simplification of the administrative structure of Higher Education institutions could turn decision-making more efficacious and changes in the system more agile and effective. In fact, the faculty boards, elected every three years, are sustained by professors and academics, which are not specifically trained for administrative tasks and their political, legal and financial intricacies.

Deans, Presidents of Councils and Heads of Departments are not professionals in public administration, although they are very knowledgeable of the specificities of their institutions and the Degrees provided by them, as well as of the trends in their respective professional fields and areas of knowledge, which opens a comfortable space for graduate profile-oriented management.

The continuity of the executive actions is assured by career administrative staff, through the valuable collaboration of the Secretary of the Faculty, but it is, nevertheless, a complex and difficult situation. These facts and their pros and cons are under discussion in Portugal. The necessity for a more professional management of Higher Education establishments is gaining increasing support. As decisions will, most probably, be made at the national level, the recent FMV Statutes revision, has not made substantial changes to the traditional organization system described above.

3. SUGGESTIONS

Formal institutional organisation of Portuguese public universities should be revised to allow for a more professional and efficacious decision-making process.

The introduction to FMV and UTL of a software specifically designed for financial, personnel and patrimonial management (POC-ED) will allow substantial improvements in organization and availability of information, leading to a higher efficacy in the management of the faculty.

The implementation of another management tool, the SIPE system, will also allow for updated information on financial and human resources, as well as data on the students throughout UTL.

The present organisation, diluting responsibilities among different boards, shows some constraints to promote the levels of excellence in need to answer present and future profession challenges.

Chapter 3 - FINANCES

1. FACTUAL INFORMATION

Although according to the Law of University Autonomy and by the statutes of FMV, the institution has full financial autonomy, there are several constraints to the exercise of this autonomy, imposed by the Ministry of Science and Higher Education (MCES). In fact, FMV depends on the annual budget allowance of MCES in 66% of its financial needs.

This budget is calculated through a complex formula, based mainly on two factors: the standard teacher:student ratio assumed by MCES as appropriate for each type of degree and the standard costs of training per undergraduate student, also for each type of degree. A small extra allowance is provided according to the number of MSc students enrolled (but not for PhD or Post-Doctoral students) and there is also a benefit proportional to the number of teaching staff with a doctorate degree. The allowance for non-teaching staff salaries is also based in the standard ratio assumed by MCES as appropriate for each type of degree.

Furthermore, the wages of teaching and non-teaching staff are annually determined by the government. Minimum and maximum registration fees for undergraduate students are also annually announced by the MCES. The registration fees for postgraduate degrees (MSc and PhD) are determined by the University Senate. Continuing Education fees are determined by FMV alone.

The indicators assumed by MCES for the budget allowance for Veterinary Medicine for 2004 are as follows: the standard cost per graduating student per year is 6,627.00 Euro; the standard teacher/student ratio is 1/9 and the non-teaching staff/teaching staff ratio is 0.85:1. As a basis for comparison, it is interesting to notice that the teacher/student ratio for Medical Schools is 1/6, as well as for Performing Arts; for Engineering Sciences it is 1/11, the same for Agriculture. Political Sciences degrees have a ratio of 1/20. As for the non-teaching staff/teaching staff ratio, Veterinary Medicine has the highest standard ratio of all degrees, the same as Medical Schools and Agriculture Schools. Within the UTL, FMV has the highest standard cost per graduating student. This is 5.443,00 Euro for Agriculture degrees, 4.091,00 Euro

for Political Sciences and 4.060,00 Euro for Computer Engineering. The percentage of FMV's teaching staff with a doctoral degree is of 82%, the second highest within UTL: 87% for the Institute of Agriculture and Forestry and 75% for the Institute of Engineering.

It is immediately noticeable that the ratios assumed by MCES for Veterinary Medicine are not the same advocated by EAEVE: 1/9 and 1/≤7,5 respectively, for teacher/student ratio and 1/0,85 and 1/≥1 respectively, for teacher/support staff ratio.

Besides the funding originating from MCES, FMV has its own revenues, originating from three main sources: registration fees from undergraduate and postgraduate students, research grants and revenues from clinical, diagnostic and other services provided to the community. FMV retains these revenues in full; no part of these is shared with other bodies. According to the regulations, Faculties may hire non-teaching staff in excess of the MCES's standard allowance, provided that they support these salaries with their own generated funds. This does not apply to teaching staff.

The Dean's Office fixes the overheads to be charged from research projects carried out in FMV, generally between 10 to 20 % of the total amount of the project.

The funding from the government is allocated in 1/12 fractions every month, mainly to face staff salaries, and the budget is kept in the possession of the Government's Treasury. FMV cannot, therefore, keep resources available (in a bank account) to face any structural investments at anytime, except for those generated directly from its services and registration fees. This means that planning ahead and spending in critical situations can always impair the payment of salaries, which is a situation always avoided by any institution's management.

3.1: EXPENDITURE

The Dean's Office allocates funding directly; due to the size of the institution, there is no budgeting distribution to Departments or other organic units of the Faculty. The Administrative Council makes decisions on expenses.

Table 3.1 - Annual expenditure of the establishment

Calendar year		2003			
				Euro	%
a. Personnel					
a.1	teaching staff	63.7%		3 151 801	41.8
a.2	support staff	29.6%		1 464 723	19.4
a.3	research staff	6.7%		328 249	4.3
		100.0%	Total for a.	4 944 773	65.5
b. Operating costs					
b.1	utilities	17.1%		430 655	
b.2	expenditure relating specifically to teaching	15.3%		385 063	
b.4	general operations (excluding b1, b2 and b3)	34.3%		866 401	
	b.1+b.2+b.4	66.7%		1 682 119	22.3
b.3	expenditure relating specifically to research	33.3%		842 442	11.2
		100.0%	Total for b.	2 524 561	33.5
c. Equipment					
c.1	teaching	42%		20 497	0.3
c.2	research	58%		38 533	0.5
c.3	general (or common) equipment	0%		0	0.0
			Total for c.	59 030	0.8
d. Maintenance of buildings				15 600	0.2
e. Total expenditure				7 543 964	100.0

Annual direct cost of training a student = 8 963 Euro

The numerator comprises:

a 1 - salaries of teaching personnel	3 151 801
a 2 - salaries of support staff	1 464 723
b1+b2+b4 - operating costs relating to teaching	1 682 119
c 1 - equipment relating to teaching	<u>20 497</u>
	6 319 140

$$\text{Cost} = \frac{a1 + a2 + (b1 + b2 + b4) + c1}{\text{Number of students in undergraduate training}} = \frac{6\,319\,140}{705^*} = 8\,963 \text{ Euro}$$

* 30 ERASMUS students are not included

Direct cost of training for a diploma = 61 847 Euro

This cost was obtained by multiplying the direct annual cost of training a student, by the average number of years of training for a student, which was 6.9 years (2002/03).

3.2: REVENUES

Table 3.2 - Annual revenues of the establishment

Calendar year - 2003		
	Euro	%
a. revenue from the State or public authorities	5 008 921	66.1
b. revenue from private bodies	0	0
c. revenue from research	1 220 744	16.1
d. revenue earned and retained by the establishment	1 122 764	14.8
d.1. registration fees from students	381 471	
d.2. revenue from continuing education	45 288	
d.3. revenue from clinical activities	564 330	
d.4. revenue from diagnostic activities	131 675	
e. revenue from other sources	221 744	3.0
e.1 financial applications (interests)	5 676	
e.2 rentals of space and equipment	42 059	
e.3 other	174 009	
f. Total revenue from all sources	7 574 173	100.0

Table 3.3 - Changes in public funding

Year	2003	2002	2001	2000	1999
Revenue (€)	5 008 921	4 922 361	4 811 614	4 508 290	4 295 598
Var. %	2003/2002	2002/2001	2001/2000	2000/1999	
	1.76	2.30	6.73	4.95	

2. COMMENTS

Although the physical reality of FMV has changed drastically with the move from Gomes Freire to the premises in Alto da Ajuda in the end of 1999, no significant reinforcement of the budget allowance from MCES was done. In fact, the costs of utilities, equipment and staff have raised considerably in the new facilities. FMV management had predicted the increase of the costs of utilities, security, cleaning and waste management. It was also understood that, a substantial investment had to be done in staff,

medical, surgical and diagnostic equipment in order to take full advantage of the new teaching hospital and clinical facilities. The necessary applications and requests to the University and the Ministry were done in advance. A significant amount of savings from self-revenues from previous years was also put aside, in order to buffer the first and most critical impacts of the moving process. Therefore, FMV had resources available to face the immediate installation in Alto da

Ajuda, but the much-needed reinforcement never happened.

The evolution of the financial life of FMV thereafter can be resumed to the following:

- The increasing number of research grants and the pluriannual funding from FCT to the research centre CIISA, the increase and diversification in clinical, analytical and expert services provided by FMV to society, resulted in a significant increase in revenues earned and retained by FMV in the last few years (up to 70% increase).
- Unfortunately, most of these revenues had to be allocated to the maintenance of the services provided, through minor equipment, reagents and consumables acquisitions. Besides this, support and technical, as well as clinical staff, had to be hired and their wages supported by the revenues generated from their own activities. This inevitable fact, evident when considering that almost 50% of the non-teaching staff is contracted and supported this way, putting an unbearable weight in the finances of FMV. This weight is not directly evident from the accountancy tables of FMV, because they have an entry in b4. general operations (Table 3.1) in the amount of 866 401 € and not in the “personnel costs”, because most of them are hired through a University owned private company.
- In the academic year 2003-2004, there was an increase in the total of FMV revenues as a consequence of an official change of the amount of students registration fee (852 Euro – maximum allowed). However, such increase still does not match the FMV present financial constraints.

There is no way around this state of affairs, since rules are very tightly implemented by the government. FMV has been applying to MSHE for special funding through “Programme-contracts”, with no results so

far. FMV has been trying to convince the government to change the two main factors that impoverish the Ministry funding of Veterinary Medicine Degrees: standard ratios (teacher:student and teacher:support staff) and standard costs per student graduating. The level of sensibility for these critical points is very low, both within UTL (perhaps because there is no Medical degree in this University) and in the Ministry.

May the future bring, if not the desired official change in the standard ratios and costs per student (that are actually directly intertwined), at least a positive approach to these critical indicators for Veterinary Education. Otherwise, the dynamics of development and trailing of the path towards excellence of FMV will be dramatically impaired in the next few years, compromising the institution’s goals for the future.

3. SUGGESTIONS

Veterinary Medicine education should be regarded as an area where excellence is an attractive investment to improve the performance of FMV’s graduates in animal welfare, animal production and in public health.

Convince MCES and other university authorities that FMV must comply with satisfactory European standard ratios and urgently needs support to bring teacher:student ratio to $\leq 1:7.5$ level.

Allow for FMV budget to bring teaching staff:support staff ratio to 1:1 level.

Convince MCES that FMV operating costs in the new Alto da Ajuda building are considerably higher than in the old building, and that it will have to supply the necessary funding for an adequate operation.

Chapter 4 - CURRICULUM

1. FACTUAL INFORMATION

Veterinary studies at FMV comprise 5 years of intramural training followed by four to six months of practical work in extramural establishments. The course is structured in 11 semesters of about 14 weeks each. Almost all subjects are taught in theoretical and practical classes. Theoretical classes last for one hour and practical for two to four hours, depending on the subject. Some courses have longer practical classes. Before each academic year, the Pedagogic Council establishes the year-calendar, the examination periods, the subject examination dates, and edits a booklet with the subjects syllabus and the rules to be followed.

The first 3 years are devoted to basic and pre-clinical subjects. The subsequent two years cover the applied and professional areas of clinical sciences, animal health and animal production and veterinary public health

The time allocated to theoretical and practical teaching is summarised in Tables 4.1. to 4.9 on the following pages.

The ratio of theoretical training to practical and clinical training in the course is about: 1:1.72.

The ratio of clinical training to theoretical and practical training in the course is about: 1:3.97 because, as it is shown in Table 4.1. and Table 4.12, 79% of final year students choose to be trained with a practitioner.

The curriculum is proposed by the Scientific Council, which has to consult the Pedagogic Council and the Consultive Council. Major modifications in the curriculum have to be approved by the University Senate. Minor modifications (less than 10% of the total number of credits or subjects) are dependent only on the Scientific Council.

The present curriculum was implemented in 1984 with minor up-dates later on.

4.1: CURRICULUM FOLLOWED BY ALL STUDENTS

Table 4.1 - General table of curriculum hours taken by all students

	Hours of training					Total
	Lectures	Practical work	Supervised work	Clinical work	Other*	
First year	246	291	10	0	0	547
Second year	365	360	46	0	0	771
Third year	379	318	6	64	0	767
Fourth year	331	156	59	98	0	644
Fifth year	403	145	54	151	0	753
Sixth year**		139		521		660
Total	1724	1409	175	834	0	4142

*Field visits and seminars

** Average hours performed by students in final curricular training

Table 4.2 - Curriculum hours by courses taken by every student

Year	Code	Course	Hours in course				Work Load	Total	ECTS
			Lectures	Practical Work	Supervised Work	Clinical Work			
1	1001	Anatomy I (part 1)	28	56			70	154	8
	1002	Anatomy I (part 2)	28	56			70	154	8
	1003	Histology	56	56			90	202	11
	1004	Biomathematics and Computing	28	28			70	126	7
	1005	Biophysics	28	18	10		56	112	6
	1006	Introduction to Biochemistry	28	28			56	112	6
	1007	General Agriculture	22	27			70	119	7
	1008	External Morphology	28	22			70	120	7
2	2001	Anatomy II	56	56	28		108	248	9
	2002	Physiology	84	58			106	248	10
	2003	Biochemistry	56	56			126	238	9
	2004	General Pathology	56	56			125	237	9
	2005	Genetics	56	56	8		108	228	9
	2006	Nutrition and Animal Feeding	28	50	6		90	174	7
	2007	Animal Behaviour	29	28	4		85	146	7
3	3001	Medical Semiology	54	30	6	30	105	225	9
	3002	Pathological Anatomy	56	84		3	110	253	10
	3003	Pharmacology and Therapeutics	84	42		14	110	250	10
	3004	Microbiology and Immunology	51	53			110	214	10
	3005	Parasitology	56	84			105	245	10
	3006	Surgical Semiology	50	21			65	136	6
	3007	Anesthesiology and Surgical Techniques	28	4		17	60	109	5
4	4001	Medical Pathology	56		16		155	227	9
	4002	Surgical Pathology	56	10		30	135	231	9
	4003	Infectious Diseases	84	36	20	10	135	285	10
	4004	Parasitic Diseases	56	28		28	140	252	10
	4005	Andrology, Gynaecology and Obstetrics	28	6		30	65	129	7
	4006	Reproduction and Artificial Insemination	28	40			75	143	7
	4007	Toxicology	23	36	23		85	167	8
5	5001	Food Inspection	55	30	5		120	210	10
	5002	Animal Husbandry and Production	96	16			130	242	10
	5003	Technology of Animal Products	56	56			130	242	10
	5004	Clinical Radiology	28	5		15	56	104	4
	5005	Large Animal Clinics	56		9	64	88	217	7
	5006	Economy	28	28			56	112	4
	5007	Small Animal Clinics	56		8	72	80	216	8
	5008	Veterinary Public Health	14	10	18		60	102	4
	5009	Sociology, History of Veterinary Medicine and Ethics	14		14		40	68	3
6		Final Curricular Training		139		521	300	960	30
Total			1724	1409	175	834	3815	7957	330

Table 4.3 - Yearly curriculum studies: First year

Subject	Hours in course					Total
	Lectures	Practical Work	Supervised Work	Clinical Work	Other	
A. Basic subjects						
Anatomy (incl. histology and embryology)	126	178				304
Biochemistry and molecular biology	28	28				56
Biology (incl. cell biology)						0
Biophysics	28	18	10			56
Biostatistics	28	28				56
Chemistry						0
Epidemiology						0
Genetics	5	6				11
Immunology						0
Microbiology						0
Parasitology						0
Pathological anatomy (macroscopic & microscopic)						0
Pharmacy						0
Pharmacology						0
Physiology						0
Physiopathology						0
Scientific and technical information and documentation methods						0
Toxicology (incl. environmental pollution)						0
B. Animal Production						
Agronomy	18	27				45
Animal behavior (incl. behavioural disorders)						0
Animal husbandry (incl. livestock production systems)	4					4
Animal nutrition and feeding						0
Animal protection and welfare						0
Environmental protection	3					3
Preventive veterinary medicine (incl. health monitoring programmes)						0
Reproduction (incl. artificial breeding methods)						0
Rural economics	1					1
C. Clinical subjects						
Anaesthetics						0
Clinical examination and diagnosis and laboratory diagnostic methods						0
Clinical medicine						0
Diagnostic imaging						0
Obstetrics						0
Reproductive disorders						0
State veterinary medicine, zoonoses, public health and forensic medicine						0
Surgery						0
Therapeutics						0
D. Food Hygiene						
Certification of food production units						0
Food certification						0
Food hygiene and food quality (incl. legislation)						0
Food inspection, particularly food of animal origin						0
Food science and technology						0
E. Professional knowledge						
Practice management	3	6				9
Professional ethics						0
Veterinary certification and report writing						0
Veterinary legislation	2					2
Total	246	291	10	0	0	547

Table 4.4 - Yearly curriculum studies: Second year

Subject	Hours in course					Total
	Lectures	Practical Work	Supervised Work	Clinical Work	Other	
A. Basic subjects						
Anatomy (incl. histology and embryology)	64	62	28			154
Biochemistry and molecular biology	64	58				122
Biology (incl. cell biology)	3					3
Biophysics						0
Biostatistics						0
Chemistry						0
Epidemiology						0
Genetics	56	56	8			120
Immunology	5					5
Microbiology						0
Parasitology						0
Pathological anatomy (macroscopic & microscopic)	20	54				74
Pharmacy						0
Pharmacology						0
Physiology	70	44				114
Physiopathology	27	6				33
Scientific and technical information and documentation methods		2				2
Toxicology (incl. environmental pollution)						0
B. Animal Production						
Agronomy						0
Animal behavior (incl. behavioural disorders)	12	7	2			21
Animal husbandry (incl. livestock production systems)	2	10				12
Animal nutrition and feeding	29	52				81
Animal protection and welfare	10	8	2			20
Environmental protection	1					1
Preventive veterinary medicine (incl. health monitoring programmes)	1	1				2
Reproduction (incl. artificial breeding methods)	1					1
Rural economics						0
C. Clinical subjects						
Anaesthetics						0
Clinical examination and diagnosis and laboratory diagnostic methods						0
Clinical medicine						0
Diagnostic imaging						0
Obstetrics						0
Reproductive disorders						0
State veterinary medicine, zoonoses, public health and forensic medicine						0
Surgery						0
Therapeutics						0
D. Food Hygiene						
Certification of food production units						0
Food certification						0
Food hygiene and food quality (incl. legislation)						0
Food inspection, particularly food of animal origin						0
Food science and technology						0
E. Professional knowledge						
Practice management			3			3
Professional ethics			3			3
Veterinary certification and report writing						0
Veterinary legislation						0
Total	365	360	46	0	0	771

Table 4.5 - Yearly curriculum studies: Third year

Subject	Hours in course					
	Lectures	Practical Work	Supervised Work	Clinical Work	Other	Total
A. Basic subjects						
Anatomy (incl. histology and embryology)						0
Biochemistry and molecular biology						0
Biology (incl. cell biology)						0
Biophysics						0
Biostatistics						0
Chemistry						0
Epidemiology						0
Genetics						0
Immunology	16	13				29
Microbiology	35	40				75
Parasitology	56	84				140
Pathological anatomy (macroscopic & microscopic)	56	84		3		143
Pharmacy	4	8				12
Pharmacology	54	26				80
Physiology						0
Physiopathology	24					24
Scientific and technical information and documentation methods						0
Toxicology (incl. environmental pollution)						0
B. Animal Production						
Agronomy						0
Animal behavior (incl. behavioural disorders)						0
Animal husbandry (incl. livestock production systems)						0
Animal nutrition and feeding						0
Animal protection and welfare						0
Environmental protection						0
Preventive veterinary medicine (incl. health monitoring programmes)						0
Reproduction (incl. artificial breeding methods)						0
Rural economics						0
C. Clinical subjects						
Anaesthetics	28	4		17		49
Clinical examination and diagnosis and laboratory diagnostic methods	30	30	6	30		96
Clinical medicine						0
Diagnostic imaging						0
Obstetrics						0
Reproductive disorders						0
State veterinary medicine, zoonoses, public health and forensic medicine						0
Surgery	50	21				71
Therapeutics	21	2		14		37
D. Food Hygiene						
Certification of food production units						0
Food certification						0
Food hygiene and food quality (incl. legislation)						0
Food inspection, particularly food of animal origin						0
Food science and technology						0
E. Professional knowledge						
Practice management						0
Professional ethics	1	4				5
Veterinary certification and report writing						0
Veterinary legislation	4	2				6
Total	379	318	6	64	0	767

Table 4.6 - Yearly curriculum studies: Fourth year

Subject	Hours in course					Total
	Lectures	Practical Work	Supervised Work	Clinical Work	Other	
A. Basic subjects						
Anatomy (incl. histology and embryology)						0
Biochemistry and molecular biology						0
Biology (incl. cell biology)						0
Biophysics						0
Biostatistics		1	1			2
Chemistry		1				1
Epidemiology	28	6	9			43
Genetics	1					1
Immunology	12	2				14
Microbiology	3					3
Parasitology	5	5				10
Pathological anatomy (macroscopic & microscopic)	10	10				20
Pharmacy						0
Pharmacology	1					1
Physiology						0
Physiopathology	10		1			11
Scientific and technical information and documentation methods		1	1			2
Toxicology (incl. environmental pollution)	7	20	14			41
B. Animal Production						
Agronomy						0
Animal behavior (incl. behavioural disorders)						0
Animal husbandry (incl. livestock production systems)						0
Animal nutrition and feeding						0
Animal protection and welfare		1				1
Environmental protection	2	1	1			4
Preventive veterinary medicine (incl. health monitoring programmes)	13	1	8			22
Reproduction (incl. artificial breeding methods)	28	40				68
Rural economics		1				1
C. Clinical subjects						
Anaesthetics						0
Clinical examination and diagnosis and laboratory diagnostic methods	17	39	4	10		70
Clinical medicine	64		16	8		88
Diagnostic imaging						0
Obstetrics	12	2		16		30
Reproductive disorders	16	4		14		34
State veterinary medicine, zoonoses, public health and forensic medicine	13	3		10		26
Surgery	56	10		30		96
Therapeutics	31	3		10		44
D. Food Hygiene						
Certification of food production units						0
Food certification						0
Food hygiene and food quality (incl. legislation)						0
Food inspection, particularly food of animal origin	1	1	1			3
Food science and technology						0
E. Professional knowledge						
Practice management						0
Professional ethics		1				1
Veterinary certification and report writing		2	1			3
Veterinary legislation	1	1	2			4
Total	331	156	59	98	0	644

Table 4.7 - Yearly curriculum studies: Fifth year

Subject	Hours in course					Total
	Lectures	Practical Work	Supervised Work	Clinical Work	Other	
A. Basic subjects						
Anatomy (incl. histology and embryology)						0
Biochemistry and molecular biology	4					4
Biology (incl. cell biology)						0
Biophysics						0
Biostatistics						0
Chemistry						0
Epidemiology						0
Genetics	12					12
Immunology						0
Microbiology						0
Parasitology						0
Pathological anatomy (macroscopic & microscopic)						0
Pharmacy						0
Pharmacology						0
Physiology	8					8
Physiopathology						0
Scientific and technical information and documentation methods						0
Toxicology (incl. environmental pollution)						0
B. Animal Production						
Agronomy						0
Animal behavior (incl. behavioural disorders)						0
Animal husbandry (incl. livestock production systems)	38	16				54
Animal nutrition and feeding	16					16
Animal protection and welfare	2					2
Environmental protection	2		3			5
Preventive veterinary medicine (incl. health monitoring programmes)						0
Reproduction (incl. artificial breeding methods)	4					4
Rural economics	32	28				60
C. Clinical subjects						
Anaesthetics						0
Clinical examination and diagnosis and laboratory diagnostic methods	56		9	64		129
Clinical medicine	28		8	56		92
Diagnostic imaging	28	5		15		48
Obstetrics						0
Reproductive disorders						0
State veterinary medicine, zoonoses, public health and forensic medicine	7		11			18
Surgery						0
Therapeutics	28	4		16		48
D. Food Hygiene						
Certification of food production units	8	14				22
Food certification	3	4				7
Food hygiene and food quality (incl. legislation)	13	18	3			34
Food inspection, particularly food of animal origin	51	30	5			86
Food science and technology	42	30				72
E. Professional knowledge						
Practice management						0
Professional ethics	3		1			4
Veterinary certification and report writing	1		1			2
Veterinary legislation	7		3			10
Total	393	149	44	151	0	737

Table 4.8 - Curriculum hours in EU-listed subjects taken by every student

Subject	Hours in course					Total
	Lectures	Practical Work	Supervised Work	Clinical Work	Other	
A. Basic subjects						
Anatomy (incl. histology and embryology)	190	240	28	0	0	458
Biochemistry and molecular biology	96	86	0	0	0	182
Biology (incl. cell biology)	3	0	0	0	0	3
Biophysics	28	18	10	0	0	56
Biostatistics	28	29	1	0	0	58
Chemistry	0	1	0	0	0	1
Epidemiology	28	6	9	0	0	43
Genetics	74	62	8	0	0	144
Immunology	33	15	0	0	0	48
Microbiology	38	40	0	0	0	78
Parasitology	61	89	0	0	0	150
Pathological anatomy (macroscopic & microscopic)	86	148	0	3	0	237
Pharmacy	4	8	0	0	0	12
Pharmacology	55	26	0	0	0	81
Physiology	78	44	0	0	0	122
Physiopathology	61	6	1	0	0	68
Scientific and technical information and documentation methods	0	3	1	0	0	4
Toxicology (incl. environmental pollution)	7	20	14	0	0	41
B. Animal Production						
Agronomy	18	27	0	0	0	45
Animal behavior (incl. behavioural disorders)	12	7	2	0	0	21
Animal husbandry (incl. livestock production systems)	44	26	0	0	0	70
Animal nutrition and feeding	45	52	0	0	0	97
Animal protection and welfare	11	9	2	0	0	22
Environmental protection	8	1	4	0	0	13
Preventive veterinary medicine (incl. health monitoring programmes)	15	2	8	0	0	25
Reproduction (incl. artificial breeding methods)	33	40	0	0	0	73
Rural economics	33	29	0	0	0	62
C. Clinical subjects						
Anaesthetics	28	4	0	17	0	49
Clinical examination and diagnosis and laboratory diagnostic methods	103	69	19	104	0	295
Clinical medicine	92	0	24	64	0	180
Diagnostic imaging	28	5	0	15	0	48
Obstetrics	12	2	0	16	0	30
Reproductive disorders	16	4	0	14	0	34
State veterinary medicine, zoonoses, public health and forensic medicine	20	3	11	10	0	44
Surgery	106	31	0	30	0	167
Therapeutics	80	5	0	40	0	125
D. Food Hygiene						
Certification of food production units	8	14	0	0	0	22
Food certification	3	4	0	0	0	7
Food hygiene and food quality (incl. legislation)	13	18	3	0	0	34
Food inspection, particularly food of animal origin	52	31	6	0	0	89
Food science and technology	42	30	0	0	0	72
E. Professional knowledge						
Practice management	3	6	3	0	0	12
Professional ethics	4	5	4	0	0	13
Veterinary certification and report writing	1	2	2	0	0	5
Veterinary legislation	14	3	5	0	0	22
Total	1714	1270	165	313	0	3462

Table 4.9 - Curriculum hours in other subjects taken by every student

Subject	Hours in course					Total
	Lectures	Practical work	Supervised work	Clinical work	Other	
Sociology	7		7			14
History of Veterinary Medicine	3		3			6

It is obvious from the Tables above that the formal teaching load of veterinary students in the first year is comparatively light. In the following years, the teaching load is quite heavy, being on average 25 hours a week. This leaves little or no scope for meaningful electives, structured student-based learning, organization of extended clinical rotations, or pre-graduate differentiation in the course. The lecture load in any year does not exceed 15 hours a week on average. We think that most of these drawbacks will be overcome in the new curriculum, with subjects spread more evenly and where there is programmed time for clinical rotations in the final years.

About 43% of the course time is allocated to subjects that belong to basic sciences, which are relevant for veterinary science and the Faculty feels it has been necessary for building up the rest of the curriculum, and for providing the necessary background for a long life learning process. However, the Faculty will reduce that weight in the new curriculum. The Animal Health and the Clinics together will take about 54% of the course time, while Animal Production and Food Safety take, respectively, 14 and 10 %.

The different subjects are taught by lectures, which are not compulsory. In opposition, practical classes are mandatory. In some subjects, supervised work appears as a privileged way of teaching.

4.2: ELECTIVE SUBJECTS

There are no electives or structured optional teaching in the current veterinary curriculum, although they are being considered for the new curriculum. However, students can participate in a wide range of extra-curricular activities at FMV, organized by the Pedagogic Council, besides the obligatory subjects. Other activities are performed on a voluntary basis and

include work in research projects, in the Hospital and in ambulatory clinic. Some students are very keen in helping to organize scientific events. The final training period also provides the opportunity for students to decide the area that they wish to follow.

4.3: OPTIONAL SUBJECTS

At present, there are no formal optional subjects offered in the FMV course. However, a few optional subjects have been suggested for the new curriculum to replace the 10% allocation time that will be removed from the theoretical component of present curriculum courses.

4.4: OBLIGATORY EXTRAMURAL WORK

At the end of the 5th year, the students take a 4 to 6 month period of professional training in any one or two of veterinary professional areas. This training can be done in affiliated institutions (e.g. slaughterhouses, laboratories, food and feed industries, food distribution and catering units, research and experimental stations, farms, and veterinary practices or in the Faculty.

After selecting their areas of work, the students submit to the Final Year Curricular Training Committee a proposal on the institution, duration, nature of work and the name of the external supervisor. After a period of training, a report is prepared on the work undertaken and evaluated by the committee. This evaluation does not account yet for the final mark of the student. However, if considered below the standards it must be re-submitted before the diploma is issued, which is necessary for the graduates to engage in professional activity.

Table 4.10 - Obligatory extramural work that students must undertake as part of their course

Nature of work	Minimum period	Year of the course in which work is carried out
Visit to cultivated pastures at a University Campus	5 h	1 st
Visit to National Animal Production Station	20 h	1 st , 2 nd , 5 th
Visit to livestock exhibitions	5 h	5 th
Visit to Animal Experimental Station of Baixo Alentejo	3 h	5 th
Visit to sheep and goat farms	4 h	1 st , 4 th , 5 th
Visit to livestock feeding manufacturing units	4 h	2 nd
Visit to dairy farms	4 h	1 st , 4 th , 5 th
Reproductive clinical examination of the cow	5 h	4 th
Visit to beef cattle production unit	4 h	1 st , 5 th
Visit to pig production units	2 h	1 st , 5 th
Visit to broilers production unit	2 h	1 st , 5 th
Visit to layer hens production unit	2 h	1 st , 5 th
Visit to dairy industry	2 h	5 th
Visit to meat industry	4 h	5 th
Inspection at livestock slaughterhouses	12 h	5 th
Inspection at pig slaughterhouse	2 h	5 th
Inspection at rabbits slaughterhouse	2 h	5 th
Fish inspection	10 h	5 th
Inspection at poultry slaughterhouse	2 h	5 th
Inspection and evaluation of fresh products markets	4 h	5 th
Inspection and evaluation of catering units	4 h	5 th
Clinical work with cattle	75 h	5 th
Clinical work with horses	30 h	5 th
Visit to a Zoological park	4 h	2 nd
Visit to GNR – dog training	4 h	2 nd
Visit to GNR – horse unit	4 h	2 nd
Visit to PSP – dog unit	4 h	2 nd
Monsanto Ecological Park	6 h	3 rd , 4 th

4.5: RATIOS

Theoretical training	= $\frac{1409}{2418} = \frac{1}{1.72}$
----- Practical and clinical training	

Clinical training	= $\frac{834}{3308} = \frac{1}{3.97}$
----- Theoretical and practical training	

4.6: FURTHER INFORMATION ON THE CURRICULUM

In the late eighties and in the nineties it became obvious that a curriculum review was necessary due to various developments in research and society. Since then, the issue has been extensively discussed at the Departments, the Scientific Council and Consultive Council levels. At present, we are entering the final stage of that process with the preparation of a definitive proposal to be submitted for final discussion and approval by FMV decision boards.

The massive generation of new biomedical scientific knowledge, the development of new didactic tools, the profile of the students that are now entering the University, the developments of the society and of the agricultural systems since the adhesion of Portugal to EU, and the developments of the veterinary profession are some of the reasons leading to the necessity for the renewal of our curriculum. However, this has to be done with the present teaching staff and students, all of whom have their own motivations and concepts of what a new curriculum should be.

The mechanisms for managing and directing the curriculum were not functioning as they should. Currently the staff takes the main decisions on course content and teaching methodologies for the disciplines they teach. While there is a good interaction and cooperation among some disciplines, that is not a universal attitude. We hope that the new organization, working since November of 2003 will overcome some of the identified negative aspects.

The objectives and the competencies previously approved and mentioned in Chapter 1, should be the frame to build the new curriculum. Furthermore the Scientific Council has redefined the scientific areas. They are Morphology and Function, Clinics, Animal Health, Animal Production and Food Safety. A coordinator leads each of these areas and will ensure that the subjects amongst areas will be properly

integrated. The moving of subjects within these areas led to the reorganisation of the Departments from 3 to 4 with a different configuration, in line with the new scientific areas. The new departments are: Dept. of Morphology and Function, Dept. of Clinics, Dept. of Animal Health and Dept. of Animal Production and Food Safety.

Bearing that in mind, the main objective of the new veterinary curriculum in the Faculty is to deliver a graduated veterinarian, equipped with adequate competencies and skills to work in the areas above mentioned, with special emphasis on clinics, animal health and food safety and also:

- ♦ a competent problem solver;
- ♦ a scientific thinker and worker;
- ♦ an ambassador for animal welfare;
- ♦ an example of personal and professional behaviour;
- ♦ a life long learner.

Optional subjects will be introduced and much more time will be devoted to hands-on clinical training (for large animals and companion animals). The new course will take 11 semesters, the last one being reserved to practical training either outside the Faculty premises or in the Faculty. The reduction of theoretical teaching time will increase the focus on self-learning. It is hoped that this will raise the awareness of the importance of life-long learning and give the students skills to do so.

The following table shows the new set of disciplines grouped by scientific areas.

Table 4.11 - The new set of disciplines grouped by scientific areas

Scientific Area	Semester	Disciplines	T	P	H
<i>Morphology and Function</i>	1	Anatomy I	28	28	
	1	Histology I	28	28	
	1	Biophysics	28	28	
	2	Anatomy II	28	28	
	2	Histology II	28	28	
	2	Genetics	28	28	
	2	Cell Molecular Biology	28	28	
	3	Anatomy III	28	28	
	3	Physiology I	28	28	
	3	Biochemistry I	28	28	
	3	Embryology and Development Biology	28	28	
	4	Anatomy IV	28	28	
	4	Physiology II	28	28	
	4	Biochemistry II	28	28	
		<i>total area</i>	392	392	0
<i>Animal Health</i>	1	Bio-statistics, computers, and documentation	28	28	
	3	General Pathology	28	28	
	4	Pathology I	28	28	
	4	Microbiology I	28	28	
	4	Parasitology I	28	28	
	5	Pathology II	28	28	
	5	Microbiology II	14	14	
	5	Epidemiology	14	14	
	5	Parasitology II	28	28	
	6	Immunology	28	28	
	7	Pathology and Clinic of Parasitic Diseases I	28	28	
	7	Pathology and Clinic of Infectious Diseases I	28	28	
	8	Pathology and Clinic of Parasitic Diseases II	28	28	
	8	Pathology and Clinic of Infectious Diseases II	28	28	
		<i>total area</i>	364	364	0
<i>Clinics</i>	5	Medicine Propedeutics I	28	28	
	5	Surgery Propedeutics I	28	28	
	5	Pharmacology and Therapeutics I	28	42	
	6	Medicine Propedeutics II	28	28	
	6	Surgery Propedeutics II	28	28	
	6	Pharmacology and Therapeutics II	28	42	
	7	Medicine I	42	16	16
	7	Surgery I	28	16	16
	7	Reproduction and Obstetrics I	28	42	
	7	Toxicology	28	28	

<i>Clinics (Cont.)</i>	8	Medicine II	42	16	16
	8	Surgery II	28	16	16
	8	Reproduction and Obstetrics II	28	42	
	8	Imaging I	28	14	16
	9	Imaging II	28	14	16
	9	Clinics of Production Animals I	14	14	50
	9	Clinics of Companion Animals I	14	16	32
	10	Clinics of Production Animals II	14	14	50
	10	Clinics of Companion Animals II	14	16	32
			<i>total area</i>	504	460
<i>Food Safety</i>	1	Deontology and bio-ethics	14	0	
	6	Veterinary Public Health	28	28	
	8	Food Safety and Hygiene	28	28	
	9	Sanitary Inspection I	28	28	
	9	General Technology	28	28	
	10	Sanitary Inspection II	28	28	
	10	Technology of Animal Products	28	28	
		<i>total area</i>	182	168	0
<i>Animal Production</i>	2	Vegetal Biology, Agriculture and Environment	28	28	
	2	General Zootechny	28	28	
	4	Animal Behaviour and Welfare	28	28	
	5	Nutrition	28	28	
	5	Animal Breeding	28	28	
	6	Economics	28	28	
	6	Feeding	28	28	
	7	Animal Production I	28	28	
	8	Animal Production II	28	28	

T – theoretical, P – practical, H – hospital training

4.6.1. Basic Subjects and Basic Sciences

Broad overview on the teaching program

Basic sciences courses comprise a set of subjects, which are the basis for the rest of the veterinary course curriculum, namely, clinics, animal health, food hygiene and animal production subjects.

The courses provide the background for a life learning process. They represent 43% of the course

time and they are mainly within the first three years of the curriculum, with the exception of Toxicology that is taught in the 4th year.

They cover knowledge in anatomy, histology, physiology, biochemistry, biophysics, genetics, biomathematics and computing, pathology, parasitology, microbiology and immunology, pharmacology and toxicology, provided in taught courses as follows:

FIRST YEAR

1001 ANATOMY 1.1 (SEMESTER 1)

1. Course Objectives

To introduce the future Veterinary Surgeons to the basic principles and methods used in Anatomy, preparing them for a correct identification of anatomical structures, with a special emphasis on those morphological details that are essential for the understanding of subjects they will be taught later in the course and for their professional activity.

2. Program

GENERAL AND BASIC ANATOMY: Concept of Anatomy. Some important anatomical laws. Anatomy and the evolution of species. General anatomical terminology. Word-building in Anatomy. Anatomical symmetry. Generalities of Osteology. Generalities of Arthrology. Generalities of Myology. Some elements of Ictiotomy.

Arthrology of mammals. Anatomical veterinary teratology (macroscopic): Some notions of teratogenesis. General abnormalities of the organism. Regional abnormalities (head, trunk, limbs, etc.). Abnormalities of splanchnic systems and apparatus. Onfalosite monsters. Parasite monsters. Double and multiple monsters.

In practical classes the following subjects are covered: Comparative Osteology (Bovine, Small Ruminants, Equine, Pig, Dog, Cat, Rabbit, Chicken): Skull - cranial region. Skull - facial region; Hyoid; Rostral, cardiac and penial bones; Vertebral column; Vertebrae; Sternum; Ribs; Shoulder girdle and bones of thoracic limb; Pelvic girdle and bones of pelvic limb.

1002 ANATOMY 1.2 (SEMESTER 2)

1. Course Objectives

To introduce the future Veterinary Surgeons to the basic principles and methods used in Anatomy, preparing them for the identification of anatomical structures, with special emphasis on morphological details essential for the understanding of subjects taught later in the course and for their professional activity.

2. Program

Splanchnology of mammals and domestic birds: Digestive apparatus; Peritoneum. Respiratory apparatus; Pleura. Urogenital apparatus: Urinary apparatus; Male genital apparatus; Female genital apparatus; Egg anatomy.

Osteology, Arthrology and Myology applied to the anatomical definition of butcher's cuts. Arthrology and myology of domestic mammals studied using sheep dissection in practical classes.

1003 HISTOLOGY (SEMESTERS 1 AND 2)

1. Course Objectives

At the end of course students should be able to: describe the principal techniques of preparing biological material for study with light and electron microscope; describe the microscopic structure and the functional meaning of the four basic tissue types, organs and systems, of the domestic animals; identify those tissues and organs under light microscope; recognise the cells, tissues and organs in photomicrographs obtained with the electron microscope; predict cell, tissue and organ function from their structure; describe the events that take place during the early embryological development, from the fertilisation to the establishment of the basic germ layers; know the key events of organs development.

2. Program

GENERAL HISTOLOGY: Introduction. Basic techniques used in the study of cells and tissues. Concept, origin and classification of the four main tissues. Epithelial tissue: classification of epithelium. Covering and lining epithelium. Basement membrane, epithelial cell adhesion and cell surface modifications. Glands. Connective tissue: Classification. Cells of the connective tissue. The extracellular matrix. Study of the main types of connective tissues. Adipose tissue, cartilage, bone and blood. Muscle Tissue: classification, morphology and functional meaning. Origin and composition of the nervous tissue: The neurone and supportive cells. Organisation of the central and peripheral nervous system. Histophysiology of the nervous tissue. SPECIAL HISTOLOGY: Study of the histology and histophysiology of the main systems of the body of domestic mammals and birds. Cardiovascular system; lymphatic tissue, lymphatic organs and the immune system; integumentary system; digestive system (Oral cavity and pharynx; oesophagus and gastrointestinal tract; liver, gallbladder and pancreas); respiratory system; urinary system; endocrine organs; male and female reproductive systems. EMBRYOLOGY: Early development in birds and mammals. Fertilisation. Cleavage and blastodermic vesicle formation. Establishment of ectoderm, endoderm and mesoderm. Development of the placenta. Microscopic structure of the various types of placenta found in the domestic animals. Development of the various organs systems in domestic mammals and birds.

1004 BIOMATHEMATICS AND COMPUTING (SEMESTER 2)

1. Course Objectives

At the end of course the student should be able to: use statistics for summarising data and perform exploratory data analysis; be aware of the assumptions underlying the theoretical models used for statistical analysis; discuss the validity and the limits of each model and the respective compatibility with the nature of the data presented for analysis; participate actively in the discussion and interpretation of statistical results; be aware of the difference between cause-effect relationships and statistical associations between variables; use the computer as a tool to perform the following tasks: (a) word-processing and presentations; (b) use a spreadsheet and a statistical software package for data storage, retrieval, processing, analysis and presentation of results.

2. Program

Descriptive statistics: General concepts; Descriptive univariate methods and exploratory data analysis for continuous and discrete variables. Probability and probability distributions (properties and applications of the Normal, Binomial and Poisson distributions); Central limit theorem and sampling distributions. Hypothesis testing: estimation of confidence intervals for a sample mean and for a proportion. Errors type I and type II underlying the hypothesis testing. Power sample size and the detection of differences. Parametric and non-parametric tests for the comparison of means. F-test for comparison of two variances. Comparison of proportions. Chi-squared distribution-contingency tables, goodness of fit and independence tests. Descriptive bivariate methods: contingency tables; scattergram plots; Q-Q plots; covariance; correlation coefficient: Spearman and Pearson. Regression: single linear model. Confidence limits for the estimation of values predicted by the regression linear model and associated errors. One-way analysis of variance. Short presentation of multivariate methods for the situations with more than two variables. Introduction to sampling methods and experimental design. Introduction to model building: stochastic and deterministic models. Computers are used for practical learning of basic commands to use a word processor (WORD97), to make presentations (POWERPOINT97), to use spreadsheets (EXCEL97), to use a statistical package (SPSS11); to produce written reports, perform data storage, retrieval, processing, analysis and presentation, applying the theoretical concepts learnt.

1005 BIOPHYSICS (SEMESTER 1)

1. Course Objectives

To provide basic knowledge on the physical principles of biological functions as well as of tools and technologies used in veterinary medicine.

2. Program

Electrophysiology: Physical basis of membrane potential and excitation; Cardiac automatism; electrocardiogram. Radiations: electromagnetic radiations in optical microscopy; radiometry and radiometric parameters; some particular photon emissions; radiation detection and quantification; energy absorption; biological effects of radions; quantification of radiation biological damage. Radioactive Isotopes: decay equations and their application in quantitative analysis. Mechanics of fluids: hydrokinematics; hydrodynamics. Properties of liquids: viscosity; superficial tension. Transfer processes: mass transfer: diffusion; osmosis; heat transfer. Ultrasounds.

In practical classes the following subjects are learned: Techniques in optical microscopy. Separation methods based on physical properties. Electrophysiology. Estimation of the heart electrical axis. Use of decay equations. Radiology.

1006 INTRODUCTION TO BIOCHEMISTRY (SEMESTER 1)

1. Course Objectives

To give basic information concerning the biomolecules and their structure.

2. Program

Aqueous solutions: properties and acid-base reactions. Enzymology and thermodynamic principles. Amino acids. Analysis of proteins. Covalent structures of proteins. Three-dimensional structures of proteins. DNA: the vehicle of inheritance. Nucleic acids structures and manipulation. Carbohydrates: molecular structure. Lipids: molecular structure. In practical classes the following subjects are learned: aqueous solutions; buffers; acid-base titrations; analysis of glycogen; analysis of fats; electrophoresis; ultra-centrifugation.

SECOND YEAR

2001 ANATOMY II (SEMESTERS 3 AND 4)

1. Course Objectives

Acquisitions of terminology of the different body structures, and training for identification of those structures, and understanding their relationship to the function or the movement that is underlying. This course especially focuses on the nervous system, the

organs of the senses and the cardiovascular and lymphatic systems.

2. Program

Cardiovascular system: Heart, Blood vessels, Pulmonary circulation, Systemic circulation, *Foetus* circulation. Lymphatic system: Organisation of this system, Lymph nodes. Glands: Hypophysis, Epiphysis, Thyroid gland, Parathyroid gland, Adrenal glands, Other glandular tissues. Nervous system: Meninges, Spinal cord, Spinal nerves, Cerebellum, Hindbrain, Midbrain, Forebrain, Cranial nerves, Reticular system, Pyramidal system, Extrapyramidal system, Hypothalamus, Limbic system, Autonomic nervous system. Sense organs: Eye, Ear, Olfactory organ, Jacobson organ, Gustatory organ, Cutaneous sense. Common integument: Skin, Horns, Skin glands, Mammary glands, Hoof. Placenta and extraembryonic tissues.

2002 PHYSIOLOGY (SEMESTERS 3 AND 4)

1. Course Objectives

Theoretical and practical learning of the different concepts and physiologic mechanisms for maintaining homeostasis in domestic animals. Development of the necessary skills to understand, explain, and interpret the knowledge of veterinary physiology, and integrate it with animal production and pathology/clinics courses.

2. Program

Neurophysiology: introduction to neuromuscular system. Physiology of the muscle and the neuromuscular synapse. Concept of reflex and stretch receptors of the skeletal muscle of upper and lower neurons and their dysfunction. Control of posture and motion by the brain - Cerebellum functions. Vestibular system and hearing. Autonomic nervous system. Vision. Endocrinology: The neuroendocrine system. Endocrine glands and their function: The thyroid gland; The adrenal glands; Endocrine pancreas; Calcium and phosphate metabolism. Gastrointestinal physiology: Regulation of the gastrointestinal function. Movements of the gastrointestinal tract. Secretions of the gastrointestinal tract. Digestion and absorption: non-fermentative processes. Digestion in ruminants: fermentative processes. Nutrients utilisation after absorption. Reproduction and Lactation: Development of gonads and gametes. Physiology of the oestrous cycle. Reproductive cycles and fertilisation. Male reproductive physiology. Gestation and parturition. The mammary gland. Renal Physiology: Glomerular filtration. Reabsorption of solutes. Water equilibrium. Acid-base equilibrium. Respiratory function: Respiratory system structure and function. Ventilation, diffusion and gas transport to the periphery. Ventilation-perfusion relationships. Mechanics of breathing and control of ventilation.

Cardiovascular Physiology: Cardiovascular system structure and function. Electric activity of the heart and the electrocardiogram. Systemic and pulmonary circulation. Capillaries and gas exchange dynamics. Control of blood flow. Neural and hormonal control of blood pressure and blood volume. Control systems of Homeostasis - Acid-basic homeostasis, temperature regulation.

2003 BIOCHEMISTRY II (SEMESTERS 3 AND 4)

1. Course Objectives

Learning of the general concepts and basics of structural and metabolic biochemistry necessary to the understanding at molecular level of biological phenomena occurring in Veterinary Sciences.

2. Program

Structure and Catalysis: The three-dimensional structure of proteins. Protein function. Enzymes and enzymatic kinetics. Biological membranes and transport. Signal transduction. Bioenergetics and Metabolism: Principles of bioenergetics. Glycolysis and the catabolism of hexoses. The citric acid cycle. Oxidation of fatty acids. Amino acid oxidation and the production of urea. Oxidative phosphorylation. Photosynthesis and photophosphorylation. Carbohydrate biosynthesis. Lipid biosynthesis. Biosynthesis of amino acids and nucleotides. Integration and hormonal regulation of metabolism. Information Pathways: Genes and chromosomes. DNA metabolism. RNA metabolism. Protein metabolism. Regulation of gene expression. Recombinant DNA technology. Special topics: Biochemistry of prions. Biochemistry of meat. Practical training is achieved on spectrophotometric techniques, techniques of enzymatic analysis, chromatographic techniques, techniques of protein analysis, techniques of nucleic acids analysis and searching for scientific information.

2004 GENERAL PATHOLOGY (SEMESTERS 3 AND 4)

1. Course Objectives

To describe, quantify and classify in a systematic and precise fashion, general and basic lesions at cell, tissue and organ levels. To collect, preserve and send biological material for laboratory exam, as well as gather the necessary information regarding the samples. To relate both macroscopic and microscopic alterations with etiologic agents. To understand and interpret the dynamic evolution of lesions. To explain the complexity and modulation processes of the adaptive and reactive pathogenic mechanisms of lesions. To value the anatomic-pathologic diagnosis as an important tool for general diagnosis, by providing the knowledge about the organic response capacity, etiologic agent pathogenicity and lesion mechanisms.

2. Program

Theoretical Programme: Cellular Pathology: cell injury and cell death. Metabolic Disorders: Disorders of lipid metabolism; Disorders of protein and purine metabolism; Disorders of carbohydrate metabolism; Disorders of calcium metabolism; Disorders of pigment metabolism. Tissue responses to damage: Protective mechanisms of tissues and organs; Inflammatory reaction and granulomatous reaction. Hypersensitivity reactions. Haemodynamic disorders, thrombosis, embolism, infarction and shock. Disorders of cell growth and differentiation (hyperplasia, hypertrophy, atrophy, metaplasia and dysplasia). Neoplasia.

Practical Programme: Gross specimens with lesions are regularly observed in class. These specimens are from slaughterhouse material, teaching gross collection and current necropsy. Microscopic slides, from these specimens and teaching slides collection, are available for further study. Photographs of gross organs and photomicrographs are also shown in class to complement the laboratory sessions. During the year students have to do atlases and image collections using several sources including Internet.

2005 GENETICS (SEMESTERS 3 AND 4)

1. Course Objectives

To acquire the basic principles and methodologies on molecular, cytogenetics, mendelian, population, quantitative genetics and animal genetics improvement. To know the molecular mechanisms of some important genetic diseases, including cancer. Use of OMIA, OMIM and other bibliographic resources to present a monographic work related with a genetic disease, gene therapy and diagnostic, genetic resistances, QTL, etc.

2. Program

Introduction to Genetics related to Medicine: Molecular basis of some Pathological disorders. Genomics. Cytogenetic basis of some pathological disorders. Single gene disorders. Genetic disorders with a biochemical expression. Oncogenes and oncogenic suppressor genes. Genetic Resistances. Pharmacogenetics. Immunogenetics. Familial disorders not due to a single gene. Gene Therapy.

Genetics and Animal breeding: Population genetics. Qualitative traits of particular importance to animal breeding. Relationship and inbreeding. Quantitative variation and heritability. Selection. Breed structure. Crossing. Genetic principles of animal breeding of domestic animals.

Individual monography on a genetically determined clinical disorder. Genetic analysis of a clinical situation with especial focus on the disorder's molecular mechanisms including its physiopathology

and its link to clinical aspects. A Seminar is organized with oral presentations and posters session.

THIRD YEAR

3002 PATHOLOGICAL ANATOMY (SEMESTERS 5 AND 6)

1. Course Objectives

Students are expected to achieve the following concepts: Understand the response to injury of different tissues and organs. Distinguish between the main patterns in pathology: developmental abnormalities, vascular disturbances, degeneration and necrosis, inflammation and neoplasia. Recognise the difference between true pathological alterations, physiological aspects and *post-mortem* changes. Get familiar with the changes that occur in different organs during the most relevant (both in frequency and severity) pathological disturbances in order to be able to identify their macroscopic characteristics in a necropsy or a necropsy report. Describe the macroscopic lesions observed using the appropriate scientific language. Know what complementary exams should be performed in order to achieve a correct diagnosis. Students should also acquire the following technical capabilities: Perform a necropsy of various domestic animals, including birds and make an accurate and complete report. Collect material for complementary exams according to their respective specificity. Address the material to the appropriate laboratory accompanied by the necessary information. Perform a Fine Needle Aspiration Biopsy and the corresponding smear. Perform an excisional and punch biopsy.

2. Program

Pathology of the digestive system: Oral cavity, including teeth. Oesophagus and birds crop. Ruminants forestomachs. Stomach. Intestine. Pathology of the liver and biliary system. Pathology of the exocrine pancreas. Pathology of the peritoneum and retroperitoneum. Pathology of the respiratory system: upper respiratory tract; lung; pleura. Pathology of the cardiovascular system: heart, pericardium, myocardium, endocardium. Arteries, veins and lymphatic vessels. Pathology of the hemolymphopoietic system: thymus; spleen; lymph nodes; bursa of Fabricius. Pathology of the endocrine glands. Pathology of the urinary system: Kidney. Bladder. Pathology of the female genital system: ovary and uterine tubes; uterus and cervix; vagina and vulva. Pathology of the male genital system: Testes and epididymus. Spermatic cord. Adnexal glands. Pathology of the locomotor system: Bone. Muscle. Joints. Pathology of the central nervous system. Pathology of the skin and adnexal structures, including the mammary gland. Pathology of the eye and ear. Practical training will be achieved on

necropsy technique in domestic mammals and birds; fine needle aspirative cytology – technique and interpretation of basic principles; and skin biopsy with scalpel and punch.

3003 PHARMACOLOGY (SEMESTERS 5 AND 6)

1. Course Objectives

The general objective is the learning of the pharmacological basis of therapeutics, so students can deal with the specific therapeutics aspects in later areas such Medicine and Surgery. The main objective is to help students to acquire basic and specific knowledge of drugs used in animals, to prevent, cure or undermine pathological conditions. The students are required to acquire knowledge in general pharmacology and in pharmacology of etiotropic and organotropic drugs, for a forward application in a therapeutic context.

2. Program

GENERAL PHARMACOLOGY: Objectives of Pharmacology and Therapeutics. Pharmacological areas and Therapeutic types. Pharmacokinetic and Pharmacodynamic concepts. Administration routes and fate of drugs in the body. General mechanisms of action. Changes in drug action. Drug associations and posology. Pharmaceutical preparations, galenic pharmacy practices, techniques and methods of prescription. Administration techniques. Antibioassay testing and Antibiotherapy rules. Individual and group therapeutics (mammals, birds, fish, exotic species).

SPECIAL PHARMACOLOGY: Etiotropic drugs: antiseptics and disinfectants. Specific chemotherapeutics. Furan derivatives; sulfonamides; quinolones; antibiotics (different groups); antifungal agents; antiviral agents; antiparasitic agents (anthelmintics, antiprotozoal). Pesticides. Organotropic drugs: drugs of central and autonomic nervous system; autacoids; drugs of the cardiovascular, respiratory, urinary and digestive systems; drugs of the genital apparatus and blood. Drugs for topical use.

3004 MICROBIOLOGY AND IMMUNOLOGY (SEMESTERS 5 AND 6)

1. Course Objectives

GENERAL OBJECTIVES: To supply the student with the basis to understand the mechanisms involved in the interactions between microorganisms the Environment, Man and Animals. To teach how to relate these basis with the microbiological component of various phenomena that will be later addressed in other subjects of the course.

SPECIFIC OBJECTIVES: To give the students their first contact with the different kinds of microorganisms with special emphasis to their role as potential pathogens of Man and animals and also their role in

the maintenance of ecological balance and their beneficial use in food industry and other purposes. Special relevance is given to the interaction between the microorganisms and their hosts introducing the basic notions of infection, epidemiology, immunity, diagnosis, pathogenesis, prevention and therapy of microbial infections. The student is exposed in the labs to a variety of techniques used in microbiological research and analysis at different levels: from the methods of culture of several types of microorganisms, to microscopy to applied methods in microbiology diagnosis, etc.

2. Program

Introduction and History of Microbiology, Taxonomy.

Bacteriology: Structure. Microbial Nutrition Growth and Control. Microbial Genetics. Mic. Ecology and Symbiotic associations: Parasitism, commensalism, mutualism and normal microbiota. Pathogenicity and resistance. Special microbiology: most relevant microorganisms in Veterinary Medicine: bacteria, (Gram+ and Gram-), mycoplasmas, chlamydia, rickettsia, fungi.

Virology: Structure and basic characteristics of viruses. Viral Taxonomy. Viral replication and life cycles. Viral genetics. Virus-Cell interactions. Mechanisms of infection and viral spread. Determinants of viral virulence and host resistance. Pathogenesis of viral diseases. Most relevant viruses in Veterinary Medicine. Laboratory diagnosis of viral diseases.

Immunology: The components of the Immune system. Function of the Immune system. The basis of the Immune response. Antigen-Antibody reactions. Humoral immunity. Cellular immunity. Complement cascade. MHC. Specific Immunity against: bacteria, viruses, parasites and tumours. Vaccines. Immunopathology.

3005 PARASITOLOGY (SEMESTERS 5 AND 6)

1. Course Objectives

The course will be presented as a dynamic field of Zoology and its study integrated with Pathology, Public Health and Animal Production. The main objectives will be the development of a dynamic perspective of the concepts concerned with the phenomenon of parasitism. The students will be gradually prepared for the course of Pathology of Parasitic Diseases through the study of parasites from domestic, wild and aquatic animals. Awareness for the importance of Parasitology and Pathology of Parasitic Diseases to Animal Production, Inspection of Animal Products and Veterinary Public Health.

2. Program

Generalities and basic concepts: the phenomenon of parasitism and aspects related to the parasite, the host and the host-parasite relationships presented. In

relation to the parasite, concepts of biological types of association; types of parasitism; adaptation to the parasitic form; parasitic specificity; localisation of parasites; ways of entry, dissemination and way out of parasites. Definition of host under the classical and ecological sense. Characterization of hosts as of "high" and "low" risk and parasitic risk defined in terms of space and time. Parasitological and Clinical periods of parasite development in relation to diagnosis and the design of integrated methods of control. Main effects of the parasite on the host and reactions of the host to parasitism. Specific study of parasites (Protozoa, Arthropoda and Helminthes) infecting domestic, wild and aquatic animals. The Classification of parasites or Parasite Systematics reflecting the evolutionary relationships between organisms. Practical training will be achieved on methods of collecting, preserving and making evident the presence of parasitic forms in animal blood, faeces, urine, hair, skin, grass, silage and soil samples.

FOURTH YEAR

4007 TOXICOLOGY (SEMESTERS 7 AND 8)

1. Course Objectives

The discipline has three main objectives: (A) Basic and specific knowledge of toxicology; (B) Development of interdisciplinary and pluridisciplinary work in the field of toxicology; (C) Training for postgraduate studies and upgrade.

2. Program

GENERAL TOXICOLOGY: Introduction and Concepts. Applied toxicology. Use of concepts. Toxicological studies. Epidemiological Toxicology. National, European and International Legislation. Clinical toxicology. Analytical toxicology.

SPECIAL TOXICOLOGY: Natural xenobiotics. Anthropogenic xenobiotics. Epidemiological toxicology - Concepts and methods. Evaluation and discussion of epidemiological models.

Practical training will be achieved on: objectives, methodology and timetables; statistics for toxicology; databases in toxicology; research in toxicology - experimental design, protocols, and evaluation of results.

4.6.2. Animal Production

The teaching of animal production subjects was under the responsibility of the Department of Animal Production. The subjects and hours taught are listed in Table 4.8. The presentation of lecture time of FMV

subjects for each year of the degree is shown in Tables 4.3, 4.4, 4.6 and 4.7.

In the animal production area, subjects covering farm animal husbandry, reproduction, breeding and genetics, nutrition, livestock production systems, animal protection, behaviour and welfare, environmental protection, rural economics, and agronomy are taught in depth. The vegetal biology is taught in some depth in the subject of General Agriculture. Theoretical lectures, practical classes, tutorials and outside visits are used to present the various matters.

The subject of animal nutrition takes an animal production approach, with some discussion of the implications of incorrect feeding managing strategies on animal health. The effect of animal nutrition on the product quality is emphasized. Topics such as nutritional disorders, clinical nutrition and dietetics do not feature prominently.

FIRST YEAR

1007 GENERAL AGRICULTURE (SEMESTER 2)

1. Course Objectives

Theoretical and practical training on agricultural and animal production related activities; characterisation of animal feeds; forage production, harvesting, conservation, storage and evaluation (chemical composition and nutritive value); pasture production and management; sources and control of agricultural pollution.

2. Program

THEORETICAL PROGRAMME: Concepts in Agriculture: Definition, objectives and relevance of agriculture; production systems. The Portuguese agriculture: Characteristics of farms and farmers; main products (quantity and distribution); productivity. Review of vegetal physiology: Effects of environment on vegetal production; fertilisation; Portuguese climate and soils. Cultural activities and machinery: Seeding and harvesting; use of pesticides; Irrigation and drainage. Feeds characterisation: Classification; chemical composition, nutritive value and other properties; processing. Forage production: Forage growth curve; choosing species and varieties; chemical composition (evolution, relation to nutritive value, definition of optimum cutting time). Forage conservation: Justification; methods of conservation (hay, silage, dehydrated); nutritive value; choosing the conservation method. Pasture production: Pastures in Portugal and in the world; classification; seeding and/or improving pastures; main species and varieties used in Portugal. Pasture management: Relation animal/pasture and animal/soil; grazing systems; stocking rate. Animal production systems: Role of the animal in the agricultural environment

(collection, conversion and concentration of nutrients); efficiency of animal production. Agriculture and environmental pollution: Main sources, prevention and control of agricultural and animal production pollution.

PRACTICAL PROGRAMME: Chemical evaluation of feedstuffs. Production and nutritional evaluation of hay and silages (laboratory and field visits). Identification of species and varieties used in forage and pasture production. Identification and main characteristics of animal feedstuffs and by-products. Main agricultural activities (field visits).

1008 EXTERNAL MORPHOLOGY (SEMESTER 2)

1. Course Objectives

To provide the students with the knowledge of: the nomenclature of the external morphology points, postures and decubitus of animals; the external morphological characteristics of animal populations occurring in Portugal; the methods and the legislation of animal identification; the methods of age assessment.

2. Program

Comparative study in horses, cattle, sheep, goats, pigs, dogs, cats and birds of: Nomenclature of body's external regions and features (points). Types and classification of skin covering structures (hair, wool, feathers; coat colours, points, marks). Postures and decubitus. Limbs conformation and straightness. Age assessment: eruption times of temporary and permanent teeth, growth of horns, colour of hair, outward appearance. Methods and systems of animal identification. Portuguese breeds and foreign breeds occurring more frequently in Portugal: origin, distribution area, national herd, morphological features and main productive purposes.

SECOND YEAR

2006 NUTRITION (SEMESTERS 3 AND 4)

1. Course Objectives

Students should be able to: Evaluate animal nutritional requirements; Assess the quality of feedstuffs; Formulate diets; Diagnose malnutrition and nutrient deficiencies.

2. Program

THEORETICALS: Introduction: 1. Importance of animal nutrition in the context of modern agriculture. Basic concepts of animal nutrition and feeding. Current methods of analysis of feeds and nutrients. Review of the anatomy and physiology of the gastro-intestinal tract of domestic animals. Nutrients and metabolism.

Water. Protein and amino acids. Carbohydrates. Lipids. Vitamins. Minerals; 2. Assessment of the nutritive value of feedstuffs and animal requirements: Digestibility of feed. Energy. Protein. Nutritional requirements; 3. Applied nutrition: Voluntary feed intake. Feeding standards. Feed processing and technology. Feed additives. Feeding strategies.

PRACTICALS: Sampling techniques. Determination of gross energy by using an adiabatic pump. Proximate analysis of feedstuffs. The Van Soest Method of forage evaluation. "in vitro" digestibility of feeds by Tilley and Terry method. Cellulase and xylanase activities of rumen fluids. Balancing rations. Computerised least-cost rations.

2007 ANIMAL BEHAVIOUR (SEMESTERS 3 AND 4)

1. Course Objectives

To characterise and analyse all types of behaviour in order to determine if they are normal or abnormal in all species studied. To relate the types of behaviour assessed with the management systems characterising them in terms of welfare. To learn about animal welfare in order to know how to act in every situation where the welfare can be impaired.

2. Program

THEORETICALS: Physiology of behaviour. Social behaviour. Behaviour organisation. Feeding behaviour. Stress and welfare. Sexual behaviour. Clinical behaviour. Abnormal behaviour. Welfare. Cattle behaviour and welfare. Horses' behaviour and welfare. Sheep and goat behaviour and welfare. Pigs' behaviour and welfare. Poultry behaviour and welfare. Cat behaviour and welfare. Dog behaviour and welfare. Other animals' behaviour and welfare. Enrichment projects to prevent welfare. Animal management systems and welfare.

PRACTICALS: Observation of animals. Animal handling. Animal transportation. Dog training. Animal restraint. Behavioural case problems linked to management systems.

FOURTH YEAR

4006 REPRODUCTION AND ARTIFICIAL INSEMINATION (SEMESTER 7 AND 8)

1. Course Objectives

To provide the students information on reproductive characteristics of companion and farm animals, on reproductive management and on control and manipulation of reproduction by natural or pharmacological methods. Practical training is provided on methods of male and female evaluation of reproductive function and on pharmacological control of oestrus and parturition in the female.

2. Program

THEORETICAL: 1. Male and female reproductive function: reproductive cycles, pregnancy, parturition, lactation, postpartum; male reproductive function; 2. Reproductive technologies and methods of manipulation of reproduction: manipulation of oestrus, contraception in small animals, induction of parturition, tocolysis; artificial insemination; embryo transfer and related techniques; 3. Management of reproduction: bovine (dairy and beef cattle), small ruminants, equine and porcine; 4. Management of reproduction in small animals.

PRACTICALS: 1. Examination of female genital tracts collected from slaughter-houses (cow and pig); 2. Palpation of cow genital tracts obtained from slaughter-houses; insertion of an insemination pipette through the cervix; 3. Rectal palpation in cows; 4. Pharmacological control and synchronisation of the oestrous cycle and ovulation: training of insertion of intravaginal devices (CIDR and PRID); discussion of synchronisation regimes with luteolytic substances and progesterone devices; 5. Dissection of male genital tracts (bull and boar);

Breeding soundness evaluation of the male and semen technology: Horse (physical evaluation, semen collection and semen evaluation in a horse Stud; Ram (physical examination performed by the students and semen collection by electroejaculation and laboratory work for microscopic semen evaluation: motility, dead:live ratio, counting, morphology).

FIFTH YEAR

5002 ANIMAL PRODUCTION (SEMESTERS 9 AND 10)

1. Course Objectives

To provide the students with the knowledge of: (1) biological basis and metabolic pathways of animal production, food utilisation and transformation into animal products; (2) productive characteristics of animal populations; (3) production systems practised and the elements that contribute to its definition and choice; (4) techniques of animal production; (5) factors that affect the quality of animal products; (6) and basis of animals housing, concerning welfare and costs. This knowledge will enable them to identify, collect and interpret production indicators, to evaluate and decide on production systems, to discuss feeding plans and to advise on new techniques.

2. Program

Scientific and technical principles of animal production. General aspects of food utilisation and transformation into animal products. Main paths of metabolism of the organic compounds implicated on animal production. General basis of feeding. Energy

utilisation: basic laws of bioenergetics applied to animal production. Physiological aspects of the different phases of the animal production chain. Efficiency of productive functions: maintenance, gestation, lactation, growth and fattening. Meat and carcass quality. Animal production systems and techniques: availability, costs and sustainability. Indicators of animal productivity and genetic improvement. Productivity and rentability. Economic efficiency of each type of animal production. Biotechnological manipulation of production – objectives, obstacles and modulation. General principles of animal housing. Dairy cattle production. Beef cattle production. Sheep milk and meat production. Goat milk and meat production. Pig production. Poultry production.

5006 ECONOMICS (SEMESTER 9)

1. Course Objectives

To enable students to understand the microeconomics of markets, particularly those of agriculture and food; of consumer demand; and of the theory of the firm. Furthermore it intends also to make students aware of government intervention in the agricultural sector making them familiar with the Common Agricultural Policy. Its ultimate goal is to give a framework of procedures and concepts to support the decision-making process in optimising animal health and production management.

2. Program

The course contents go mainly through the following subjects:

THEORETICAL: 1. Introduction; 2. The Elementary Theory of Demand; 3. The Elementary Theory of Supply; 4. Basic Methods of Economic Analysis; 5. The Determination of Price; 6. Introduction to Policy Analysis.

PRACTICALS: 1. The Agro-Forestry Production Complex; 2. Income and Productivity Indicators; 3. The Production Function; 4. Partial Budgets; 5. Cost-benefit Analysis; 6. Market Intervention.

4.6.3. Clinical Sciences

Broad overview of the Clinical Sciences

Clinical sciences are one of the fundamental aspects of the teaching of graduation students, and clinical training for undergraduate students is provided at three levels: (a) pre-clinical area (3rd year), (b) clinical area (4th and 5th year) and (c) final semester curricular training period (6th year). In the first level, basic concepts of semeiotics and therapeutics are taught along with general principles of pathology. In

the second level, students learn specific pathological situations in medicine, parasitic and infectious diseases and surgery, along with specific therapeutic knowledge. In the final level, students involved in the clinical area (79%) dedicate one semester to companion and/or large animal clinics.

Teaching of clinical sciences is based on the following subjects: Medical Semiology (3001), Pathological Anatomy (3002), Pharmacology and Therapeutics (3003), Surgical Semiology (3006), Anesthesiology and Surgical Techniques (3007), Medical Pathology (4001), Surgical Pathology (4002), Infectious Diseases (4003), Parasitic Diseases (4004), Andrology, Gynaecology and Obstetrics (4005), Toxicology (4007), Clinical Radiology (5004), Large Animal Clinics (5005), Small Animal Clinics (5007) and final semester curricular training period (6001).

Final semester curricular training period (6001): The majority of students (79%) chose clinical work for the final semester in large (26%) and companion animal (53%) clinics. Most of the final semester training is carried out in private practices in Portugal, but some students chose foreign countries (EU and USA) and an increasing number of students are doing their training period in the Faculty Hospital.

THIRD YEAR

3002. MEDICAL SEMEIOLOGY (SEMESTERS 5 AND 6)

1. Course Objectives

At the end of the course, the student should be able to: Correctly use medical terminology to describe clinical signs and syndromes; perform a thorough and systematic physical examination in bovine, equine and canine subjects; recognise the health status in an animal; select, from the signs collected from the physical examination, those that are indicative of disease; critically evaluate clinical signs and propose adequate diagnostic plans; select the additional diagnostic endeavours rationally most adequate to confirm the diagnosis; correctly perform simple laboratory tests; evaluate the results of laboratory tests and, together with the physical signs collected, decide upon probable diagnosis; coherently and comprehensively decide upon the prognosis of medical conditions.

2. Program

THEORETICAL DIDACTIC UNITS: General Semiology; Methodology of clinical examination; Diagnosis, prognosis and clinical recommendations; Clinical Thermometry; Digestive system; Semiology of

the liver; Pancreatic Semiology; Respiratory System; Cardio-vascular System; Blood and Haematopoietic organs; Urinary system; Dermatologic examination; Neurologic examination. PRACTICAL CLASSES: (Physical Examination) Anamnesis and General Physical Examination Examination of the Digestive system Examination of the Respiratory system. Examination of the Cardio-vascular system, Dermatological Examination, Neurological examination. Laboratory Semeiology: Complete blood count; Faecal digestion, absorption and trypsin tests; Hepatic Semiology; Endocrine Pancreas Semiology; Analysis of effusion fluids; Hemostasis Tests; Urinalysis.

3007. ANAESTHESIOLOGY AND SURGICAL TECHNIQUES (SEMESTER 5)

1. Course Objectives

To provide the students with the fundamental knowledge and applied techniques of anaesthesia.

2. Program

Local anaesthesia: Mechanisms of action of local anaesthetics, main local anaesthetics, techniques of local anaesthesia (analgesia); techniques of regional anaesthesia (analgesia).

General anaesthesia: Mechanisms of action of general anaesthetics; general anaesthesia by means of fixed anaesthetics; general anaesthesia by means of inhalation.

Pre-anaesthetic care: Clinical examination, selection of the anaesthesia technique, pre-anaesthetic medication, and equipment verification.

Intra-anaesthetic care: Monitorisation of the patient, control of equipment, muscle relaxation, anaesthetic accidents - reanimation.

Post-anaesthetic care.

3006 SURGICAL SEMEIOLOGY (SEMESTERS 6)

1. Course Objectives

To expose the students to the fundamental concepts in surgery (scope, surgical techniques, most common diagnostic and therapeutic procedures).

To demonstrate the most common therapeutic and diagnostic procedures and, in some selected instances, to train the students in their execution.

2. Program

Brief historical background to surgery. Surgical terminology. Surgical inflammation. Healing of soft tissues. Sutures. Surgical separation of the soft

tissues. Haemostasis. Wound dressings. Fluid therapy. Blood transfusion. Shock. Principles of osteosynthesis. Endoscopy. Ultrasonography.

FOURTH YEAR

4002 SURGICAL PATHOLOGY (SEMESTERS 7 AND 8)

1. Course Objectives

The discipline aims at studying the different subjects concerning pathologic and clinical aspects of problems with surgical interest. It also concerns main surgical procedures and techniques. Small and large animal surgical problems are discussed in an applied view. Practical classes introduce students to clinical real cases and its surgical solutions and techniques.

2. Program

1. General considerations of systematic surgical pathology involving the different tissues. 2. Small animals surgery: Skin and grafts. Ophthalmologic and ear problems. Mouth and salivary glands problems. Head and neck soft tissues problems. Thorax problems. Pulmonary and upper airway problems. Heart and great vessels problems. Diaphragmatic problems. Abdominal problems: hernias. Gastro-intestinal problems. Hepatic, splenic and pancreatic problems. Endocrine problems. Genito-urinary problems. Neurosurgical problems. Orthopaedic problems. 3. Large animals surgery: Podal problems. Ruminotomy. Equine lameness: fractures, navicular, podophyllite and other conditions. Equine respiratory conditions. Equine colics.

4003 INFECTIOUS DISEASES (SEMESTERS 7 AND 8)

1. Course Objectives

Contribution for the student's education on Animal Health particularly related to basic concepts and general methodologies used on the characterisation and control of infectious diseases (ID), relevant for Public Health, livestock husbandry and small animal welfare, including List A diseases threatening EU.

2. Program

MODULE OF EPIDEMIOLOGY: Theoretical course: General concepts. Causal models. Determinants of disease. Transmission and maintenance of infection. Epidemiological studies. Surveillance. Seminars: Animal health information systems. Disease Modelling. Outbreak investigation. Economics of disease. Practical course: Animal Health Data Bases. Disease occurrence. Data collection. Sampling methods.

MODULE OF INFECTIOUS DISEASES: Theoretical course: Introduction: Pathogenesis and immune mechanisms in viral and bacterial diseases. ID affecting a broad range of hosts: FMD. Rabies. Tuberculosis. Brucellosis. Salmonellosis. Pasteurellosis. Colibacillosis. Leptospirosis. Listeriosis. Clostridiosis. Ringworm. Cattle ID: Mastitis. BSE. EBL. IBR. BVD. CBPP. Paratuberculosis. Actinobacillosis. Small ruminants ID: Footrot. Contagious agalactia. Chlamydiosis. Contagious ecthyma. Caseous lymphadenitis. Scrapie. Swine ID: Erysipelas. Atrophic rhinitis. Enzootic pneumonia. Swine influenza, Aujeszky disease. Parvovirus. Classical swine fever. African swine fever. PRRS. Circovirus. Poultry ID: Gumboro, D. Marek, D. Newcastle, D. Infectious bronchitis, Avian Influenza, Dogs ID: Distemper. Parvovirus. Hepatitis. Laringotracheitis. Cats ID: FLV. FIV. Calicivirus/herpesvirus. Parvovirus. Rabbits ID: Mixomatosis. Viral haemorrhagic disease. Horses ID: African horse sickness. Infectious anaemia. Influenza, Glanders. Strangles. Practical course: Biomodel on pathogenesis of bacterial infection and serum neutralisation. Lab. Diagnosis of Brucellosis, Salmonellosis, Pasteurellosis, Colibacillosis, Ringworm, Mastitis, Enterotoxaemia, Aujeszky D., African swine fever, Distemper, Canine parvovirus, FLV and FIV; Tuberculin testing; Sanitary legislation of rabies.

Seminars: New advances on ID diagnosis. New advances on vaccine strategies. Herd Health: Cattle, Small ruminants, Swine and Poultry. ID of fish. ID of bees.

4004 PATHOLOGY OF PARASITIC DISEASES (SEMESTERS 7 AND 8)

1. Course Objectives

To provide knowledge on ethioepidemiology, symptomatology and control of the processes caused by the main group of parasites and their implication in Animal Health and Production as well as in Public Health. To know how to make a differential diagnosis with other pathology processes, obtaining a global and integrated picture of the clinical act.

2. Program

THEORETICAL PROGRAMME: Parasitic Diseases of several animal species – (Economic importance and in Human Health; Ethioepidemiology; Symptoms and Lesions; Diagnostic; Prophylaxis and Treatment). Parasitic diseases of Leporids, Poultry, Ruminants, Equids, Swine, Aquatic Animals, Bees and Wild Fauna.

PRACTICAL PROGRAMME: Diagnosis techniques for several parasitosis: Dermatological examination (scabies), haematological (microfilariae and haemoprotozoans), serological (*Leishmania*),

secretions (*Trichomonas*) in tissues (*Toxoplasma*, *Trichinella*, *Leishmania*) and coprological tests. Reference to some indirect methods: Direct agglutination, direct and indirect immunofluorescence, ELISA and indirect haemagglutination. "Post-mortem" examination of dogs, cats, sheep, rabbits and poultry.

4005 ANDROLOGY, GYNAECOLOGY AND OBSTETRICS (SEMESTER 8)

1. Course Objectives

To provide the students education and training on: diagnostic, therapeutic and prophylactic methods of reproductive diseases of companion and farm animal species; control of reproduction at the farm level; evaluation and prognosis of fertility; use of reproductive technologies in subfertile animals.

2. Program

THEORETICAL: Pet animals, equine, ruminants, swine. Pregnancy diagnosis, pathological conditions of pregnancy including embryo-foetal mortality and abortion, dystocia and puerperal abnormalities, male and female infertility, fertility control and environmental and management factors affecting fertility.

PRACTICAL: Andrological and gynaecological exams in dogs; vaginal cytology and on clinic progesterone determination in dogs and cats; semen recovery and processing in the dog and artificial insemination in the bitch; complementary exams in the cow; complementary exams in the mare; obstetrical and gynaecological sutures in slaughterhouse material (uterine and perineal); castration in the horse; tocological principles, including the use of obstetrical tools and differentiation of main types of dystocia and their resolution in the phantom; Videos on natural and assisted parturition and caesarean section; presentation of clinical cases in pet and farm animal species; caesarean in the ewe; caesarean in the cow.

4007 MEDICAL PATHOLOGY (SEMESTERS 7 AND 8)

1. Course Objectives

To offer the students adequate information on the evolution of the pathological processes, including aetiology, pathogenesis, lesions and symptoms; correct interpretation of environmental data, anamnesis, clinical and laboratory analysis, aiming at diagnosis, prognosis and therapeutic approach to successfully resolve the pathological situation and re-establish health status.

2. Program

General concepts of: Environment and its importance in animal health. Animal husbandry. Clinical examination of the patient. Diagnosis. Prognosis. Therapeutic approach. Altered states of normal conditions. Disorders of cardiovascular system in the different animal species. Disorders of respiratory tract in the different animal species (horses, ruminants, swine, dogs and cats). Disorders of the gastrointestinal system in the different animal species. Disorders of urinary system in the different animal species. Disorders of endocrine system in the different animal species. Nutritional and metabolic disorders. Disorders of skin.

FIFTH YEAR

5004 CLINICAL RADIOLOGY (SEMESTER 9)

1. Course Objectives

The students have to know:

Principles of the physics of radiation, ultrasonography, CT scan and magnetic resonance.

The students have to recognize and make the interpretation: Main radiological and ultrasonographic signs of the most prevalent aetiologies in small animals and horses.

2. Program

Principles of radiology- physics, x-ray machine, x-ray room, films, cassettes, intensifying screens, grids, contrast mediums, x-rays safety. Ultrasonographic physics, ultrasonographic machine. CT scan, Magnetic resonance physics and machine.

Main radiological and ultrasonographic pathology by body systems in small animals: Head, neck, thorax, abdomen, appendicular system.

Main radiological pathology in horses of the limbs: Hoof, third phalange, interphalangeic joint, second phalange, proximal interphalangeic joint, metacarpus/metatarsus, knee, tarsus

5005 LARGE ANIMAL CLINICS (SEMESTERS 9 AND 10)

1. Course Objectives

The objective of this course is to allow the students to contact with and participate in the resolution of clinical cases in the field of large animals, making them aware of the activity of a large animal practitioner. Basically, the teaching emphasis in 3 different aspects:

1. Performing activities, like resolution of dystocias, surgery work, dehorning calves, trimming hooves, etc. 2. Training on the physiopathologic mechanisms of disease, on the interpretation of the results of clinical, laboratory and other clinical exams and on the therapeutic actions. 3. Resolution of heard health problems (mastitis, infertility, and metabolic diseases).

2. Program

DISCUSSION SESSIONS: These discussions will take place twice a week, with the duration of one hour. The goal of these sessions is to have a discussion based on clinical cases that the students follow during the visits to the farms and selected subjects

Subjects discussed during the year 2002/2003.

Physical Examination in Ruminants and Horses. Anaemias in Cattle. Diarrhoea. Displacement of the Abomasum. Simple Indigestion. Ruminant Acidosis. Bloat. Abomasal Ulcers. Traumatic Reticuloperitonitis. Vagal Indigestion. Ketosis and Pregnancy Toxaemia. Fatty Liver. Hepatic Abscesses. Umbilical Masses. Clinical Cases Involving the Nervous System. Milk Fever. Down Cow Syndrome. Respiratory Problems in Ruminants and Horses. Skin Problems in the Horse. Lameness in Horses. Ocular Problems in Horses. Equine Colics. Clinical Problems in the Foal. Swine Pathology.

MOBILE CLINICS SESSIONS: These sessions are based on visits to farms located in the area of Lisbon. Students are divided into small groups that go to farms 4 days a week. The purpose of these sessions is to give students the opportunity to be familiar with the clinical work that a large animal practitioner has to deal with. These visits are divided in routine ones and emergency ones. Besides, whenever it is possible sick animals are brought to the Veterinary School.

5007 SMALL ANIMAL CLINICS (SEMESTERS 9 AND 10)

1. Course Objectives

The students should be able to: perform clinical examination; integrate clinical history and the symptoms observed in order to perform a diagnostic; select the appropriate complementary exams; interpret the results of such exams accordingly to the clinical case; to prescribe the appropriate therapy and to explain the owner the prognostic and expenses foreseen; feel the need for a permanent update of knowledge, including new areas of science.

2. Program

Digestive System Disorders: Clinical Manifestations of Gastrointestinal Disorders, General Therapeutic

Principles, Diseases of the Oral Cavity, Pharynx, Oesophagus, Stomach, Intestines (Acute Diarrhoea, Chronic Diarrhoea), Liver and Biliary Tract, Exocrine Pancreas, Peritonitis. Respiratory Disorders: Clinical Approach to the Patient with Respiratory Disorders, Clinical Manifestations Diagnosis and Treatment of Upper and Lower Respiratory Tract Disorders, Pleural Cavity and Mediastinum. Cardiovascular Disorders: Clinical Approach to the Patient with Cardiovascular Disorders, Cardiac Insufficiency *versus* Circulatory Insufficiency, Diagnostic Tests for the Cardiovascular System, Management of Congestive Heart Failure, Disturbances of Cardiac Rhythm, Myocardial Diseases. Dilated and Hypertrophic Cardiomyopathy, Endocardial Diseases. Endocarditis and Degenerative Valve Diseases, Pericardial Diseases: Diagnosis and Treatment. Urinary Tract Disorders: Clinical Manifestations of Urinary Disorders, Diagnostic Tests for the Urinary System. Clinical Manifestations, Diagnosis and Treatment of Acute Renal Failure, Chronic Renal Failure, Urinary Tract Infection. Disorders of Micturition. Skin Disorders: Clinical Approach to the Patient with Dermatological Disorders, Bacterial Diseases, Allergy Diseases (Urticaria and Angioedema, Atopy, Contact Hypersensitivity, Food Hypersensitivity Dermatitis, Flea Allergy Dermatitis), Immune-Mediated Dermatoses (Pemphigus Complex, Bullous Pemphigoid, Systemic Lupus Erythematosus, Discoid Lupus Erythematosus, Cold Agglutinin Disease, Cutaneous Drug Reaction), Keratinisation Defects, Endocrine Skin diseases. Endocrine Disorders: Clinical Manifestations, Diagnosis and Treatment of disorders of: Endocrine Pancreas (Diabetes Mellitus), Adrenal Gland (Hyperadrenocorticism, Hypoadrenocorticism. Thyroid Gland (Hypothyroidism, Hyperthyroidism), Hypothalamus and Pituitary Gland (Acromegaly, Hypopituitary Dwarfism, Diabetes Insipidus), Parathyroid Gland (Hyperparathyroidism, Hypoparathyroidism). Nervous System Disorders: Clinical Approach to the Patient with Neurologic Disorders, Diseases of the Brain, Cerebellar Disorders, Cerebral Disorders, Disorders of the Spinal Cord.

4.6.4. Food Hygiene

Broad overview on the teaching programme

Food hygiene is one of the most important roles of veterinarians in the protection of public health. According to the concept "farm to fork" most of the curriculum, oriented for the production of a healthy animal in a healthy environment, contributes to this subject. However, direct contributions to food hygiene

teaching are concentrated on the 5th year of the curriculum, in the disciplines of “Sanitary Inspection” (SI), “Food Technology” (FT) and “Veterinary Public Health” (VPH). The discipline of “Toxicology” on the 4th year is also directly involved in food hygiene addressing the residues of xenobiotics in food.

In relation to products, SI deals with the animals exiting from farms (or from capture, in the case of fish and shellfish) up to their transformation on carcasses, the first raw material, and all the related risks; FT starts from the raw materials (meat, milk, eggs) up to the production and distribution of food; VPH deals with broad policies and the links to the consumer. Each discipline addresses the premises/equipment necessary for their activity, i.e. SI deals with animal transportation and slaughterhouses, FT with factories and cold storage; VPH with markets, canteens, etc.

Description of disciplines

FIFTH YEAR

5001 SANITARY INSPECTION (SEMESTER 9 AND 10)

1. Course Objectives

The objectives of SI are to provide future veterinarians with theoretical and practice training on food hygiene, food safety assessment and control and repression of commercial food frauds. Students should obtain a solid knowledge of the procedures of sanitary inspection of livestock and game, poultry and eggs, rabbits, fish and shellfish. Students have to know the techniques involved in the transporting and the slaughtering of animals and to perform the *ante* and *post mortem* examinations. Students should be able to recognise normal and abnormal carcasses/parts and the adequate sanitary decision. Ability to identify the animal species from meat cuts is also required. Students must also know how to use legislation

2. Program

SI requires basic knowledge from previous disciplines such as animal production and clinics (for the *ante mortem* examination) and anatomy, pathology, microbiology, parasitology, infectious diseases and toxicology (for the *post mortem* inspection). The discipline is organised into 2 main parts, the fundamental cycle and the professional cycle.

FUNDAMENTAL CYCLE: Risk analysis (risk assessment, management and communication in foods and feeds; food microbiology, chemical residues, additives and growth promoters, parasites, biotoxins and physical hazards). Legal basis of food inspections acts.

PROFESSIONAL CYCLE:

1. Meat and meat products inspection (livestock production and transportation, hygienic slaughtering, *ante* and *post mortem* inspection); regulations.
2. Poultry, rabbits and captive game sanitary inspection (production, hygienic transportation, slaughtering, *ante* and *post mortem* inspection); regulations.
3. Eggs sanitary inspection (production, transportation, inspection acts, commercial classification and hygienic storage); regulations.
4. Fish and fish products sanitary inspection (production and fisheries, hygienic a board and inland storage, inspection and commercial classification).
5. Shellfish and shellfish products sanitary inspection (production and sanitary purification, inspection acts and commercial classifications); regulations.
6. Game inspection (hunting, commercialisation); regulations.

5003 FOOD TECHNOLOGY (SEMESTER 9 AND 10)

1. Course Objectives

The objective of Food Technology discipline is to provide students with the knowledge of the operations and processes of food engineering, with emphasis on the technological transformation of products of animal origin. The teaching of food safety and technology is important in the preparation of veterinarians to work in multidisciplinary groups in food safety fields to contribute to the public health protection. The matters of food technology are integrated with those of food inspection and veterinary public health.

The practical work developed in this discipline aim to introduce the students with the food safety methods and respective evaluation, along the food chain. The students must know the basic principles of food technology, and have a more profound knowledge on food quality and on certification of food and food industries.

2. Program

Teaching of Food Technology discipline has two components: the theoretical lectures (one hour, twice per week) and the practical classes (two hours per week).

THEORETICAL: 1. Presentation of the plan of studies. Purposes of the teaching of Food Technology to veterinarians. 2. Fundamentals of Food Hygiene, Food Technology and applied Food Microbiology. Hazards and risks of food consumption. Prevention of food-borne diseases. Food additives and technological aids. 3. Unit operations and unit processes in food technology industries. 4. Water and waste waters. Methods of treatment. Control of environmental pollution. 5. Good Manufacture Practices. Constructions, equipment and personal hygiene. Cleaning and disinfection. 6. Food preservation by heat processing. Lethal and non-lethal heating. Canned food. Using equipment for

heating and cooling food. 7. Food preservation by hurdle technology. Hurdle effect applied to packaging and distribution of minimally processed food. 8. Proactive methods for Quality Assurance (QA) – HACCP system. Good Manufacture Practices (GMP) Codes. Quality Control (QC) in food industries and plant inspections. 9. An introduction to the study of meat and meat products. 10. An introduction to the study of poultry meat and poultry products. 11. An introduction to the study of milk and dairy products. 12. An introduction to the study of fish and seafood. 13. An introduction to the study of honey and wax. 14. An introduction to the study of leather and wool.

PRACTICAL: 1. An introduction to the study of unit operations and processes. 2. Physical, chemical and microbiological analysis of water for food processing, water for special uses and wastewater. 3. Cleaning and sanitation of plants and equipment. Cleaning aids, detergents and disinfectants. Environmental and personal hygiene. 4. Production of canned food by "commercial sterilisation" (Appert's process) and production of ready-to-eat frozen and cooled meals. Ingredients, packages, lethal and non-lethal heating effects. 5. Carcass deboning and meat cuts. 6. Meat technology. Meat analysis. 7. Heat treatment. Milk and dairy technology: cream, butter, cheeses and yoghurt. 8. Fish: preparation, cooling and freezing. 9. Production of canned fish, dry salted fish, smoked and anchovied fish. 10. Physical and chemical analysis of food products. 11. Microbiological and immunological analysis of food products. 12. Application of HACCP system to food products.

5008 VETERINARY PUBLIC HEALTH (SEMESTER 10)

1. Course Objectives

VPH include some subjects directly related to food hygiene. Other subjects are related with different fields as biomedicine and animal experimentation, zoonosis, environmental protection, public emergencies and education for health. The general objective of the discipline is to stress the interdisciplinary characteristics of VPH and the importance of veterinarians social and economic intervention with the aim of putting in a professional perspective all concepts, knowledge and information students have acquired in other subjects, adding the description and the use of attitudes and professional tools to better comply with market needs. Practical classes have been established in order to allow students to understand the fundamentals of food safety and to practice some veterinary activities in the last segment of food chain.

2. Program

Theoretical lectures of food hygiene comprise: Food safety and food assurance especially directed to the

areas of distribution and catering of food products; The principles of food hygiene in the EU and in Portugal; and, General issues of communication methodologies related to the sanitary education of food producers and food handlers.

The teaching of other VPH fields includes: Intervention of veterinarians in biomedical areas (specially laboratory animal production and use); Role of animals in urban areas and the problems of surveillance, prevention and control of risks to humans posed by these animals; Main issues concerning veterinary role in environmental protection in urban and rural areas (namely, the utilisation of animals as risk indicators and the hygienic disposal and rendering of dead animals, herd and animal industry wastes); National and European animal health programmes concerning zoonoses, including prevention, control and eradication programmes as well as the corresponding monitoring and surveillance systems; National contingency programmes of public health intervention in large-scale natural catastrophes or man-induced emergencies; General issues of communication methodologies related to the sanitary education.

Practical classes address: Inspection of catering units (including plague control of mice and insects); Inspection of fresh markets; Investigation of food poisoning outbreaks (epidemiological questionnaire analysis).

Final curricular training (SEMESTER 11)

The curriculum of the degree in veterinary medicine comprises a compulsory period of training that must be carried out after approval of all the subjects of the course. The learning objectives of this period are to deepen abilities, competencies and skills of final year students in the area of their choice, having in mind the beginning of their professional activity. The existence of such period of training, almost always carried out as extra-mural work, has the advantage of allowing some kind of differentiation at the last semester of the degree, minimising the still strict structure of our curriculum. Students usually select the field of activity they would like to pursue after graduating, having a closer contact with the professional reality and gaining some degree of expertise that will be most helpful for finding a first job, based on day-one competencies and skills acquired at the Faculty. Besides, the curricular training also contributes to the opening of the University to outside colleagues.

The majority of students (79%) choose to perform clinical work during the final semester, as patent in the table below. However, an increasing number of students take the option of Food Quality and Safety,

summing up to 17% in the academic year of 2002/2003.

At present, the organisation of this period is of the responsibility of the Faculty's Scientific Council, through a designated Final Year Curricular Training Committee of four members.

The final curricular training has the recommended duration of 4 to 6 months and the Faculty assures that all students have the possibility of finding a place and a supervisor for the training. During this period, the student has an external supervisor, with a relevant *curriculum* for the area chosen, who will directly follow the student and monitor the work developed, and an internal tutor, who is responsible for the liaison with the Faculty, to help the student to overcome any difficulty encountered as well as to assist the student on report writing. The training can be carried out in one or two of the professional areas and the students have the freedom to choose the supervisor(s) and the place(s) where to follow it.

Table 4.12 - Final curricular training (SEM.11)

Final training semester 2002/2003		
Area of studies	Students	
	N	%
Clinics	100	79
Large animals	33	26
Small animals	67	53
Food safety	22	17
Research	4	3
Other	1	1
Total students	127	

At the end of this period, the supervisor is asked to give a qualitative assessment of students' performance and achievements during the training period. The student must submit a report to the FMV, after approval of the Supervisor and the Tutor. The Final Training Committee, on the basis of the assessment of the supervisor and the analysis of the report, qualitatively evaluates the students for their training period. The evaluation result must be equal or superior to 3, in a grading scale 1-5 (being 1 the lower and 5 the highest), and it will be included in the graduation certificate. An ECTS weight of 30 credits has been calculated for this period.

For the new study plan, the Scientific Council of FMV has agreed that extra-mural work must comprise the maintenance of a 30 ECTS curricular training. The format of the training is not yet completely detailed, but it has been agreed that flexibility must be encouraged. Extra-mural work will start from the 3rd

year of the degree, but still maintaining the final period of a minimum of 4 months, that, together with optional subjects, contribute to the desired differentiation within Veterinary Medicine degree. Also, research is likely to be re-enforced, as opportunities for student's participation in FMV or external projects are increasing, and although only 3% of students took that option in 2002/2003, the number of students interested in such activities is also increasing.

4.7: SPECIFIC INFORMATION ON THE PRACTICAL CLINICAL TRAINING

As stated before, practical clinical training for undergraduate students is provided at three levels: (a) pre-clinical area (3rd year), (b) clinical area (4th and 5th year) and (c) final semester training period (6th year).

Clinical training is provided in medicine and surgery of companion animals (including exotic species), food producing animals and wild species. The major training provided in the first level of education (pre-clinical) is in-house, although some students start a voluntary training in private practices. In the second level, students are trained with patients present to the Faculty Hospital, either companion or food producing species, and in ambulatory practice for ruminants, equine and swine. In the last level of education (training period in the 6th year) students in the clinical training have at minimum, four months of training, with an average of five months (660 hours minimum, not considering the workload).

Prior to the start of the clinical rotations, that are mainly directed at 5th and 6th year students, students are involved in practical and tutorial activities, in the 3rd and 4th year (semesters 5 to 8), which aim at developing their clinical approach, diagnostic and procedure-executing skills. In this manner, students acquire ease and familiarity with dealing with animals and assimilate standard procedures for diagnostic and clinical management towards sick individuals or groups of animals.

In Medical Semeiology (5th and 6th semesters), students learn and practice the techniques of questioning and registering medical facts, so as to build a relevant clinical history. They spend 30 hours each in hands-on physical examination of cattle, equines and dogs. These classes are mainly directed at recognising normal findings, both in a general and special (by body systems approach) clinical examination and detecting their variations in the different species. The techniques of inspection, palpation, percussion and auscultation of different body structures are practised by each student. The students dedicate another 30 hours each analysing several clinical specimens of body fluids by means of

manual techniques, in order to make an appropriate record of the results and, subsequently, interpreting their relevance in the clinical context of the case. Case studies, using the Problem-Based Learning method are discussed and evaluated for anaemic patients and liver pathology, for 6 hours each student.

In Anatomical Pathology (3002), students are expected to acquire concepts that are a fundamental basis for the clinical training that follows, such as: understand the response to injury of different tissues and organs; distinguish between the main patterns in pathology (developmental abnormalities, vascular disturbances, degeneration and necrosis, inflammation and neoplasia); recognise the difference between true pathological alterations, physiological aspects and post-mortem changes. They are also taught how to perform a Fine Needle Aspiration Biopsy and the corresponding smear, and how to accomplish an excisional and punch skin biopsy.

In Pharmacology and Therapeutics (3003), students apply their knowledge of Pharmacodynamics and Pharmacokinetics, therapeutic uses and collateral or toxic effects of drugs by supervised work of elaborating prescriptions for given clinical cases. Each student also practices administration techniques and posology of animal medicines in bovine, equine, canine and ovine patients.

Surgical Semeiology (3006) provides training in general surgery and basic skills in surgical techniques: sutures; separation of tissues; haemostasis; wound dressing; fluid therapy; blood transfusion; shock; principles of osteosynthesis; endoscopy; ultrasonography.

In Anaesthesiology and Surgical Techniques (3007), students are trained so they are able to: A – Safely and effectively use modern anaesthetic equipment: Competently operate anaesthetic gas machines; Competently use and operate ancillary anaesthetic equipment and monitoring apparatus. B – Describe and apply general principles of safe anaesthetic practice to all species of animals: Complete a thorough pre-anaesthetic clinical assessment and evaluate the patient's pre-anaesthetic status; Interpret a patient's laboratory findings and recognise their significance to the administration of anaesthesia; Safely induce, maintain and recover animals from general anaesthesia; Recognise and evaluate the signs and severity of pain in animals; be able to administer appropriate analgesic agents and monitor their effects; Effectively administer and monitor local anaesthetic agents; Describe and be able to perform the common regional local anaesthetic procedures. C – Be able to evaluate and correct systemic complications that arise during general anaesthesia and emergency situations: Recognise and evaluate signs of dehydration, hypovolaemia, anaemia, blood loss and septic shock which may develop peri-operatively; Promptly identify

anaesthetic emergencies and apply appropriate and timely therapeutic measures.

In Medical Pathology (4001) (Internal Medicine – 7th and 8th semesters), students apply knowledge in the previous semesters in the solution of clinical problems. This is a way of avoiding the overcrowd the Faculty Hospital and still involving the students in clinical cases. Each student actively participates in 16 hours of clinical case discussions, in groups of around 20. The main goals are the development of clinical reasoning and selective evaluation of clinical manifestations of actual clinical cases, aiming at the establishment of a differential diagnosis plan, exploration of the hypothesis risen by means of the interpretation of ancillary tests and, finally, establishing a definite diagnosis and prescribing the appropriate therapy. The method adopted is problem-based learning (PBL).

Cases are prepared in data show, with clinical history and physical examination data, supported by images whenever relevant, and students are led to establish a list of problems for the case and the subsequent list of differential diagnosis for each problem. Then, the students select laboratory, imagiologic or other tests and their results are presented to the group. The discussion and interpretation of this information is then made in the context of the clinical presentation and the students present an hypothetical diagnosis, which is then evaluated by the group and the teacher. Finally, treatment strategies are discussed and selected for the case.

Figure 4.1 - Surgical Training



In Surgical Pathology (4002), students deal with Anaesthetics problems in an applied way, related to specific clinical situations and anaesthesia involving practical clinical cases. All surgical cases and clinical situations include diagnostic procedures like clinical examination and history, main complementary diagnostic methods and laboratory work. Diagnostic support includes imaging methods like radiology, ecography and tomographic examinations, E.C.G., biopsy and cytology and laboratory work. All clinical and pathologic situations with surgical interest go

through morphologic and anatomic considerations, pathophysiologic mechanisms, clinical and complementary diagnosis, medical therapeutics and surgical indications, surgical techniques, post surgical and functional recovery. Practical classes include clinical cases and work, where students participate as members of the surgical team. Small animals, large animals and exotics are considered and a relative importance is given to each matter trying to reflect real surgical expression. Some reproductive diseases are included, but most of them together with obstetric problems are concern of other discipline.

In Infectious Diseases (4003), practical courses are based on laboratory diagnosis of diseases and legislation and on field activities in farms, related to clinical medicine, prophylaxis and therapeutics of ID.

In Parasitic Diseases (4004), practical classes are directed at the diagnosis of several parasitic diseases: dermatological (scabies), haematological (microfilariae and haemoprotozoans) and serological examinations (*Leishmania*), secretion (*Trichomonas*), tissue (*Toxoplasma*, *Trichinella*, *Leishmania*) and coprological tests. Furthermore, the students practice *post-mortem* examination of dogs, cats, sheep, rabbits and poultry, in search of parasites of different organs and tissues.

Andrology, Gynaecology and Obstetrics (4005). The discipline gives practical training on methods of diagnosis and therapeutics of individual animals and on methods of fertility control in farm herds. Clinical examination and diagnosis and laboratory diagnostic methods – practical classes covering in detail the andrological and gynaecological examination in farm and companions animals. Laboratory diagnostic methods include vaginal cytology, hormone assays and interpretation of uterine cytology, biopsy and microbiological findings. Clinical medicine – The reproductive soundness examination is preceded by the general health examination. Diagnostic imaging – focus is given in ultrasound diagnosis of pregnancy and reproductive pathology in pets, equids and the cow. Obstetrics – Practical training with models on the obstetrical procedures, including tocolysis and partial fetotomy; practical training in suture patterns with abattoir material regarding the uterine and perineal interventions; practical training in the caesarean section of the cow and ewe; discussion of videos covering normal and abnormal parturition of farm and companion animals. Reproductive disorders – practical classes presenting clinical cases and methods for their follow up and treatment. Surgery – Caesarean section in ruminants (cow, ewe) and training in abattoir material (cow, sow); Castration in equids; Discussion of videos presenting the caesarean section and the repair of perineal lacerations. Therapeutics – Practical training in intrauterine administration of drugs.

Toxicology (4007), Clinical aspects of toxicology, including individual and group diagnostics, support and specific treatment, analytical identification of xenobiotics.

Clinical Radiology (5004), Diagnostic imaging contributes with specific knowledge about principles and interpretation in radiology and ultrasound of main pathologic problems in small animals, and horse. These subjects are important to help in the formulation of differential and final diagnosis of different aetiologies in clinical medicine, surgery, obstetrics and reproductive disorders.

Small Animal Clinics (5007) course is a 5th year subject that requires background knowledge, skills and attitudes acquired during the basic and pre-clinical subjects taken in previous years. The course staff is composed of two teachers. The main aim of the learning process is directed to the resolution of problems, and therefore follows a problem-based approach, by tutorial and clinical work. Students are stimulated to acquire knowledge, develop critical reasoning, and build skills and attitudes adequate to the major professional requirements in companion animal's clinical practice. The course comprises theoretical lectures, tutorials and hospital practice. Tutorials are problem-based learning exercises, where students are required to solve clinical cases, with the assistance of the teaching staff, in two-hour sessions, where students must develop diagnostic plans, propose the adequate complementary exams and arrive to a final diagnosis. Clinical work is carried out as Hospital work.

For Hospital work the class is divided in 6 groups in rotation. Each group have 12 to 18 students that stay in the Hospital 7 hours a day for 1 week, every 6 weeks (for 4 hours students are directly supervised by teaching staff, the remaining time is supervised by non-teaching clinical staff – practitioners) in a total of 4 weeks per year. Each group is subdivided in 4 small groups and distributed by medicine, surgery, diagnostic imaging and in-patients care. Each subgroup stays one day (7 hours) in each area and rotate. In medicine, students must take the clinical history and the clinical signs, require the complementary exams and discuss the diagnosis plan and the adequate therapeutic. In surgery, supervised by four staff members, students are incorporated in surgical teams as anesthetists, second surgeon, and instrumentalist. In diagnostic imaging, two staff members supervise students involved in radiology, ultrasonography and CT scan, positioning animals, assistance in contrast administration and interpretation of image results. In the in-patient wards, students are responsible for monitorization of vital signs, administration of treatment plans and nursing care. Teaching and non-teaching staff supervise these students.

Students are also actively involved in emergency care, integrating the team on duty. Student's role is

mainly helping the veterinarian in the first approach to the cases. Once the patients are stabilized, students assume a much more active role, monitoring the animals and taking care of medication. At the end of the course students are expected to be able to carry out diagnosis plans and establish the adequate therapeutic of Internal Medicine clinical cases.

In the academic year of 2002/03, students were not formally and directly supervised by teachers of Small Animal Clinics (SAC), because of re-structuring of the hospital. However, in 2003/04, each 5th year student spends an average of 80 hours in clinical work, directly supervised by the teaching staff of SAC. Furthermore, each student engages in clinical work supervised by interns and residents of the small animal hospital for 85 hours more. Besides regular hours, each student performs small animal hospital night (two twelve-hour) duties and weekend (1,5 weekend) duties during their 5th year.

Large Animal Clinics (5005) is a course in the 5th year, basing teaching in 3 main areas: (a) outside work in farms. There are agreements with farms around Lisbon visited both in emergencies and on routine work, Mondays to Thursdays in the morning and on emergencies the rest of the week; b) activities with animals admitted in the hospital, mostly calves and horses; c) discussion sessions based on specific subjects, 2 hours a week and whenever there is no possibility to go out (rain, lack of vehicles). Students are divided in 3 groups (2 groups are allocated to food animals and 1 to horses) of 7 students and they stay with a teacher Monday to Thursday in the morning in a timetable of around 4 hours each morning, 4 days a week plus emergencies, all year long. Students are involved in clinical work of dairy cattle (80 hours), horses (50 hours), beef cattle (10 hours) and small ruminants (10 hours) in physical examinations, administration of drugs and interpretation of laboratory results, and they are responsible for taking care of in-patients of the hospital of the Faculty (feeding, physical exams, administration of drugs).

Students perform several types of local anaesthesia in cattle (epidural, paravertebral, local) and in horses (to diagnose lameness); also some aspects related with the administration of sedative drugs (xylazine) are discussed. Clinical examination and diagnosis and laboratory diagnostic methods. Students perform almost every day physical exams on patients (horses, cattle, and less often small ruminants). Blood is collected in some cases from the patients and sent to the lab in order to perform chemical analysis and blood counts. The results are discussed with students. Diagnostic imaging: X rays and ultrasound are used often in horses with lameness. Obstetrics: During our visits to farms, occasionally students have a chance of solving dystocias and assist normal calvings especially in cattle. Reproductive disorders: Students have a chance to perform rectal palpations

in order to diagnose pregnancies and to palpate cows with reproductive problems (follicular cysts, metritis). Also they can perform rectal palpations in cows that are going to be culled. Surgery: The students have a chance to participate in several types of surgeries (displaced abomasums, caesareans, hoof amputation, umbilical hernias). Therapeutics: The choice of drugs and some properties of the compounds to be administered to sick animals are discussed with students.

4.8: SPECIFIC INFORMATION ON THE PRACTICAL TRAINING OF FOOD HYGIENE

The courses directly involved in the practical training of food hygiene are Sanitary Inspection (SI), Food Technology (FT) and Veterinary Public Health (VPH).

Practical training in SI is carried out almost completely outside the school, in slaughterhouses and fishery ports and plants, simulating future professional conditions of work. At the abattoirs, time is spent at the slaughter line and analysing in detail the unfit carcasses and offal. Handling of materials supervised by lecturers provides experience. However, students are not allowed to perform inspection cuts at the slaughter line. There is a close relationship between the faculty and the veterinary services because all practical classes are organised with the approval of the veterinary services, that frequently provide for some of the materials used at the slaughterhouses (knives, for example), as well as rejected offal and other material for further training. Some supervised work is also developed at the Faculty (eggs and shellfish inspection and identification of animal species of meat cuts), using the anatomy and pathology dissection rooms.

Figure 4.2 - Food Microbiology laboratory



Practical classes are compulsory and attendance is registered. Students are only allowed to register for final exams if they assist of a minimum of two thirds of practical classes.

In FT the practical training is mainly carried out inside the faculty but the school also provides the means of transport to study visits to slaughterhouses and food industries, where the students can contact the reality and learn with the experience of the vets in practice. These visits also provide the possibility of students to acquire knowledge on the processes from the raw materials to the final transformed products. These study visits include a pig slaughterhouse, a freezer installation, a meat cut room, plants of food of animal origin (mainly meat industry and milk industry), and a unit of treatment of effluents.

The practical lessons that are developed at the Faculty, in the food technology plant and in the attached laboratories of food chemistry and microbiology, are organised for groups of 15–20 students subdivided in groups of 4 or 5. The students perform analysis of food and water and in the pilot plant they produce meat, dairy and fish products like sausages, cheeses, yoghurts, canned fish, etc.

Figure 4.3 - Food chemistry laboratory



The students must attend obligatory practical work, at the faculty or in study visits. The attendance is verified by checking the presence of the students in each session.

VPH practical work comprises one session at the faculty and two extra-mural sessions. Inside class, dedicated to the investigation of food poisoning outbreaks, is provided for groups of 20 to 25 students at the computer room. Outside classes are held in groups of 4-6 students on inspection of fresh food markets and food catering units. These classes are organised throughout the year. The attendance is compulsory and students must submit a group report from each visit.

4.8.1 Teaching in a slaughterhouse

Practical training in meat, poultry, rabbit inspection in the discipline of SI takes place in four abattoirs where cattle, sheep/goats, horses, pigs, poultry and rabbits are slaughtered. The details on these abattoirs are the following:

1. Pig's slaughterhouse (40 km from Lisbon): the speed line is 300 pigs/h (2300/day, in average) and the slaughterhouse contains a cut/deboning room. Students learn about examination *ante mortem*, *post mortem*, critical control points in the processing line and in the cutting room, the way to transport and conduct animals (one session of 2 h for a group of 16 students –1/6 of the course, with 2 staff).

This abattoir is also visited by the FT discipline, 1 visit/student, during 2 hours, approximately. Group size is 15 students, subdivided into 2 subgroups (7-8 each) with 2 teachers (1 for each 7-8 subgroup). The students observe the work carried on and attend the explanations provided by the teachers. The visit includes a freezer installation with the capacity of 1,500 ton of storage, a meat cut room working with 250 pigs/hour and a unit of treatment of effluents with the capacity of 5,000 m³ total retaining;

2. Poultry slaughterhouses (one at 40 km from Lisbon and the other at 90 km from Lisbon). The first slaughterhouse kills broilers at a rate of 6,000/h, and the second slaughters laying hens and broilers at a rate of 3,000-4,000/h. Students learn about examination *ante mortem*, *post mortem*, critical control points of the processing line and the way to transport animals (one session of 2 h for a group of 16 students –1/6 of the course, with one or 2 staff; 3 groups of students go to one of the slaughterhouses and the other 3 go to the other);

3. Rabbit slaughterhouse (90 km far from Lisbon): the speed line is 1000 rabbits/h. Students learn about examination *ante mortem*, *post mortem*, critical control points of the processing line and the way to transport animals (one session of 2 h for a group of 16 students –1/6 of the course, with one or 2 staff);

4. Three multi-species slaughterhouse (the longer distance is 70 km from Lisbon): the line speed for cattle is 35-40/h, for sheep/goats is 110-120/h and for pigs is 120/h. Horses are slaughtered at a rate of 3-4/week. Students learn about *ante mortem* and *post mortem* examination, critical control points of the processing line, the way to transport and conduct animals (12 h in 6 sessions for a group of 16 students –1/6 of the course, with one or 2 staff).

4.8.2 Teaching in premises for the production and processing of food from animal origin

FT discipline visits a sausage factory, a meat industry and a milk industry. The students visit each place once time, for 2 hours. Group size is 15 students, subdivided into 2 subgroups (7-8 each) with 2 teachers (1 for each 7-8 students). The students just observe the work carried on.

SI also visits a ham and sausage factory (1 visit of 2h in groups of 16 students (1/6 of the course)) and visits a fishery port (10h in 5 sessions for a group of 16 students, with 2 staff).

1. Factory of ham and sausages (10 km far from Lisbon). In this factory students learn about the raw materials used, the HACCP system and how to make "charcuterie" products.
2. Meat industry (30 km from Lisbon): this industry produces traditional and commercial products. For example, the production of cooked ham is 100 ton/week, approximately, and the same quantity of Portuguese "chouriço" is produced.
3. Milk industry (35 km from Lisbon): students observe the milk processing and the production of yoghurt and Portuguese cheese.
4. Fishery port (in Lisbon): with fish arriving from the Portuguese coast and the African coast. Students learn how to evaluate the freshness of fish and the way to preserve fish.

4.8.3 Teaching in premises for distribution/sale or consumption of food

The VPH discipline has 2 practical classes in a catering unit and in a market of fresh products. Each student has one visit, in a group of 5-6 students and 1 teacher.

1. Catering unit (at the University Campus): prior to the visit there is a session for the explanation of the content of the visit, the criteria of evaluation of this type of premises, the professional attitude, etc. The visit is made in the presence of the technician responsible for the canteen. The students collect data, monitor insect presence and perform swabs from equipment surfaces and cutlery. In the third part of the class, at the faculty, samples are tested by the students with a bioluminescence equipment. A group report is mandatory.
2. Market (in Lisbon): an introductory session is made to explain the objectives of the visit, the professional attitude and the details of premises, equipment, workers and the conditions of storage and selling of products that should be observed. The visit is made with the veterinarian responsible for the market. Students observe and collect data on the conditions

of selling of bread and pastry, milk and milk products, fresh meat, fresh poultry, fresh fish, salted dried fish (cod), vegetables, frozen products, market support structures (load and unload products from transport vehicles, cold storage for fish, and for vegetables, ice production, garbage management, dressing room and w.c.). Students have to present a final group report.

4.8.4 Teaching in premises of the Faculty

All students take part on the production of (1) different canned foods, (2) production of traditional and international meat products and its packaging, (3) processing of milk and production of milk products, and (4) production of fish products. After the production of the different products, the students make an application exercise of an HACCP plan and do the final quality control with microbiological, chemical and sensorial analysis of the product. SI classes on egg and shellfish inspection and identification of animal species of meat cuts also take place at the Faculty, as well as VPH class on food borne outbreaks epidemiological investigation.

2. COMMENTS

The occurrence of public health and animal health emergencies such as dioxins, BSE, Foot and Mouth disease, and nitrofurans, has strengthened the need of closer and effective collaboration between the disciplines of the animal production area and herd health and clinics areas. In modern farm animal husbandry, the farmers increasingly demand on the veterinarian support towards health monitoring and preventive health measures. This is indispensable to ensure profitability, but also to show a good external image of safe products and to prevent any more disasters such as those occurring in the past. Apart from this, the efficiency of production systems naturally continue to be one of the main goals to the economic success of animal farming, which relies on well prepared staff on animal management, genetics, feeding, and reproduction. The knowledge of physiological and metabolic principles of animal production is then the key to be able to correctly interpret any disturbances and to adapt the production system to particular conditions and new challenges or rules. The emphasis of the training in production animals should reflect these demands, including communicating with farmers and taking the approach "from stable to table". With the new departmental structure, that is already in function, the

areas of Animal Production and Food Safety were joined in order to give a stronger emphasis on that concept. Just as a practitioner has to draw upon and combine different elements of veterinary science, so the teaching needs to integrate the teaching/learning in areas such as population medicine, epidemiology, nutrition, breeding, genetics, reproduction, husbandry, housing, quality of food products, economics, etc. with the objective of preserving the health and the well-being and optimise the productivity of farm animal populations.

As a whole, the course broadly covers the different production systems, considering the economics of the livestock production and leads towards the application of clinical treatment animal-groups in a food-safety perspective.

The Food Hygiene curricular component appear in the 5th year of the Course and earlier contact of students with this area is desirable. At the 4th year of new curriculum, before the food inspection and food technology, two new disciplines – Hygiene and Food Safety – were added, addressing more basic aspects and allowing the possibility to improve practical subjects in the fifth year.

New departmental organisation and the creation of scientific areas to better manage curricular matters are expected to improve a more close relationship between food related disciplines. However, present curriculum tries to integrate all disciplines involved giving students adequate knowledge on the processes occurring in the transformation of live animals/raw materials to final products and their microbiological chemical and sensorial analysis. Importance is given to the knowledge on the fundamentals of food science and modern food technology, its legislative aspects, the pluridisciplinary approach, the use of proactive methodologies and the importance to guarantee the traceability in the food chain in a perspective of safety from feed to food. Direct contact of students with public institutions and experts with responsibilities on the field of public health, such as competent authorities, regional and local veterinary services is also envisaged.

Regarding the practical component of the curriculum in this area, a reasonable preparation for sanitary inspection and food technology is given to the students but a better ratio theoretical/practical training is difficult to achieve due to the high number of students and the organisation of the 5th year timetable that do not allow students to have more time for practical training than to fulfil minimum requirements. Practical training at the FMV premises is well organised as the food technology plants and labs are adequate for the number of students.

It is obvious from the analysis of the distribution of teaching staff in clinical areas that these are severely understaffed, when taking into account the number of

students of the 4th, 5th and 6th years. Although FMV has partially solved this problem by means of hiring Veterinary Surgeons for clinical duties at the small animal hospital, the truth is that the vast majority of faculty members do not directly participate in clinical training of students, or do it marginally. This, worsened by the higher dropout or change of area of teaching staff from clinical areas and the impossibility of replacing these elements for legal and budget reasons, puts a very heavy load of work and responsibility on the few teachers dedicated to clinical areas. For these reasons, clinical research and postgraduate education realizations are chronically jeopardized in FMV, as well as the progression in the academic career of teaching staff in clinical areas, which is conditioned not by clinical performances, but number of publications.

The curricular rearrangement proposed for the near future puts a heavier emphasis in the clinical area. FMV will have to find a way to staff this area properly in the future, so as to render possible the desirable improvement in the quantity and quality of clinical training.

FMV and the Bologna Process:

FMV is well aware of the educational challenges posed by the quality culture in Higher Education that has been developed across Europe through the Bologna Process. Veterinary Education does not fall into the two levels (bachelor/master) recommended for other areas of knowledge, and there is no need to introduce a degree of Bachelor of Veterinary Medicine, specially as one of the pre-requisites for such is the existence of a labour market for graduates.

However, European treaties assure the free movement of persons, goods and services, and it is of outmost importance for our students the automatic recognition of their studies and professional diploma (Council directives 89/48/EEC and 78/1026/EEC). Mobility of both students and professionals is a reality that requires transparency and readability of degrees and UTL has strongly supported the implementation of the tools available for such. FMV has developed so far the European Credit Transfer System, applied to the present curriculum.

Although not fully applied to our students, ECTS was calculated based on the contact hours (lectures, tutorials, etc) and work-load of each subject of the course, as presented in Table 4.2. This information is available both in the ECTS Course Guide and Information Package and on the FMV web-site (www.fmv.utl.pt/Erasmus/erasmus.htm). ECTS are fully considered in the curriculum under development.

3. SUGGESTIONS

Recent changes in grouping curricular subjects and disciplines, is expected to bring a better efficacy in course integration and delivery.

The main shortcoming is, at present, the lack of staff for teaching of practical classes.

Fewer students per year would allow for a better teaching, with better practical training per student.

There is a need to increase the staff in clinical teaching area, and to allow for post graduation and specialisation of young teachers. A master degree in clinics would allow for a deeper involvement of the teaching staff with veterinarians, and increase the post-graduation personnel in the Hospital.

Food technology subjects would be better allocated in the 2nd semester of the 4th year and in the 1st

semester of the 5th year, mainly to act as a motivation for the students and also to be a support of Food Inspection teaching.

VPH and other disciplines directly related with the food chain (animal production and health, food inspection and food technology) might profit from a more close linkage both in terms of syllabus and final evaluation.

Present staff does not allow for a greater number of practical classes. It might be possible to better rationalise human resources by interchanging staff from different disciplines.

FMV is preparing the Diploma Supplement, in order to accomplish the above mentioned Bologna Process requirements of transparency and readability of degrees.

Chapter 5 -TEACHING: QUALITY AND EVALUATION

1. FACTUAL INFORMATION

5.1: THE TEACHING PROGRAMME

Teaching is built on a discipline-based programme, organized on a sequence of coherent topics at horizontal and vertical levels, starting with teaching of basic matters and evolving to terminal teaching of topics related to relevant knowledge in different areas of professional application. The present curriculum was introduced in 1983. Objectives and contents of disciplines are organized by professors in charge of teaching, according to the general School's policy proclaimed by the Scientific Council in 2000 in which students' general and specific competences to be acquired during their studies are clearly defined, taking into consideration the following aspects:

"The present and future curricula have to be conceived in order to reassure the acquisition of the necessary professional competences based on the stimulation of conceptual reasoning, the development of a posture directed towards problem solving and by encouraging the team work, altogether within a teaching/learning atmosphere in permanent contact with professional needs of the country and the UE".

Individual programmes of disciplines including teaching objectives, theoretical and practical contents and recommended bibliography, among other details, are submitted to the Pedagogic Council on a yearly basis and published on the Student's Guide, therefore becoming public knowledge, available on the website.

The coordination of teaching has not been implemented by regulatory or functional structures within or among departments and services, although coordination and agreements for complementary teaching and/or teaching collaboration occurs at section level (teaching staff/discipline) or among disciplines.

The Pedagogic Council participates in teaching co-ordination mainly through the elaboration of timetables and the organization of examination schedules and other evaluations, based on proposals discussed with students and teaching staff, according to teaching needs.

Teaching at discipline level is offered in lectures, practical and laboratory sessions and applied seminars.

Theoretical teaching is mainly provided on a classic way by most disciplines, although case-based teaching and interactive computer assisted learning are also reported in 16 and 6 out of 38 disciplines, respectively.

Practical teaching is provided in the great majority of disciplines to groups of students as work in laboratory sessions, in direct contact with animals (healthy and sick), in the Food Technology pilot plant, abattoirs, private farms, experimental units. Practical classes are in general introduced by brief theoretical descriptions followed by "hands on" exercises (reported in 33 out of 38 disciplines). On a smaller scale, case-based or interactive computer assisted learning are also used in practical teaching (in 20 and 9 out of 38 disciplines, respectively).

Theoretical-practical teaching varies from supervised work, seminars by external experts, thematic discussions supervised by faculty members, for all students and in some cases for groups of students.

Problem based learning approach has been partially introduced in some disciplines (reported in 16 out of 38) at theoretical and practical levels.

During the last two years, the Pedagogic Council, in collaboration with students, has organized extracurricular activities for students of the first and second years named "Complementary Activities", aiming at a better insertion of students in the objectives, organization and activities of the under-graduation course in particular and in the life of the School in general. Within these activities, groups of students supervised by elder colleagues, staff workers or teachers, participate, on a voluntary basis, in the maintenance and care of large and small animals kept in the School premises, thus contributing to improve animal welfare and simultaneously to their own education.

Under identical objectives and organization, students of the third, fourth and fifth years are offered the possibility to participate in the so called "Hospital Activities" mainly at the small animal hospital where they develop activities according to their knowledge in the relevant subjects.

Mobility programs are widely participated, as around 28% of FMV students are enrolled on at least one exchange period during their degree. Although the present curricular plan does not include any credit ratings of disciplines, ECTS has been already applied, to facilitate the above-mentioned actions (see Table 4.2.).

A large majority of disciplines (> 90 %) uses text books (available in the library and/or provided by the

teachers) as basic study material to be used by the students. However, study is supplemented with in house prepared text books or notes elaborated by teachers ($\pm 30\%$), copies of material presented during classes ($\pm 20\%$), and scientific papers generally provided by teachers ($\pm 15\%$). It is of common knowledge that students use notes taken during classes as study material, however assessment of this procedure is not determined.

Use of Internet sites is pointed out in approximately 10% of the disciplines. Use of library is essential to the study of approximately 50% of disciplines.

Traditional audiovisual equipment (slides and overhead projectors) are available in all classrooms and laboratories. Datashow and video equipments are available on a permanent basis in three classrooms (out of five). Mobile equipment is also available. Internet connections are available in all classrooms.

A computer room is used when necessary by different disciplines namely, Biomathematics, Animal Nutrition, Epidemiology (Infectious Diseases), Biophysics and Physiology.

Computer facilities are used for teaching purposes in 28 disciplines. Specific teaching software is used in several disciplines namely, Anatomy, Biophysics, Biomathematics and Informatics, Genetics, Physiology, Biochemistry, Nutrition, Pharmacology, Microbiology, Infectious Diseases, Toxicology, Animal Husbandry, Public Health and Large Animal Clinics.

Partners in education

Except for some disciplines at the initial level of the course, and disciplines using the Small Animal Hospital facilities, around 50% of disciplines and namely those of the fourth and fifth years interact with external professionals, based on protocol agreements and very often, based on contacts established by teachers.

Practical teaching takes place among others on official institutions as Estação Zootécnica Nacional (EZN), Coudelaria Nacional (Horse Stud Center), GNR (Horse-Mounted Police), Companhia da Lezírias, Centro Experimental do Baixo Alentejo, Docapesca, IPIMAR, CRASPEM de Monsanto (Ecological Park) and private companies as feed industries (PROVIMI), farms (SOCLA, Casal de Quintanelas, Barão&Barão, Casa Paisana, José Policarpo, Duarte França, Casa Florêncio, Manuel Barata, Quinta Pedagógica dos Olivais, Casa do Gaiato, Associação de Protecção de Infância, Fertiprado), abattoirs and food processing plants (CASO, Fricarnes, Sicasal, Santacarnes, Raporal, Porcave, Avipronto, Intercoelhos, Sociedade Industrial de Carnes da Arrábida) and pharmaceutical

laboratories (ATRALCIPAN, PFIZER, BAYER, MERIAL).

On a routine basis, groups of 8-15 students are transported to different locations where practicals take place. With the exception of students involved in preclinical and clinical disciplines (fourth and fifth years) who develop “hands on” work, the others just observe and discuss the different aspects of the activities developed.

During visits or working sessions, students are supervised by teachers and/or technical staff of the guest entity.

In 12 distinct disciplines, external experts (27 national and 2 foreigners) collaborate in teaching activities at different levels (seminars, theoretical and practical classes) on a total of around 120 hours/year. FMV has a regular collaboration of several veterinary practitioners and specialists of different subjects who contribute to the undergraduate teaching programme. A list of Faculty external lecturers, visiting experts and associates in practical classes, referring their area of expertise, is shown below:

Invited Lecturers

Professor Francisco Avillez, BAgron, PhD.
Head, Agrarian Economy
Higher Institute of Agronomy (ISA)
(economics)

Professor Carlos Noéme, BAgron
Agrarian Economy
Higher Institute of Agronomy (ISA)
(economics)

Professor Hugo Gil Ferreira, MD, PhD.
BioMedical Institute, University of Porto
(physiology)

Visiting experts

Mr. René Scholten, DVM
Equine practitioner, Holland
(large animal clinics, infectious diseases)

Professor Charles Hjerpe, DVM, PhD.
Large Animal Clinics, University of Davies (California)
(large animal clinics)

Mr. José Bidarra, BBiology.
Biolmago
(pest control)

Mr. Carlos Fragoso de Almeida, DVM
Regional Agriculture Services of Ribatejo&Oeste

(environmental protection)

Mr. Carlos Morbey, DVM
Director, Council Veterinary Services
Lisbon Council Authority
(food hygiene)

Dr. Miguel Fevereiro, DVM, PhD. (Cornell)
Head, Virology Section, National Laboratory of
Veterinary Research (LNIV)
(viral infectious diseases)

Mrs. Maria Inácia Carvalho, DVM
Head, Brucellosis Unit, National Veterinary Diagnostic
Laboratory (LNIV)
(brucellosis diagnostic)

Dr. Rui Perestrelo Vieira, DVM, PhD.
State Veterinary Services
(swine infectious diseases)

Mrs. Raquel Luisello, DVM
National Veterinary Services
(ruminant national health programmes)

Mr. António Menezes, DVM
Avian specialist
(avian infectious diseases)

Dr. Paula Ramos, DVM
Portuguese Fish Institute (IPIMAR)
(fish parasitic diseases)

Dr. Sónia Centeno Lima, BBAiology, PhD
Tropical Medicine and Hygiene Institute (IHMT)
(parasitic diseases)

Professor Helena Angelo, BPharm, PhD.
Head, Parasitology Section
National Institute of Health (INSA)
(parasitic diseases)

Dr. Maria Manuela Afonso-Roque, BBAiology
Researcher, Institute of Tropical Research and
Development (CVZ/IICT)
(tropical parasitic diseases)

Mr. Helder Cortes, DVM, MSc.
Assistant, Evora University
(parasitic diseases)

Professor José Manuel Almeida, DVM, PhD.
Veterinary Pharmacology and Toxicology
University of Trás-os-Montes e Alto Douro (UTAD),
Portugal
(Pharmacology)

Mr. J. Cardoso Resende, DVM
Portuguese Veterinary Chamber
(deontology)

Faculty associates

Mrs. Maria José Rodrigues, DVM, MSc.VPH
Lisbon Council Authority
(fresh food markets hygiene)

Mr. André Magalhães, DVM
Technical manager, UTL Social Services catering
units
(food catering units)

Mr. João Paisana, DVM
Dairy cattle practitioner
(Large Animal clinics)

Mr. Mário Barbosa, DVM
Director, National Equine StudBook
(animal production and equine reproduction)

Mr. José Júlio Alfaro Cardoso, DVM
Swine practitioner
(swine reproduction)

Mr. António Leitão Alegre, DVM
National Breeding Institute
(bovine reproduction)

Mr. João Nestor das Chagas e Silva, DVM
National Breeding Institute
(IA specialist)

Mr. Luis Sardinha, DVM
Manager, swine slaughter and meat processing unit
(CASO)
(meat technology)

Mr. Telmo Nunes, DVM
Researcher, UISEE/FMV
(epidemiology)

FMV teaching staff is frequently asked to collaborate in other Portuguese and European veterinary education institutions both in undergraduate and post graduation courses.

In the academic year 2002-2003 these collaborations took place in Portuguese institutions, namely:

Other Veterinary courses:

University of Évora

Instituto de Ciências Biomédicas Abel Salazar (ICBAS), University of Porto

University of Trás-os-Montes e Alto Douro

Higher education establishments:

Instituto Superior de Agronomia (ISA), Technical University of Lisbon

Faculdade de Medicina, University of Lisboa

Instituto de Higiene e Medicina Tropical (IHMT), New University of Lisbon

Faculdade de Medicina, University of Porto

Escola Superior de Biotecnologia, Catholic University (Porto)

Escola Superior Agrária de Elvas, Portalegre Polytechnical Institute

Escola Superior Agrária de Coimbra, Coimbra Polytechnical Institute

Escola Superior de Hotelaria do Estoril.

Public institutions:

Direcção Geral de Veterinária (DGV)

IBET.

Regarding European Institutions, staff from FMV collaborated under ERASMUS with Faculties of Milano, Padova, Cáceres, Las Palmas de Gran Canaria and Uppsala.

5.2: THE TEACHING ENVIRONMENT

In relation to available staff development facilities FMV does not organize formative actions in the area, on a regular basis. However, Scientific Council has organized a few courses in pedagogic matters and more recently (2002) the Pedagogic Council organized a Seminar (20 hours) on “Problem based learning (PBL) on Teaching in Veterinary Medicine”, addressed to teaching staff and students. The Seminar was conducted by a group of six professors and one student from the Faculty of Veterinary

Medicine of the Swedish University of Agricultural Sciences in Uppsala, under a collaborative Programme supported by the Swedish STINT Foundation. Stimulated by the success of this Seminar, the Pedagogic Council intends to promote similar actions on a more regular basis.

Further to the above mentioned actions the Rectorate of UTL organises short courses, on a yearly basis, directed to teaching staff of the different schools, aiming the improvement of didactic skills.

Teaching excellence is not the most relevant criteria for promotion of teaching staff. Assessment of teaching quality is poorly addressed and limited to inquiries to students promoted every year by the Pedagogical Council. Although some teachers include in their *curricula* the results of student's appreciation, this policy is not generally used or reinforced for progression purposes.

Improvement of quality teaching has been done also through investments in laboratory and hospital equipments and audiovisual materials to enhance teaching capabilities at discipline level.

5.3: THE EXAMINATION SYSTEM

The Scientific and Pedagogic Councils proposed, in 1994, a regulation named “Knowledge evaluation system and rules to admission to final exams”, in which evaluation procedures and criteria for admission to exams were defined.

Under the current system, evaluations occur on two defined periods during which no classes are offered:

- i) The so called “Normal period” in two phases – 1 month at the end of the first semester (dedicated to final exams of semester disciplines and to partial evaluations of annual disciplines); 2 months at the end of the second semester (dedicated to final exams of semester and annual disciplines).
- ii) The so called “Second opportunity period” – 1 month, in September before the beginning of each academic year (dedicated to final exams of annual and semester disciplines) in which students may perform a maximum of four exams.

Further to the above mentioned exams, two “special examination periods” occurring during the first period of the first semester, are dedicated to exams of “working-students” (2-3 weeks) and students of the fifth year fulfilling conditions to finish graduation (4 weeks).

Extraordinary exams are also organized during all the academic year for “High Competition Athletes” and for student leaders of the “Student’s Union”.

Different examination systems are used in FMV:

Table 5.1 - Proportion of disciplines using different examination types

Relative weight of examination forms	
Written examination (descriptive short answers)	78.9%
Written examination (descriptive long answers)	39.5%
Multiple-choice questions	60.5%
Oral examination	26.3%
Practical examination	73.7%
Clinical examination	7.9 %
Continuous assessment	15.8%
Others*	10.0%

* Reports evaluation

Evaluations are made by juries composed by the teachers of the disciplines and in many instances include 1 or 2 teachers of different disciplines. In one case, an external examiner is included in the jury.

No limits are applied to retake examinations.

Students may initiate a new year having not passed previous examinations under specified conditions. Maximum numbers of unaccomplished disciplines still allowing students to register in the next years of the course is determined as follows:

Table 5.2 - Specified conditions for students enrolment in each curricular year

2 nd Year	3 rd Year	4 th Year	5 th Year
Two disciplines from 1 st year	One discipline from 1 st year and/or one from the 2 nd year or two from 2 nd year	One discipline from 2 nd year and/or one from 3 rd year or two from 3 rd year	One discipline from 3 rd year and/or one or two from 4 th year or three disciplines from 4 th year

5.4: EVALUATION OF TEACHING

The quality assessment of the teaching/learning process is promoted by the Pedagogic Council through inquiries promoted twice a year (at the end of each semester), to be filled in by students. The inquiries address global aspects of each subject, such as coordination of contents of both practicals and lectures, contribution of the discipline to the whole learning, adequacy of evaluation and workload. Each teacher is individually assessed through specific items (availability, development of critical reasoning, etc). Students are also asked to give their opinion on the facilities available to each discipline.

Results of the enquiry are pulled together and analysed. The global appreciation of each subject is distributed to all teachers of each discipline. Individual results of teaching/learning performance are only communicated to the respective teacher, to the responsible of the discipline, the Dean and the Presidents of the Scientific and Pedagogic Councils.

However, many teachers choose to make these results available and quite often include them in their CV.

5.5: STUDENT WELFARE

The accommodation for students is partially provided at central University level, through several residencies. A canteen serving the Campus is located within a walking distance. Furthermore, there are 8 rooms and a living room, available for students staying on Hospital duty at FMV.

Students have full access to a computer room with web connection.

The FMV bears in its own premises the Students Association facilities. These comprise offices, a copy centre and two small catering and cafeteria units.

Sport facilities are also provided at University level, and the students have full access to swimming pools, gymnasium, football and other sport pavilions.

FMV has a Student Support Office, where a Professor and a Psychologist provide guidance to students, at different levels, whenever requested.

Furthermore, Merit Grants are awarded by UTL to FMV students, based on their scholar performance, each year. Also, FMV awards a prize to the best student in the Clinical area of each course, the Prof. A. Abreu Lopes Prize.

2. COMMENTS

One of the main constrains for the quality of teaching is the teachers:student ratio. In fact, the global ratio is still on the “not satisfactory” band, according to EAEVE/FVE recommendations. Despite the strong governmental restrictions to enlarge the teaching staff through recruitment of new teachers, the Faculty has made a considerable effort to overcome this difficulty, mainly in the field of small animal clinics. However, a reinforcement of some teaching areas is still necessary.

Most of the teaching staff of the Faculty has made good progress in their career, which had a good impact over the quality of teaching.

The teaching program has not been changed over the past 20 years. Although the EC Directive is followed, in terms of curricular contents, new professional challenges require adjustments of *curriculum*. Some of the new requirements have been met through individual efforts and updates in subject contents. However, some fields of Veterinary Science teaching have not yet met the aimed standards.

Based on week points identified and new requirements, a new *curriculum* is in the final phase of development, awaiting approval by the Consultive Council of FMV. Students may surely give an important input to the definitive design. Also in terms

of evaluation, students are particularly accurate in their comments and suggestions, as patent in the results of the above-mentioned inquiries, and their input should be taken into consideration.

Student's mobility at FMV seems to be a quite attractive activity. The proportion of student exchange in both directions, led to the application of ECTS system through an “ad-hoc” conversion rate (Table 4.2).

3. SUGGESTIONS

Higher quality of teaching/learning can be achieved through more adequate ratios and an even deeper involvement of students in the different professional areas and in research activities.

Teaching quality of staff should be recognised and in fact used as assessment criteria for promotion.

Teaching methodologies could be improved in different areas.

Evaluation of both students and teachers should follow more clear parameters. Students would only benefit from a decrease in the time spent in examinations throughout the year, which could be gained by different approaches for evaluation (to be defined) and considering their participation in different activities developed at the Faculty.

The re-introduction of a maximum number of consecutive years during which students may fail would give rise to a desirable selectivity although as the *numerus clausus* for FMV is very demanding, our students show a good performance during their course.

Coordination of contents and complementarity among disciplines at both horizontal and vertical levels is highly desirable.

Teaching coordinators of present Scientific Areas are expected to take this responsibility.

Future curriculum should fully apply ECTS.

Chapter 6 - FACILITIES AND EQUIPMENT

1. FACTUAL INFORMATION

6.1: PREMISES IN GENERAL

The Veterinary Medicine course began in Portugal in 1839 and the Faculty of Veterinary Medicine (FVM) worked for more than a century, until 1999, in the former facilities (Pole II) in the Lisbon centre. FVM has volunteered for the pilot study of ACVT evaluation system in 1989, still in those former premises. However, the great development of the city has overcome the growth of the faculty located in one of the busiest boroughs of Lisbon.

The present facilities in Pólo Universitário do Alto da Ajuda (Pole I), were built in the nineties, surrounded by the Tapada da Ajuda wall (East), a road (South) and the Monsanto Park on the other sides. The FVM moved in September/October 1999 to the new premises (to begin the academic year of 1999/2000) and was officially open on the 26th March 2000, by the President of the Republic of Portugal.

Figure 6.1 - Lecture theatre



The new premises are located nearby the ISA, the Faculty of Architecture and the Institute for Social and Political Sciences, forming a new University campus of Lisbon with common canteens and sports centres.

FVM teaching areas are organized essentially by five groups of functional areas: three (four since November 2003) departmental sectors, Hospital facilities and Common Services (CS).

The total functional area of the new facility is around 28,000 square meters and is divided in several buildings or blocks:

A – Administrative, Management and Maintenance Services, Main Editorial Centre, Lecture Theatres and General Library. This block provides support services

for the entire Faculty, namely concerning the Secretariats and Dean's and other Faculty management offices, two lectures halls and Library services.

B – Main Hall and Auditorium for Academic Sessions, University events and Congresses, with associated multimedia room. It is located between buildings A and C.

C – This building has a vertical functional arrangement: floor C-1, the basement, is the main parking lot. Floors C0 and C1 are dedicated mainly to teaching activities: Teaching Laboratories, 2 Lecture Theatres Professor's Room, 2 Audio-visual Rooms, a Technical Book Shop, Student's Union (with Direction Room, Editorial Centre and Multimedia room), 2 Bar/Cafeteria units. C2 is only partially occupied by the Food Technology Sector, and may, in the future be used for expansion. Floors C3 and C4 comprehend Departments' administrative rooms and secretariats, Teaching Staff Offices, non-teaching staff rooms and Diagnostic and Research Laboratories. In each floor there are central preparation and sterilization units, which provide the washing, preparation, sterilization and packaging services to the teaching or research laboratories of that floor. These units also provide distilled, demineralised or otherwise purified water to the labs.

D – This is a building mainly devoted to Clinics and Hospital support units: Bioterium, Reproduction Laboratories, Surgery theatres for Small and Large Animals and related rooms (Medicinal Gases, Preparatory and Sterilizing Room, Surgery in-patient cages, Recovering Box), Imagiology (X-Rays, Ultrasonography, Tomography), Meeting Rooms, Libraries, Pharmacy and clinical staff offices;

Figure 6.2 - Tomography unit



E – This building is exclusively dedicated to small animal Clinics: waiting room and reception area, consultation rooms, sample collection room, radiology, intensive and intermediate care units.

F – Kennel and cattery, with associated support rooms and 1 Lecture theatre.

G – Rooms for clinical practical classes with animals (Gynaecology examination room), Anatomy and Pathology practical training rooms, Anatomy preparation room, Necropsy rooms, Refrigerating and freezing chambers, Isolation unit and general store.

H - Animal premises, including dog and cat accommodations, stables of the Large Animal Unit (Small ruminants, Cattle and Horses) and two practical class rooms.

The detailed plans of the Faculty of Veterinary Medicine, including room dimensions and design, are contained in Appendix I.

All buildings have autonomous vertical and horizontal communications and Buildings A and C have elevators for every floor, even for the parking site in the basement.

Figure 6.3 - Main plan of the FVM



A - Administrative Services; B - Main Hall; C and G - Teaching & Research; D, E and F – Hospital; H - Animal premises.

6.2: PREMISES USED FOR CLINICS AND HOSPITALISATION

Large Animals (LA)

Equine: FMV has 6 individual boxes, which are spacious enough to be used by more than one animal (e.g., donkeys, mares and related foals). One box is used permanently for a resident equine, the others are reserved to clinical cases brought to FVM by the LA clinical staff. These boxes are located in the Large Animal’s stable of Block H. There is also access to the Horse Mounted Police (GMR) facilities near FMV (app. 2 Km) through a protocol of collaboration between the two institutions. Not only

students attend classes there but horses from that unit do come for clinical consultation at the school premises. This unit has 250 individual boxes which house over 200 horses, a surgery room and a Equine Hospital.

Cattle: There is room for 6 adult animals. Four boxes are used for animals in practical classes (e.g., Physiology, Animal Behaviour, Pharmacology, Medical Semiotics). Occasionally, clinical cases are brought in by farmers or by clinicians of ambulatory clinics, for teaching and treatments. The animals are kept in the LA stable of Block H.

Small ruminants: sheep and goats are kept in the small ruminant stable of Block H. There are boxes that may hold approximately 30 sheep and/or goats. Some boxes are used for animals of FVM, since only occasionally hospitalisation is required. However, some of these boxes (four) have been used quite often for calves, namely when the LA stable is full.

Swine: Requests for clinical work in pigs is practically non-existent in the area due to legal constraints concerning movement of pigs. Some pens next to the small ruminant stable of Block H, originally designed for pigs, were adapted for sheep and goats. Pigs are instead kept at EZN.

There is a multipurpose isolation facility designed to accommodate large and medium animals and/or small animals which is described in 6.3.

The facilities comprise lecture halls, classrooms, tutorial rooms, teaching and research laboratories, staff rooms and service rooms. Additionally, there is a Main Library, a Large Animal Unit (with related support services and animal accommodation spaces) and an area with several offices used by the Students Union.

Table 6.1 - Places available for clinics and hospitalisation

- n° of hospitalisation places for cattle	2
- n° of hospitalisation places for horses	5
- n° of hospitalisation places for small ruminants	20
- n° of hospitalisation places for pigs	*
- n° of hospitalisation places for dogs	37
- n° of hospitalisation places for cats	15
Number of animals that can be accommodated in isolation facilities;	
- small animals	10
- farm animals and horses	6-10

Figure 6.4 - Horses and cattle stables; A. North view



6.3: PREMISES FOR ANIMALS

Besides the Ajuda animal premises described in 6.2, FMV has a protocol with EZN (70Km away) that allows for the use of an exclusive area of 300m² of covered open space as a LA clinical unit, at Santarém. The same protocol also allows for the performance of practical classes and clinical training using the various food animal species housed in EZN.

Additional hands-on training is provided during visits to commercial farms through specific protocols of the ambulatory clinics and other subjects such as Infectious and Parasitic Diseases.

Figure 6.5 - Horses and cattle stables; B. South View



There is also a protocol with GNR for students to have access to horse clinical practice, as referred above. Under this protocol, students have access to police dogs in premises located at a walking distance from the school (100 dogs).

FMV is provided with a multipurpose isolation section in Building G (next to the necropsy room), prepared

to accommodate animals suffering of current contagious diseases (except List A).

The isolation unit comprises four separated animal rooms (G0.28, G0.29, G0.30 and G0.31), a small laboratory and a preparation room, feed and other material stores, changing rooms and WCs. Animal rooms can work with negative pressure and HEPA-filters at the exhaust holes. Isolation facility has air filtered inlet and separated sewage.

In room G0.31, it is located a convertible (positive - negative pressure) isolator both for work with SPF animals and/or for dangerous pathogens handling.

The animal rooms can accommodate up to ten small animals and/or up to 6 to 10 large or medium size animals.

Figure 6.6 - Small Ruminants stable



There is also an experimentation animal unit in Building D which provides rats, mice and rabbits both to teaching and research projects.

6.4: PREMISES USED FOR THEORETICAL, PRACTICAL AND SUPERVISED TEACHING

Lecture halls are dedicated to veterinary medicine undergraduates. Other group work facilities are sometimes shared with animal production undergraduation and post graduation teaching.

The Pedagogical Council is in charged of managing available teaching spaces for undergraduates. Departments related to other teaching responsibilities manage directly their own spaces.

Table 6.2 - Premises for lecturing

Number of lecture halls						5
Number of places per lecture hall						
Hall	A1.14	A2.16	C0.12	C1.12	F0.1	
Places	120	120	80	80	120	

Table 6.3 - Premises for group work

Number of rooms that can be used for group work (supervised work)								7
Number of places in the rooms for group work:								
Room	C3.2	C3.3	C3.37	C3.38	C3.78	C3.79	C0.13	
Places	25	25	25	25	25	25	20	
Total number of places in rooms for group work								170

Table 6.4 - Premises for practical work

Number of laboratories and other spaces for practical work by students										45
Number of places per laboratory										
Room	C0.17	C0.18	C0.19	C0.22	C0.23	C0.26	C0.27	C1.17	C1.18	
Places	30	25	25	30	40	35	35	35	30	
Room	C1.20	C1.21	C1.23	C1.25	C1.28	C2.3	C2.9	C2.18	C3.5	
Places	15	30	25	25	25	20	20	20	20	
Room	C3.6	C3.7	C3.8	C3.76	D1.4	D1.12	D1.13	D1.17	D1.24	
Places	20	20	20	25	8	8	8	8	12	
Room	D1.25	D1.26	D1.40	D1.41	D2.24	D2.26	E1.4	E1.5	E1.6	
Places	12	12	15	15	8	17	8	8	8	
Room	F1.6	G0.1	G0.2	G0.9	G0.10	G0.17	H0.7	H0.13	H0.20	
Places	12	30	30	25	25	35	12	17	17	
Total number of places in laboratories and other spaces:										900

Each of the rooms and laboratories used for practical work is equipped with emergency eye wash and other decontamination devices, such as showers, as well as smoke detectors and gas evacuation systems, according to Portuguese safety legislation. Students and other users are informed of the dress code and protection required for entering particular premises and also of safety operation procedures to be abide by, namely hazardous waste handling and disposal.

Health and safety procedures and their quality control are coordinated by the Technical Support Team of the Dean's Office, specifically by the Safety Officers.

6.5: DIAGNOSTIC LABORATORIES AND CLINICAL SUPPORT SERVICES

The Clinical Pathology Laboratory renders services to the Veterinary Teaching Hospital and to private practices and animal hospitals in the Lisbon area but also country wide (around 20,000 tests in 2002). Services include large and small animals, zoo animals and exotic species haematology, biochemistry and urinalysis. Special haematology tests performed include bone marrow cytology and, blood cross match, Coomb's test and automated coagulometry. The Clinical Pathology Laboratory also offers cytology (performed on a variety of biological specimens), automated serum protein electrophoresis, autoimmune disease diagnosis (antinuclear antibody titration and LE cells diagnosis), effusion fluids analysis and semi-quantitative analysis of uroliths. The Clinical Pathology Laboratory also comprises a microbiology section dedicated to clinical bacteriology and antimicrobial resistance.

Additional to routine clinical pathology work the Laboratory provides graduate and post-graduate training in clinical pathology and bacteriology and also as a strong interest in bacterial pathogenesis and antimicrobial resistance research.

FMV Hospital clinical activities and private veterinary practices of the Lisbon urban area also count on the analytical support of several diagnosis laboratories associated to various disciplines of the faculty. These laboratories also participate in graduation and postgraduate student training in their respective fields of action. A list of these diagnostic laboratories follows:

1. Histopathology and cytology laboratory (C4.8, C4.9, C4.10 and C3.10)
2. Parasitology laboratory (C4.11, C4.12 and C4.43)
3. Mycology laboratory (C3.46)
4. Virology laboratory (C4.83)
5. Retrovirology and Immunology laboratory (C4.50)
6. Bacteriology laboratory (C4.51)
7. Reproduction laboratory (D1.40, D1.41, D1.43 and D1.45).

Each of these laboratories has its own independent premises in buildings C and D and their activities are supported by the central preparation and sterilization units mentioned above.

The sector of Microbiology and Immunology renders diagnostic services requested by FMV Hospital and external colleagues, in Laboratories C4.50 (Retrovirology and Immunology) and C4.51 (Bacteriology). Diagnosis runs in conjunction with applied research in both laboratories. The

Retrovirology and Immunology Laboratory is fully equipped and develops work mainly on companion animals affecting virus, not restricted to Retrovirus. A special emphasis is put on immunity induced by vaccination in dogs and serology and epidemiology of feline viral infections. Bacteriology Laboratory has a marked vocation to perform clinical diagnosis of production animals' bacterial diseases and anaerobic infections. Antimicrobial susceptibility is evaluated and auto-vaccines are prepared upon request, after characterisation of pathogens. The recognised need for a quick replay from the laboratory led to the development of diagnosis technics as alternative to traditional bacteriology, such as serology (ELISA) and PCR for *Leptospirosis*. Other methods are presently under study, namely on mastitis pathogens.

The sector of Parasitology and Parasitic Diseases perform several routine diagnostic methods (coprological methods, skin scrapping, hematological analysis, parasite identification, search for *Leishmania* spp.), in Laboratories C4.11, C4.12 and C4.43. The laboratories are equipped for the major parasitological techniques, namely bench and microcentrifuges, light, stereoscopic and immunofluorescence microscopes and digital camera for parasite identification. These facilities have been recently equipped with a thermocycler, flow chamber, automatic plate washer, immunoelectrophoresis and tissue desintegrator to perform PCR techniques for *Babesia/Theileria* spp. identification.

Pharmacology and Toxicology unit provides diagnostic services concerning the study of animal intoxications and poisonings, aiming both the animals (domestic and wild) and their environment (farm, house and natural ecosystems). The techniques are performed in Laboratories C3.5, C3.6, C3.7 and C3.8, with devices such as gas chromatography, HPLC, HPTLC and Atomic Absorption.

The Mycology Service (Laboratory C3.46) provides diagnosis on animal micotic diseases, namely dermatosis, particularly microsporosis, trichophytosis, candidosis, malassesiosis and aspergilosis. It also renders diagnostic service concerning environment and food contamination with micotoxins. The Laboratory is equipped with microscopes, and an incubator for the overall techniques.

The Clinical Pathology Laboratory has improved recently its offer for the clinicians, namely with molecular techniques concerning the identification of bacteria resistant to antibiotics. The sector acquired recently thermocyclers, bench and microcentrifuges, gel containers and flow chambers for a better performance in the field of molecular diagnostic.

The Pathology Laboratory is responsible for the macroscopic and microscopic diagnosis of major pathological situations, both ante and post-mortem. Besides the necropsies performed in G0.17, the histopathological techniques and microscopic

diagnosis are done in Laboratories C4.8, C4.9, C4.10 and C3.10. This sector has a tissue processor, paraffin dispenser, bench and microcentrifuges, light microscopes and a digital camera for recording the major diagnosed cases.

The Reproduction and Obstetrics Laboratories (D1.40, D1.41, D1.43 and D1.45) perform gynaecological and andrological exams in several species indoor (small carnivores and horses) and outdoors (ruminants and horses), gives technical assistance on the reproduction management (infertility survey on cattle and horses, female/male exam, semen freezing and artificial insemination) and associated pathology. For the routine exams are used ecographic and endoscopic devices, both for small and large animals, light microscopes and monitors and liquid nitrogen containers.

The Embryo Transfer Laboratory (D1.44) provides services towards the improvement of cattle and horse reproduction using the techniques of embryo transfer and sexing, mainly between imported and native breeds. Inverted microscopes with micro-manipulation, PCR thermocycler, normal and CO₂ flow chambers are among the most important equipment.

The Food Technology Laboratories (C2.3, C2.8 and C2.9) are involved with major chemical and microbiological analysis of several food processing types (traditional and industrial sausage production, cooked and pre-cooked dishes, milk and cheeses, fish, etc.). Besides the microscopes and centrifuges, the laboratories are equipped with industrial freezing, smoking incubator, ultra-filtration, reverse osmosis, several scale machines for milk and meat processing, spectrophotometer, rotavapor.

Imagiology services are allocated according to the animal species targeted. Thus, ultrasonography, endoscopy, computed tomography and radiology services are integrated in the small animal Hospital facilities, i.e., in building D and F, in close vicinity with the companion animal clinics.

Large animal radiology service is located in the ground floor of building D. Ultrasonography of large animal species is provided either by Reproduction Clinics (building D0) or by mobile equipment transported by the ambulatory clinics service, which is also the case for large animal endoscopy.

Anaesthetic support is provided in the Hospital Building D by a central gas distribution framework (oxygen, nitrous oxide and compressed air) with outlets in each of the surgery theatres. Mobile gas cylinders and anaesthetic apparatuses are also used for specific needs within buildings F and D, namely for imagiologic and other diagnostic procedures.

Preparation of surgical instruments, surgical drapes and clothing is organized in the ground floor of buildings F and D, namely in the laundry unit and

preparation and sterilization unit, exclusive to hospital use.

One laboratory is being set up specifically for the radio-isotope work (C4.44) and is currently under a process of licensing (for the use of ³²P, ³⁵S, ¹²⁵I, ²H and ⁵¹Cr) by the services of the Ministry of Health (process n.º1749).

6.6: SLAUGHTERHOUSE FACILITIES

FMV has access to seven slaughterhouses that are visited by the disciplines of Sanitary Inspection and Food Technology. Description of those is presented in Chapter 4.8: Specific Information on the Practical training of Food Hygiene.

6.7: FOODSTUFF PROCESSING UNIT

Food Technology sector is equipped with a multipurpose (meat, dairy and fish) teaching food processing unit (C2.9).

Practical classes and visits of the discipline Food Technology are also performed in different foodstuff processing units. Description of these is presented in Chapter 4.8. Specific Information on the Practical training of Food Hygiene.

Figure 6.7 - Food processing unit



6.8: WASTE MANAGEMENT

Waste management is an important issue in institutions as FMV, producing materials classified by legislation as “hazardous residues” in the teaching and research laboratories and at the hospital.

Waste management follows two main lines, according with the type of waste:

1. Dangerous residues (group III and IV) are collected by a company in charge of hospital waste removal and disposal called SUCH;

2. Non-dangerous residues (group I and II) are collected by Lisbon County Authority (CML).

Residues management follows EU and national legislation requirements (Desp.Conj 761/99, 31/9; Desp. Min.Saúde 242/96, 13/8; Decision 94/37/CEE and Decision 94/904/CEE).

1 . Management of hazardous residues

Separation and packaging:

The different types of dangerous waste include sharp objects, infectious material, dead animals/parts of small and experimental animals, drugs and chemical products. The volume of waste (group III and IV) produced at FMV in 2002 was 20,730 kg.

SUCH provides containers for these types of waste.

Group III materials (dried residues, infectious materials) are collected in cardboard boxes lined with a plastic bag and with a system for hermetic closure. Printer cartridges are recycled returning to suppliers.

Group IV materials as dead animals/parts of animals and drugs are collected in "bio-boxes".

Chemical products and Rx film processing residues are collected in plastic jerry cans.

Labs, consultation and surgery rooms are provided with specific rigid containers (yellow boxes) for the collection of needles, blades and other sharp objects.

One person is in charge of collecting all boxes and cardboard boxes that are placed inside special containers. These containers and the bio-boxes are then stored up to collection by SUCH.

Personnel involved in residues collection wear protection suit, apron, boots, gloves and in especial occasions, mask.

Storage:

A storehouse at room temperature is used for the storage of jerry cans, grouped by type of product. All the other waste is submitted to cold storage. The organisation of the cold storage room keeps record of the date of entry of containers.

Transport and final destination:

SUCH does the removal of this waste upon call, usually twice a week. The transport used is adequate for this type of waste and final destination is the incineration. Cannon Hygiene, a company subcontracted by SUCH, collects special waste boxes from toilets.

Safety of the processes:

The correct separation and identification of containers and their circuit, the protection of the

personnel involved and the safety of storage up to collection, assures the adequate safety to the process.

A special procedure is followed for cadavers of ruminants, which are collected by another specialized firm for incineration as SRM (specific risk materials). The remains are kept in large containers in the refrigeration room of the post-mortem facilities, and recollection is made upon request.

Radio-isotopes (125L) are used in just one laboratory, included in an analysis kit. The residues are collected, diluted and stored in appropriate containers for a 2 months quarantine. These residues are then collected by SUCH for incineration.

2. Management of non-dangerous residues

Volume:

The volume of this type of waste is not known because removal is performed by CML with no costs.

Separation and storage:

There are two units for separation of paper, glass and plastic containers (eco-point). Its use is voluntary but cleaners separate paper and plastic bottles for recycling. In some places, waste bins for different materials are provided.

Organic waste is removed daily from premises by cleaning workers and collected in specific containers, stored outside the buildings.

Transport and final destination:

CML removes organic waste on a daily base for convenient disposal. Eco-points are unloaded whenever necessary.

6.9: FUTURE CHANGES

Several adaptation works, mainly in the Clinical buildings and animal wards and stables are projected and under development. It is the case of the equine soft track, non-slippery flooring of large animal surgery rooms and the sling suspension crates for downer cows. These are minor modifications of flooring, space divisions and functional adaptation of premises. No major alterations to the faculty facilities are projected for the near future.

In Pole II, a Museum of Veterinary Medicine will be housed, thanks to a protocol signed with CML. This museum will show, among other features, a rare collection of preserved organs exhibiting lesions of several diseases, resulting from FMV's own collection merged with an important collection donated by the Lisbon Municipal Slaughterhouse, which is now closed.

2. COMMENTS

The premises of FMV in Alto da Ajuda were planned and are broadly adequate to undergraduate teaching of 80 students per course year. However, FMV has a student population that surpasses this number, which creates logistical problems. These have been satisfactorily dealt with by FMV's administration in the last few years. A reduction of student population would correct this situation, but this is a scenario that would have severe impacts upon finances (see Chapter 3). Therefore, FMV must continue enduring this slight overcrowding situation and assuring that its impact on the quality of teaching is minimized.

FMV needs major re-equipment of most of the teaching, clinical and diagnostic support facilities. Actually, due to the dimension and functioning processes of FMV, every piece of equipment installed is directly or indirectly used for teaching. Financial constraints prevent renewal of equipment supported by the faculty's own funds, except in critical areas. Therefore, the administration of FMV and CIISA have applied to national re-equipment programmes and, more recently, to programme-contracts with MCES, which, hopefully, will give some fruits in the near future.

Although Pole I premises are relatively new they have undergone several maintenance interventions in the last three years, because of the poor quality standards of construction. The Technical Support Team coordinates interventions in this field, which are funded by FMV's budget or by PIDDAC funds provided by UTL. Equipment maintenance is also coordinated by the Technical Support Team, through direct intervention; outsource contracting or maintenance contracts acquired together with the apparatuses. Unfortunately, as the latter option substantially increases immediate costs of purchase of equipment (although profitable in the long run), it is not widely applied.

With the rise of the number of postgraduate activities, which is a positive factor, the number of available rooms for small group work seems insufficient.

In the near future, there will be a need to re-allocate available existing spaces to create more working group rooms. There is enough space in the faculty, and the creation of the new departmental structure warrants more space for modular/group work.

Few years ago, FMV has invested in new vehicles to transport groups of students to the location of adequate practical training (ex. slaughterhouses, meat industry units, fish inspection units, farms) and ambulatory clinic. However, extra-mural activities are very demanding to the present teaching staff.

Rapid changes in the last decade of animal production activities around Lisbon area have conditioned a significant reduction on the number of livestock units and the corresponding animal activities. This trend may be aggravated in the near future, becoming more difficult to cope up with the present number of curricular extra-mural practical activities.

3. SUGGESTIONS

In the light of the curricular changes in course, more teaching staff will have to be hired by FMV, in order to assure optimisation of the quality of teaching, through the full use of the present facilities and support to extramural training of students.

Identify available under-utilised spaces to be converted in extra group work areas.

The administration of FMV constantly pursues collaboration of outside partners, both public and private, by means of protocols which improve the access of students to slaughterhouses, meat-processing plants and livestock farms. As this represents a priority of FMV, a substantial investment has also been made each year, and will continue to be supported, so as to provide transportation of students to these extra-mural sites of practical and clinical training, through the use of FMV's own vehicles and drivers or by outsourcing.

A foreseen reduction in the availability of access to commercial farm animals and food processing units at a workable distance from FMV, may require re-organization of present curricular programmes of large animal clinics and some food hygiene subjects. These changes are intended to aim at the possibility of extramural training periods for undergraduate students during the 2-3 final semesters of the course.

Chapter 7 - ANIMALS AND TEACHING MATERIAL OF ANIMAL ORIGIN

1. FACTUAL INFORMATION

7.1: BASIC SUBJECTS

ANATOMY

Species used in Anatomy teaching are mainly sheep, dog, cat and, depending on availability, horse, bovine and rabbit.

Sources:

- Sheep: bought to a livestock dealer, coming from farms around Lisbon; 96 animals were used for practical classes (dissection of muscles and joints, and splanchnology); 37 more animals were used for practical exams.
- Dog and cat (cadavers): some obtained from a Lisbon animal shelter and others are euthanized patients at the FMV hospital; variable numbers, depending on availability, for practical classes of splanchnology. In the case of dogs, at least 10 animals are used each year.
- Horse, bovine and rabbit: submitted for pathology analysis; numbers are variable.

Freezing is used as preservation method.

PATHOLOGY

In the 2nd year, students of General Pathology have part of their training studying macroscopic pathological changes of bovine, ovine, swine and equine organs, brought to FMV from a slaughterhouse. These organs and pieces of organs with relevant macroscopic changes add up to 40 case specimens for each student and consist mainly of lungs, livers, kidneys and spleens of the species mentioned above.

Pathological Anatomy practical training depends upon the delivery of cadavers for necropsy, both of small and large animals. These are partially sent in by the Hospital or by the mobile Clinic, and partially by veterinary clinics operating in the area of Lisbon. Due to that fact, the number of necropsies of small animals performed by the students is significantly higher, when compared with farm animals.

Students assist several field necropsies performed during their rotations of Infectious Diseases and Large Animal Clinics in the 4th and 5th years, thus

compensating the relative paucity of production animal necropsies of the 3rd year.

Figure 7.1 - Students performing necropsies



The technique of necropsy of birds is carried out on broilers brought in from a regional slaughterhouse and rejected during the live examination. The number of avian cadavers obtained generally allows for each student to perform one necropsy on his/her own, closely following the teacher's demonstration.

The number of equine necropsies is also very low, although the situation has already improved since the protocol that FMV signed with the GNR.

Only few necropsies of swine have been performed in the past years. This is due to the fact that circulation of dead swine is severely restricted.

A virtual collection of organ pieces with pathological changes, necropsy images and the correspondent microscopic preparations has been built over the years in FMV. These collections, available to students at all times are online at FMV website and stored in CD ROMs. They provide important study material for the students, who actively participate in the collection process, and have the advantage of perpetuating the availability of pathological specimens for visualisation and reference.

PHYSIOLOGY

Physiology practical learning is accomplished in different environments, such as the laboratory, large animal stables and computer laboratory.

In the laboratory, rat is the species used for experimental assays (35/year). Also, some slaughterhouse organs are used. In the stables, 5 sheep, 1 cow and 1 donkey are used in 8 classes (about 15 students in each class).

Table 7.1 - Number of necropsies over the past 3 years

species	Number of necropsies		
	2002/2003	2001/2002	2000/2001
Farm/large animals; cattle	49(28)	48(19)	40(14)
equines	9(3)	8(1)	3(1)
small ruminants	12(4)	18(4)	32(14)
pigs	2	5	2
Avian species*	110	23	11
Rabbits	23	48	18
small/pets; dogs	234	277	223
cats	117	134	80
other pets**	39	52	41

() Number of field necropsies performed by Infectious Diseases and Large Animal Clinics
 * only poultry and pigeons were considered
 ** include ornamental birds, exotic species, rodents and fish

PHARMACOLOGY

In Pharmacology, practical training of drug administration routes is performed in cattle, equine, small ruminants and dogs. The in-house animals of

the Faculty and some hospitalised animals under treatment are used for this purpose. The number, specie and animals used by each group of students in practical classes of Pharmacology are shown in Table 7.2.

Table 7.2 - Animals used in Pharmacology practical classes

Species	Number used in each rotation	Rotations per year	Total number
Cattle	3	4	12
Equines	2	4	8
Small ruminants	3	4	12
Dogs	6	4	24

MEDICAL SEMIOTICS

Part of the practical training of this 3rd year subject consists of hands-on clinical examination and clinical procedures using live animals. Each student has access to a total of 15 bovine patients, 10 equine

patients and 15 canine patients for systems-based physical examinations over an academic year. In practicals, each group of students also tests 16 blood samples (canine, feline, bovine and equine), 9 canine, feline or equine urine samples, 3 canine faecal samples and 3 canine effusion fluids.

ANAESTHESIOLOGY

In the practical classes of this subject, each student assists in anaesthetizing 28 canine patients and 12 bovine and equine patients over the academic year.

SURGICAL PROPEDEUTICS

In this 3rd year discipline, each student practices preparation of patients to surgery, standard access to elective surgical sites, sutures and bandages in 28 canine and 28 large animals.

INFECTIOUS DISEASES

Groups of 6 to 8 students accompanied by a staff member do weekly visits to livestock farms (mainly dairy cattle and sheep herds) for herd health activities such as vaccine administration, dehorning, animal disease screening (tuberculosis, brucellosis, leucosis), and also to diagnose and treat clinical cases and perform necropsies.

For the academic year 2002-2003 a total of 266 cattle and 2093 small ruminants (sheep and goats) were handled by 100 students.

7.2: ANIMAL PRODUCTION

Practical teaching of animal production is performed in Faculty facilities using in-house animals to study body condition of cattle and small ruminants. Most of the practical classes take place at EZN. Both this official organism and the National Horse Stud Farm, located in the same area, have signed protocols with FMV. Students can work with some of the animals in both institutions.

The available animals are shown in the table 7.3.

Table 7.3 - Number of animals available in EZN to teach Animal Production

Dairy cows	50
Beef cows	100
Ewes	250
Goats	30
Sows	80
Laying hens	500
Mares	40
Stallions	70
Foals	100

During the academic year, for practical classes concerning specific breeds of cattle, horse and small ruminants, students visit the National Agricultural Animal Shows in Santarém and Beja, to get better acquainted with several different livestock breeds.

Each student visits EZN several times, during practical training of animal production matters.

ANIMAL BEHAVIOUR

In Animal Behaviour practical training is performed in the observation of different animals of several species and based on the observation of their normal and abnormal behaviours under different management systems (extensive and intensive production). In this discipline is also taught how to restrain animals of several species in order to perform either clinical treatments or any management needed (conducting, cleaning, grooming and so on). The animals used in this discipline belong to the vet school or people linked to the discipline or to the institutions referred below.

Animals used per student:

Practical classes:

- Within the Faculty

Cattle	-	3 animals	- 1 hour/week (3 weeks)
Goats	-	6 animals	- 1 hour/week (3 weeks)
Sheep	-	4 animals	- 1 hour/week (3 weeks)
Dogs	-	15 animals	- 1 hour/week (3 weeks)
Cats	-	4 animals	- 1 hour/week (1 week)
Poultry	-	2 animals	- 2 hour/week (1 week)
Rabbits	-	2 animals	
Rodents	-	2 animals	

- Visit to GNR:

Dogs	-	140 animals	- 4 hour (1 week)
Horses	-	200 animals	- 4 hour (1 week)

- Visit to PSP (Police Dog Unit):

Dogs	-	100 animals	- 4 hour (1 week)
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- Visit to EZN:

Stallions	-	70 animals	- 8 hours (1 week)
Beef cows	-	100 animals	
Dairy cows	-	50 animals	
Ewes	-	250 animals	

- Visit to CRASPEM (Monsanto Ecological Park):

Birds	-	30	- 4 hours (1 week)
Several mammals	-	20	
Reptiles	-	10	

7.3: FOOD HYGIENE

In the practical teaching and training of the discipline Food Technology and particularly related with the subjects meat, dairy and fish technology the Faculty buys some raw materials that allow students to practice the manufacture and the chemical and microbiological analysis of these products.

Examples of amounts of raw materials used in practical classes of Food Technology are listed in Table 7.4

Table 7.4 - Raw materials used in Food Technology practical classes in academic year 2002- 2003

Product	Weight (Kg) or Volume (litres)
3 half pork carcasses	120
Liquid blood	18
3 Liver	4.5
Belly	16
Trimmings 70/30	180
Mesenteric fat	15
Natural casing	24
Milk	120
Fresh cream pasteurised	11.250
Powder milk	3
Tuna fish	24 cans
Sardines	24 cans
Fresh sardines or other fish	18

The discipline of Sanitary Inspection also provides eggs and shellfish to teach inspection of these products at the Faculty.

Contact with animals and animal origin products also exist in the visits of Food Technology, Sanitary Inspection and Veterinary Public Health disciplines to seven slaughterhouses, a meat factory, a ham and sausage factory, a milk industry, a fish market, a fresh market, a canteen, as fully described in Chapter 4.8.

7.4: CONSULTATIONS

SMALL ANIMAL CLINICS

The main objective of small animal clinics is to give the students direct and extensive contact with sick animals and their owners.

Localisation

The patient consultations (Building E) and surgery (Building D) take place in the Hospital area that is physically separated from the diagnostic area. There is a people's access between laboratories and Hospital area to facilitate the clients and staff circulation. However, outside the Hospital, animals are not allowed to circulate.

Organization and tasks

The small animal clinic is open to the public. Clients are registered at the reception desk, where an administrative person fills in the heading of an individual clinical record. The exceptions are animals referred to the faculty strictly for diagnostic procedures (imaging examinations, blood and urine works, biopsies, etc).

All the work of consultation or collection of samples is done in the small animal Hospital area.

The small animal clinics is coordinated by a clinical director. There are eight veterinarians that are part of the academic staff in consultations and surgery. These perform their clinical duties in conjunction with five veterinarians for internal medicine, two for surgery and two for diagnostic imaging, which do not belong to the academic staff. The small animal clinics has two receptionists and seven veterinary technicians (two in surgery, five in internal medicine including the hospitalisation rooms).

Fifth year students work every morning in internal medicine. Mondays and Wednesdays mornings are spent also in surgery, as well as every afternoon from 6 to 9 pm, in groups of 16-18 students during one month. Students of the fourth year are in surgery on Tuesdays, Thursdays and Fridays between 9-12 am in groups of twenty students during three weeks. Three students of the third year rotate every week by the small animal clinics. Final semester students spend all day, from 9 am to 9 pm in the small animal clinics. They spend two months in internal medicine and hospitalisation, two months in surgery and two months in diagnostic imaging.

Receptionists receive the clients and book the referral appointments, organise the individual clinical records and receive the payments.

Hospital technicians are responsible for cleaning consultation rooms, for maintaining the pharmacy stocks and for helping students and veterinarians with the handling and restraint of animals. In surgery, they are responsible for cleaning and sterilisation, for preparation of operating theatre, and for helping in the preparation of patients and the asepsis of operating field and surgery instruments.

Students receive the cases, perform the history collection and the clinical examination and transmit

the data and information to the responsible veterinarian, who finishes the consultation, prescribes the medication and discusses the treatment with the client. All students are encouraged to ask the practitioner any questions they consider relevant during the consultation. Students are encouraged to administer all medications in the consultation room. After the client leaves the consultation room, the veterinarian discusses the most relevant aspects of that case with the students. Final semester students are responsible for the correct administration of therapy prescribed by the veterinarians. They also do the initial clinical history of patients. They are helped by fifth year students.

In surgery, the final semester and fourth year students help with patient preparation, administration of anaesthesia under veterinarian supervision and maintain the anaesthesia and act as junior surgeons, helping the veterinarian during the surgery.

The owner and the animal are received by a veterinarian and a group of three students. In case of referral consultation, there is a previous booking for the different speciality according to a specific timetable (Table 7.8).

All the complementary examinations are done during the consultation (X-rays, blood counts, chemistry, etc) or after booking, in case of more demanding processes.

All results of complementary examinations are centralised in the reception desk and incorporated in the clinical record of each animal.

In elective surgical cases, like ovario-hysterectomy or male castration, the attending veterinarian directly makes the booking of surgery. If the case is not routine surgery, the veterinarian calls a surgeon that decides if further complementary examinations are necessary, type of surgery and discusses with the owner the prognosis and costs involved.

Timetables

The Small Animal Hospital outpatient clinic, is open 50 weeks (it closes for only six days at Christmas and Easter). The Hospital is open to the public, for consultations, five days a week (Monday-Friday) between 9 am. and 9 pm. During the weekends, only hospitalised animals are followed by a veterinarian and students of the fifth year. A veterinarian, who thereafter stays on call until 9 am, follows the patients in hospitalisation after 9 to 12pm. A team of final semester and fifth year students stay in the hospital overnight. In case of emergency related to in-house patients, the students call the veterinarian in charge of the night duties during that week.

LARGE ANIMAL CLINICS

Large animal clinics work all year round. In August, there is one staff member available for emergency calls.

For hospitalised cases, after 5pm and during weekends, teams of final training and 5th year students assure therapeutic procedures. See 7.8 to evaluate the functioning of the mobile clinics.

Table 7.5 - Number of animals received for consultation in the past three years

Species		Number of patients		
		2002/2003	2001/2002	2000/2001
Farm/large animals	cattle	27	10	2
	equines	73	13	2
	small ruminants	6	5	5
	pigs	4	-	-
	other farm animals*	-		
Small animals/pets;	dogs	4291	3099	1942
	cats	805	612	445
	Birds and rodents	321	324	243

* Reproductive examinations are not considered - 300; neither are the animals attended in the herd health programs- over 2,000 animals, or, the animals assisted by the ambulatory clinic, approximately 12,000.

Table 7.6. refers animal species, number of animals and slaughterhouse material (genital tracts of bovine and swine) used and type of work performed in

practical and clinical teaching of Reproduction and Obstetrics disciplines.

Table 7.6 - Animals and animal organs used in practical and clinical teaching of Reproduction and Obstetrics disciplines

Animal species	Number of animals	Type of work/teaching	Observations
Cattle	4	Caesarean section	
Cattle	192	Rectal palpation	16 classes x 12 animals
Cattle	36	Vaginoscopy	12 classes x 3 animals
Cattle	16	Male evaluation	4 classes x 4 animals
Equine	10	Castration	4 classes x 2-3 animals
Equine	8	Male evaluation	4 classes x 2 animals
Small ruminants	8	Caesarean section	4 classes x 2 animals
Small ruminants	4	Male evaluation	4 classes x 1 animal
Canine	48	Vaginoscopy + smears	16 classes x 3 animals
Canine	48	Male evaluation	16 classes x 3 animals
Genital Tracts			
Female -Cattle	32	Manipulation for rectals	
Female - Swine	32	Comparative anatomy	
Male - Cattle	16	Dissection	
Male - Swine	16	Dissection	
Clinical training			
Female - Canine	64	Ultrasound examination	
Female - Canine	21	Vaginoscopy + smears	
Female - Canine	11	Artificial Insemination	
Male - Canine	12	Ultrasound examination	
Female- Feline	9	Ultrasound examination	

7.5: HOSPITALISATION

Table 7.7 - Patients hospitalised in the clinics in the past three years

species	Number of hospitalisations			
	2002/2003	2001/2002	2000/2001	
Farm/large animals;	cattle	27	10	2
	equines	73	13	2
	small ruminants	6	5	5
	pigs	-	-	-
	other farm animals	-	-	-
Small animals/pets;	dogs	352	223	-
	cats	114	98	-
	birds and rodents	-	-	-

Figure 7.2 - Consultation at the hospital

7.6: VEHICLES FOR ANIMAL TRANSPORT

The Faculty has two trailers available, one for horses and one for ruminants. Animal transportation service is not charged to the clients to attract more demand to the Faculty Hospital. It is important to remember that FMV is located in an urban area with very few large animals farms in the inner circle area of 50Km.

7.7: EMERGENCY SERVICE

Emergencies arrive to the Faculty generally as first opinion cases during the day (9am-9pm). The three small rooms for consultation are equipped with the general equipment for first aid (Maggyt tubes, otoscope, stethoscope, ophthalmoscope, electrocardiograph, intravenous catheters, first aid box with main pharmacological agents to administer in emergency). On ground floor exists a room with two ultrasound machines, and next to this room the surgery room (100 m²) there are five anaesthetic machines two of them equipped with electronic monitors. Next to the surgery room a large room has some Shoreline boxes to control these patients. The Clinical Pathology laboratory is open during consultation period and provides an emergency service to these patients. During the night it is available to the veterinary on duty.

For large animals, staff is permanently available on call.

7.8: MOBILE CLINIC

The mobile clinic unit works with a staff of three veterinarians an average of 60 hours per week. These veterinarians work on call through mobile phone. This unit has two vehicles available, one jeep

and a van with a capacity to transport 7 to 8 students each.

During the year, the mobile clinic has a caseload of 450 horses, 960 cases of cattle and 107 cases of surgery in cattle.

Figure 7.3 - Mobile clinic

Four state horse stables (Mounted police, Forest police, Portuguese School of Equestrian Art, and Companhia das Lezírias) are regularly visited by the unit.

On call, visits to food animals private farms reach an average of 240 visits/year and 28 visits/year for surgery cases (ex. displaced abomasum, caesareans, claw amputation, laparotomies).

Dairy and beef herds regularly visited by teams of students, accompanied by one staff member, are: Casal de Quintanelas, Barão&Barão, Casa Paisana, José Policarpo, Duarte França, Casa Florêncio, Quinta Pedagógica dos Olivais, Casa do Gaiato, Manuel Barata, Companhia das Lezírias and EZN. The total number of cattle in these herds are around 12,000.

7.9: OTHER INFORMATION

The veterinary school holds an agreement with a charity kennel, where five spays/month are performed for training of students.

In the small animal Hospital, approximately eighty per cent of cases are first opinion cases. The other twenty per cent are referrals by colleagues that work mainly in Lisbon area, but also some cases arrive from other parts of the country like Algarve, Alentejo and Ribatejo. For the Faculty this policy of mixed practice (first opinion and referrals) are important because it allows students to have easy access to common cases like vaccinations, deworming, dietary policy, and acute diarrhoea. The Faculty has competency in some subjects of medicine and surgery to receive referral cases. In 2002-2003 academic year, 399 referral cases were received in

Neurology, Diagnostic imaging, Dermatology, Gastroenterology, Endocrinology, Cardiology, Orthopaedic surgery and Thoracic surgery. Of all referrals cases seventy per cent are dogs, 20 percent

exotic animals (mainly birds and rodents), and 10 per cent cats.

The schedule of referral consultations has specific days for attendance, as shown in Table 7.8.

Table 7.8 - Weekly referral consultation schedule

MORNING				
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
General consultation + Neurology + Diagnostic Imaging	General consultation + Cardiology + Diagnostic Imaging	General consultation + Neurology + Diagnostic Imaging + Orthopaedics	General consultation + Gastroenterology + Diagnostic Imaging	General consultation +
AFTERNOON				
General consultation	General consultation + Dermatology	General consultation	General consultation + Dermatology	General consultation + Dermatology

The fees that clients pay at the Faculty Hospital are set on basis of the average prices that the OMV establishes for the Lisbon area. This policy has the objective of not creating conflicts with private veterinary surgeons that work around the Veterinary School.

is under installation, which will make the access easier and more extensive.

The relationship between the Faculty and the practitioners is good. It is a School policy to maintain doors open for all private practitioners that need any kind of professional support. There are many examples of collaboration between FMV and many veterinary professionals of different fields. Such policy is also well recognized by many practitioners and other veterinarians that work in food companies, slaughterhouses, official departments and farmer associations. This might explain the open doors and the help that our students get from them in finding training places and guidance for the extra-mural training at the final semester. The FMV maintains protocols with some official departments that favours practical training of Animal Production, Reproduction and Large Animal Clinics (ex. EZN). The same is achieved by specific protocols with the GNR, Forest Police, Portuguese School of Equestrian Art and Companhia das Lezírias for equine cases.

7.10: RATIOS

Table 7.9 - Animals available for clinical work

Ratio: students/production animals		
number of students graduated in the last year	98	1
----- = ----- = -----		
number of production animals	1798	18.3
Ratio: students/companion animals		
number of students graduated in the last year	98	1
----- = ----- = -----		
number of companion animals	5630	57.4
NOTE: these numbers do not include hospitalised animals		

All the administration of the clinical activity is centralised by the administration of the Veterinary School and all the materials that are needed to the hospital or clinical work are paid by the administration of the veterinary school.

Case records are kept in the Hospital and accessible both to staff and students. The same happens to results of clinical pathology and histopathology, as well as imagiological cases. A clinical web network system

Table 7.10 - Animals available for necropsy

Ratio: students/post-mortem examinations		
number of students graduated in the last year	98	1
----- = ----- = -----		
number of cadavers necropsied	595	6.1

2. COMMENTS

The main weakness of anatomy teaching concerns the practical study of splanchnology. There is no problem in getting sheep for practical classes (although it is very expensive). However, to get animals from the other species is very difficult, especially on a regular basis – there are not many dead animals available and it is difficult to get organs from slaughterhouses (they are located far from the FMV and sanitary reasons make the transport of some organs difficult).

In the last five years, the small animal clinic showed a significant increment in terms of organization, number of personnel involved in these activities and involvement of the students. However, we recognize that much more has to be done so as to increase the level of clinical training of undergraduate students and create a level of graduate students as interns and residents.

Small animal clinics has an imbalance in the Hospital building with very large and disproportionate space to surgery comparing with rooms to small animal clinics. There is also one consultation room that is too large and does not allow an adequate environment for either students, veterinarians, clients or animals.

The hospitalisation room is too small in internal medicine and very big in surgery and because of lack of personnel, surgery and emergency cases are forced to share the same space, as the surgery in-patient ward is only used less frequently.

The surgery rooms are too spacious and disproportionate. Probably, one surgery room should be divided into four small rooms, which is much better to asepsis maintenance, and is adequate for our surgical caseload.

The second surgery room could be prepared as a training area for third year students (introduction to surgery) and the large hospitalisation surgery room used has an emergency room and recovery room for animals after surgery.

We have a computer programme to do the management of medical and drug stocks and the

individual animal case records. However, we do not have enough computer terminals to network with the different diagnostic laboratories, consultation rooms and surgery room.

The main objective of the Faculty is to train undergraduate students. However postgraduate studies are today so important that Bologna Process elected this type of education as a main goal.

Our caseload has increased in the last five years with the greatest increment in 2002/2003. The trend for 2003/2004 seems to be the same. The main species is the dog and this reflects the high number of dogs kept as pets relatively to cats in the Lisbon area and perhaps in the country.

One year ago, the Faculty presented to the MCES a plan to expand the veterinary hospital. This plan was approved and we have a promise of reinforcement of the Faculty budget concerning this item. The objective is to increase the number of personnel and have some improvements in terms of equipment.

In terms of new equipment it is our intention to buy an ultrasound apparatus, an endoscope, one oxygen chamber, infusion pumps, and two new anaesthetic machines. In a next phase, we hope to have magnetic resonance resources.

Limitation to the teaching of Pathological Anatomy is the low number of large animals received for necropsy. However, that limitation is partially solved because of the opportunity students have to perform necropsies again in the fifth year in Large Animal Clinics.

Since last national evaluation report, there is a significant improvement in the number of both farms and animals assisted by the ambulatory clinics.

Hospitalisation of large animals shows two different patterns. Horses come more often to FMV Hospital to take advantage of our facilities (X-rays, blood analysis, fluid therapy). Cattle due to transportation difficulties come less often. However, there has been an effort from the Large Animal staff team to bring in as many animals as possible for teaching purposes. Most of these animals are calves (easy to transport) offered by the farmers. Due to financial constraints, it has not been possible to purchase animals to be culled from the assisted herds.

In large animal clinics, some weak points were also identified in the practical teaching and training, such as:

Staff appointed to the mobile clinic is scarce. Namely, there is just one member working with horses.

The organisation of the fifth year does not allow students to go out to farms for monthly periods. Instead, presently they have to work for four periods of one-week.

It would also be desirable that students have been exposed previously to some of the subjects in need to better perform their duties.

The number of students at the fifth year is too high. The course has to be divided into 6 groups of 16/17 students each, for the rotations with clinical areas. It is hard to perform practical training in slaughterhouses and in other food processing facilities with such large groups.

There is also a trend in the meat and fish processing units to diminish the number of active units and to reduce the access of students to such premises.

3. SUGGESTIONS

Improvements could be made by taking measures such as:

Organize transport of organs from slaughterhouses that already co-operate with the FMV.

To get some more animals from the Municipal kennel and increase the use of preserved material in Anatomy practical teaching.

Divide the consultation room E1.6 to allow for adequate new consultation rooms.

Rebuild the main surgery room (dividing in four small rooms).

Reinforce the equipment of the emergency unit.

To do the amplification of the hospitalisation to the surgery level, and recruit more employees to maintain this facility.

A suitable computer network with adequate software, more computer terminals and a better hospital reception unit should be implemented.

FMV needs to organise and develop postgraduate training in internships (medicine) and residencies (neurology and dermatology).

The increase in caseload requires wider options from the faculty to clients in terms of open hours and services. It is our intention, in the near future, to open the Hospital 24 hours and to receive emergency cases after 9 pm.

It would be important to have more veterinarians and cars involved in the large animal clinics to increase the quality of practical teaching,

Purchase animals to be culled off from the assisted farms and bring them to the Large Animal clinic Hospital for teaching purposes.

Faculty curriculum should allow a better integration of different disciplines, in order to improve student's availability for Hospital and extra-mural activities.

Fewer students per year would allow for better teaching, with more practical training per student.

Chapter 8 - LIBRARY AND LEARNING RESOURCES

1. FACTUAL INFORMATION

The library is specialized in the area of Veterinary Sciences, providing services to support the basic training, research and postgraduate studies.

The access to the library is free. Students and staff are required to present their faculty ID cards and outsiders need to present their personal identification for registration at the service desk.

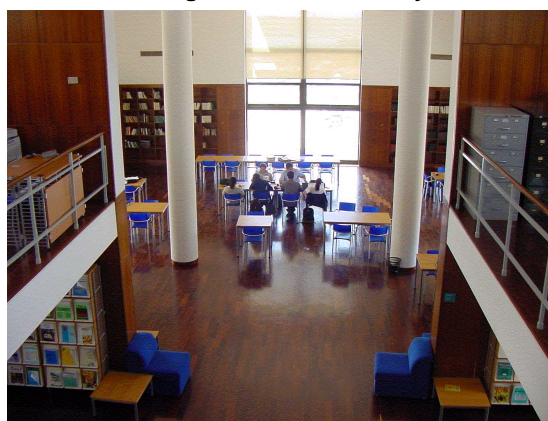
A summary of the funding, staffing, opening hours and transactions of this library is presented at Table 8.1.

Location

The library is located on the 3rd floor of Building A, above the administrative services and the two main lecture theatres. The library has a floor area of 920m² on three levels with wide open spaces and large windows, providing a relaxing environment to the users with natural light and a magnificent panoramic view over the Tagus river.

There is a lift up to the 3rd floor, the lower level of the library. The access to the intermediate level (a mezzanine) and upper level (4th floor) requires the use of stairs.

Figure 8.1 - FMV Library



8.1: LIBRARY

Table 8.1 - Data on the main Library

Library of the Faculty of Veterinary Medicine:			
- Is this specific to the veterinary training establishment?			Yes
- Is this common to two or more establishments?			No
Veterinary Medicine Library's annual budget allocation over the past three years:			
	Books	Periodicals	Total/ Year
	(a)	(b)	(a) + (b)
Year 2002/2003	1 220.10 € +	32 423.06 €	= 33 643.16 €
Year 2001/2002	952.59 € +	33 069.35 €	= 34 021.94 €
Year 2000/2001	7 187.90 € +	33 657.34 €	= 40 845.24 €
- Number of full-time library employees:		4	
- Full time equivalents of part-time employees :		0.5	
- Number of journals received each year (in addition to books) :		120	

(48 periodicals are received from regular subscription plus 80 periodicals received either from offers or through exchange with other libraries)

- Number of student reading places:	110 reading places	
Library opening hours:	weekdays	weekends
	during term-time	09.00 to 18.30
	during vacations	09.00 to 17.00
- Number of loans to students per academic year	approximately 9 000 loans per year	

Computerised document search systems that are accessible to students:

Users with an internet connection can access the on-line catalogue, the AGRIN bibliographic database (presently with 11 520 records, including about 6 000 national and other european thesis in the veterinary medicine area, and other selected papers) through the library Website (<http://biblos.fmv.utl.pt>). Other databases available of relevance to students are:

- *Compendium on Continuing Education for Practicing Veterinarian (CD-ROM's from 1995 to 2000, and on paper until 2003);*
- *Focus on Veterinary Science*
- *Current Contents (Life Sciences)*
- *Citation index*
- *Martindale - CD-ROM's*
- *Nutrition Abstract & Review Series - (CABIEJ)*
- *Medline - CD's (1997)*
- *CCLife Sciences (in diskettes and only for 1994)*

8.1.2. Facilities and services

The 3rd floor comprises the reception with a service desk, the shelves exhibiting the periodicals, the offices of the library's administration, 1 room with archives and 2 deposit rooms, where reserved collections, old books, veterinary faculty thesis and final year students' reports are kept. The service desk organises books and journals loans and information services. Cards can be bought at the service desk to be used on two card-operated photocopiers available on the intermediate level (mezzanine). On request the library also provides a paid interlibrary loan service, sometimes supplying the photocopies of particular papers.

Due to the limited amount of recommended books (in most cases the library owns only one copy) the loans of books are restricted to the period between the closing time from one day to the opening hours on the following day. The library acknowledges that multiple copies of textbooks recommended for courses should exist and be held on reserve to ensure student access at all times, but the solution to

this problem is dependent on more funds in the library's budget for acquisitions.

There are currently two library computers for students to access electronic collections, CD-ROM material and search the Internet, located at one room on the 3rd floor. In this floor there is also 1 room equipped with TV and video, frequently used for study group and supporting 6 places. The reading room on this floor, with about 210 m² and 70 reading spaces, all wired for laptop use, contains books (reference books and thesis).

On the mezzanine, the users can find additional reference books, the two card-operated photocopiers, the manual catalogues for reference books and journals and three reading places.

The 4th floor provides a reading room with about 180m² and 12 reading places. The recommended course textbooks are concentrated in this area. Additionally there are two rooms in this floor with a capacity of 8 reading places each, usually used as study group rooms. Accounting for the capacity on both floors of the two reading rooms and study group rooms the library has a total of 110 reading spaces.

8.1.3. Opening hours

During term time the library opens on weekdays (Monday - Friday) from 9.00 to 18.30 hours. On vacations the library opens on weekdays (Monday - Friday) from 9.00 to 17.00 hours.

8.1.4. Resources and collections

The library subscribes 48 journal titles. An additional number of 80 other titles are received either by offers or from exchange with other institutions.

The library owns a vast collection of literature on veterinary sciences comprising about 41,712 books, 1,665 periodicals and 97 manuscripts. Additionally the library owns a collection comprising more than 8,000 reserved books, many related to the history of the veterinary profession in Portugal.

8.1.5. Information skills

The database AGRIN has a Users Guide with clear instructions to perform different types of search. However, the library staff is available to assist students and other users in using the library resources.

8.1.6. Staffing

The library staff works in collaboration and under the supervision of one professor of the teaching staff that is assigned to that position by Pedagogic Council of the Veterinary Faculty. Thus library staffing consists of 1 coordinator professor and 4 full-time employees (1 graduated librarian with expertise in the management of libraries and documents, 1 technician with specific training on library and documents database management, and 2 administrative performing multiple tasks such as assisting users at the reception desk, providing information and help in bibliographic search, as well as helping the management of books - acquisitions, cataloguing, recovering damaged books and providing photocopies on request). In addition, the library has 1 part-time person equivalent to 0.5 full-time that supports the users attendance at the reception desk in order to maintain the library open until 18.30 hours.

8.1.7. Liaison with the Faculty

The Faculty has an active and decisive role in the discussion of budgeting and approval, major collection developments, suggesting titles of books and journals for acquisition and other issues. The library and teaching staff collaborate to ensure that reading lists and recommended books are provided in advance of each new academic year. However, due to financial constraints, the library does not always manage to accomplish all these objectives.

8.1.8. Subsidiary Libraries of the establishment

There are no subsidiary libraries on the establishment but some departments and teachers have speciality books, journals, CD's and videos available to students on an informal basis. Some teachers bought interactive CDs for teaching purposes. The library does not have information on individual veterinary departmental library holdings of textbooks, journals or audio-visual materials, but has some informal knowledge of its existence.

8.2: INFORMATION TECHNOLOGY AND AUDIO-VISUAL SERVICES**8.2.1. Audio-visual Services**

The library based audiovisual materials consists of a very poor and small collection of about 6 CDs and 26 videotapes of which only about half a dozen are related directly to the courses taught at the veterinary faculty. Most of the tapes are more than 5 years old. Access to the videotapes is available during library opening hours (approximately 42.5 hours per week). Videotapes can be visualized in one of the study group rooms with TV and video equipment with space for seating up to six people. The CDs can be utilized on the two computers available at the library. As mentioned earlier in section 8.1.8., the library has informal knowledge that there are several interactive CD's and videos that were bought individually by teachers or departments and students are given access to these resources on an informal basis.

There is a specific veterinary audiovisual service with 1 full-time employee. His main task is to manage and provide the maintenance of the technical audio-visual equipment installed all over the veterinary faculty premises. The Faculty has one conference room with 220 seats, fully equipped with audio-video and PC projection equipment. This particular room is also equipped with cameras (for the recording in video of conferences, lectures or any other on-going events)

and equipment to perform simultaneous translation tasks during conferences.

In addition there are three lecture theatres, each with 120 seats, equipped with devices for the projection of audio-video and PC, which are frequently used by teachers during their lectures. When these theatres are free from lectures, students or staff can request to use these facilities for the visualization of any audio-visual materials.

All the audio-visual material is housed either at the library and managed by the library staff or stored at the individual libraries of the departments and teachers offices, with independent management. Although there are facilities and equipment to produce videos, none of the videocassettes available at the library were produced by the faculty audiovisual services.

8.2.2. Information technology facilities

The computer service is specific of the Faculty and is not common or shared by other university or research institution. It comprises 1 full-time employee plus 0.5 full-time equivalent of part time employee. The service comprises the hardware and software equipment that are used as servers of the Veterinary Faculty network and its use is restricted to the computers services' staff.

There is one computer room, C0.30 – “Universia Room”, financed by a banking institution (TOTTA), for self-use by students with 18 PCs (1 year old IBM's, 1.7Ghertz, 128 MB RAM, Windows XP operating system, Microsoft Office 2002 and Internet Explorer). The room has one laser printer, and, at the moment, students are requested to bring paper on or pay for it. In the future the students will have to pay extra money to support the toner costs as well. During term time and vacations, the room is only open on weekdays (Monday to Friday) from 11.00 to 19.00 hours and closes completely during August. Any student can use these computers. The highest use of this computer room occurs between 11.00 and 16.00 hours, that means, during lunch breaks and in the early evening. Most of the students that arrive at the veterinary school as first year students have already had some experience with computers during their high school training. Nevertheless, all first year veterinary students are required to attend the course of Biomathematics and Computer Sciences, where several computer topics specific to their needs are covered. All students are requested to register at the computer services in order to access the faculty internal network facilities. Some courses use interactive CD-ROM for teaching, namely the courses of Anatomy, Physiology and Large Animal Practice or public domain software like Epidemiology and

Veterinary Public Health. It is difficult to quantify how many programs are available because most programs were bought individually by teachers and a guess estimate would be approximately 20 CDs. It is important to notice that in the case of the Anatomy course the teachers have developed themselves the interactive programs that they use for teaching.

Figure 8.2 - “Universia” Room



2. COMMENTS

2.1. LIBRARY SERVICES

There is an ongoing project to restructure the library management system, involving the adoption of a new software (“Millenium®”) that allows for the automatic management of loans through the use of code bars. This new system will replace a series of procedures that are currently performed manually and will substantially improve the management efficiency and control over the loans. Additionally the project involves the connection on line between all the libraries belonging to the Technical University of Lisbon and other national and international libraries. This connection will allow for the expansion of possibilities in the current services of interlibrary loans. In parallel, the library is already developing a new set of rules for the library users that aims to facilitate the management of resources and improve the quality of services provided.

The staff dedicated to these services is currently inadequate to meet the operating hours that are required by students and faculty members. The library acknowledges that it should be able to meet the users demands, but cutbacks in the Faculty's budget from the MCES have resulted in an unsatisfactory state which is unlikely to change in the near future. The cutbacks in the financial budget also affected the acquisition of books and periodicals and the library acknowledges that it is necessary to

subscribe new journals and to update some books and get extra copies of others (especially in the case of recommended course textbooks).

2.2. INFORMATION TECHNOLOGY FACILITIES

There is an ongoing project to implement wireless technology, which will be very useful in the near future considering the increasing use of laptops by students. There is one lecture room (C1.25), equipped with 15 PCs and 27 seats that allows for the use of computers and electronic resources in teaching. The existing facilities are adequate for current student coursework and learning. Students complain that they would like to have more places available on self-use.

FMV is also in the process of joining, through UTL, the project of Digital Scientific Libraries, which will greatly improve and expand the access to publications on-line, from 4 major publishers.

3. SUGGESTIONS

Several suggestions have been made under the comments section and its solutions are basically dependent on increased financial resources to cover:

- additional staff to extend the library opening hours in accordance with the demand from students and faculty staff.
- the investment in the update of books and journals subscription in order to ensure an adequate support of the needs of the faculty's students, teachers and researchers.
- the investment in the acquisition of videos, interactive programs on CD-ROM/ DVD and the necessary update of hardware to support the reading of DVD's is a necessity for the faculty's strategic development and curriculum implementation in order to stimulate interactive learning amongst students.
- students entering the veterinary medicine course should be encouraged to have computing proficiency to facilitate their learning and make full use of the library database and other electronic resources.

The project involving the implementation of wireless network connections has a component to develop the production of information contents, which can be of value to the community in general, and includes the development and the update of the Faculty WebPages.

Chapter 9 - ADMISSION AND ENROLMENT

1. FACTUAL INFORMATION

Although FMV offers presently a degree in Zootechnical Engineering, jointly with the ISA, the numbers presented in the tables below concern only Veterinary Medicine students. The undergraduate

students, including the ERASMUS students are quantified in the most advanced year they are registered, even though they are still coursing one or more disciplines from previous years. The entry for 6th year concerns the 11th semester, which corresponds to the compulsory practical training period (no classes) within or outside the Faculty.

9.1: STUDENT NUMBERS

Table 9.1 - Undergraduate student composition

a.	Total number of undergraduate students*	735
b.	Male students	283
c.	Female students	452
d.	Nationals	681
e.	Foreign students	54
	- from EU countries	27
	- from non-EU countries	27
f.	1 st year students	155
g.	2 nd year students	124
h.	3 rd year students	105
i.	4 th year students	92
j.	5 th year students	149
k.	6 th year students	110

* Includes 30 ERASMUS

Source: CME – Students database

Postgraduate students population is dealt with in Table 9.2. There are two Doctorate (PhD) degrees offered by UTL through FMV: Doctor in Veterinary Sciences and Doctor in Animal Science and Technology. The former is awarded to candidates who possess a degree in Veterinary Medicine and the latter is awarded to candidates possessing degrees other than Veterinary Medicine.

FMV offers four Master Courses: Veterinary Public Health, Animal Science in Tropical Environments, Animal Production, and Food Science and Engineering. The two latter are carried out jointly with other schools of UTL, namely ISA, IST and ISEG. These courses are taught in 4 semesters. Due to organizational and candidate demand reasons not all

courses are active at all time. In the academic year 2002/2003, only the MSc course on Veterinary Public Health was running the curricular component, hence the numbers in Table 9.2.

Table 9.2 - Postgraduate student composition

2002/2003		PhD			MSc	Total
		1	2	Total	3	
n.	Total number of postgraduate students	28	15	43	26	69
o.	Male students	10	5	15	10	25
p.	Female students	18	10	28	16	44
q.	Nationals	25	15	40	23	63
r.	Foreign students	3	0	3	3	6
	- from EU countries	1	0	1	0	1
	- from non-EU countries	2	0	2	3	5
s.	1 st year students	6	6	12	20	32
t.	2 nd year students	7	3	10	6	16
u.	3 rd year students	1	2	3	0	3
v.	4 th year students	2	1	3	0	3
w.	5 th , or subsequent, year students	12	3	15	0	15

1 - Veterinary Science
2 - Animal Science and Technology
3 - Veterinary Public Health

Total number of students in the establishment (a + n)= 735 + 69= 804

9.2: STUDENT ADMISSION

FMV, through its Scientific Council, determines the minimum access grades for each graduation student and the *numerus clausus* for each year. The access grades are calculated taking into account the grades of the 10th to 12th schooling years and, to a higher weight, the grades obtained in the National Exams of the 12th year in the specific chosen subjects for Veterinary Medicine, which are Biology and Chemistry. Grades are given in a 0 to 20 points scale. The minimum access grades adopted in the last few years have been 12 out of 20 for each subject. *Numerus clausus* have varied, according to the dropout rate (since budget funding is based on number of students), in the last ten years from 85 to 105.

Besides the *numerus clausus*, which determines the standard admission regime, students can access FMV through several government-determined situations (RGE - special entry regime in Table 9.3); these students have to respect the minimum grades in the specific subjects chosen by FMV, but do not compete for admission with the students of the standard entry regime. The RGE quota includes high-

competition athletes, sons/daughters of Portuguese emigrants, diplomats and Portuguese public servants located abroad and nationals of former Portuguese colonies, finally, a contingency for Madeira and Azores residents. Both the standard admission and the special entry regimes are centrally controlled and applied by the MCES.

Furthermore, other criteria for admission are allowed. The Dean's Office, following recommendations of the Scientific Council, annually fixes the number of vacancies for each of the following situations, (also accounted for in Table 9.3): MDC - transfer from other degrees (for University students coursing degrees other than Veterinary Medicine); CMS - students with other degrees (for graduates of degrees other than Veterinary Medicine); CSE - foreign students with other degrees (for foreign graduates of degrees other than Veterinary Medicine); PER - exchange from the same degree and other universities (only for first and second year students); REI - re-entrance (for former FMV dropout students); TRF - transfer from the same degree (students of Veterinary Medicine from other Universities) and ADH - Ad Hoc (for candidates over 25 years old that pass the Ad-Hoc special examination to enter University).

There are perverse effects of the national method of admission of students to higher education: ranking is solely done by grades and not by vocation; candidates, in face of the risk of not being admitted to their degree of choice, enrol for degrees with the same specific subjects, just for entering into the University system. This leads to situations that FMV has lived through the years: students, whose first choice would be a Medical school, apply for

Veterinary Medicine as a second choice and are admitted. These students spend their first three years trying to move to a Medical School and, eventually drop out. Conversely, students that truly wish to become Veterinarians are admitted to other Biology and Agriculture-related degrees. This is why FMV has allocated most of its vacancies for the MDC - transfer from other degrees contingency.

Table 9.3 - Intake of veterinary students

Year	number applying for admission	number admitted										
		'standard' intake	other entry mode	Total	RGE	MDC	CMS	CSE	PER	REI	TRF	ADH
2002/2003	575	109	26	135	8	15	1	1	0	0	0	1
2001/2002	570	88	25	113	4	11	2	1	0	1	6	0
2000/2001	660	92	21	113	8	11	0	0	0	1	0	1
1999/2000	835	91	19	110	2	13	2	0	0	1	0	1
1998/1999	799	85	19	104	3	11	2	0	3	0	0	0
1997/1998	1206	87	23	110	8	9	1	0	4	1	0	0
1996/1997	724	88	23	111	7	11	1	1	1	1	1	0
1995/1996	1514	82	16	98	4	9	2	1	0	0	0	0
1994/1995	1285	85	13	98	0	8	1	1	3	0	0	0
1993/1994	721	85	17	102	3	8	2	2	2	0	0	0

Source: CME – Students database

RGE - special entry regime

PER - exchange from the same degree and other universities

MDC - transfer from other degrees

REI - re-entrance

CMS - students with other degrees

TRF - transfer from the same degree

CSE - foreign students with other degrees

ADH - Ad Hoc

Erasmus students

The EU stimulates the cooperation between Higher Education Institutions, aiming at improving the quality of education, to the benefit of students, teachers and Institutions, as well as of the society where future professionals will be integrated in a near future. Mobility activities, together with broader actions, are part of this cooperation. The evolution of Socrates/Erasmus activities reflects the fact that following a period of studies abroad is a stimulating experience, allowing students to discover other countries and cultures, besides representing an important step in academic and professional careers.

The number of students received and sent by FMV during the academic year of 2002/2003 is listed below (Table 9.4), with the indication of Countries. Students mobility at FMV has reached the level considered optimum by the European Commission, as 36.9% of our students enrol an Erasmus exchange during their course, and we aim at maintaining the present level of exchange. The majority of our students apply for Erasmus in the last semester, for the final training. However, there is a tendency of an increase in the number of students applying to study abroad during whole academic year, and we believe that such trend must be encouraged.

Table 9.4 - FMV ERASMUS students exchange during 2002/2003

Country	University	Students sent by FMV				Students received by FMV			
		N of students			Months	N of students			Months
		M	F	Total		M	F	Total	
Belgium	Gent		2	2	6	1		1	3
Germany	Hannover		3	3	27				
	Leipzig		1	1	3				
Spain	Barcelona		4	4	14		1	1	3
	Léon					2	2	4	36
	Madrid		1	1	6				
	Zaragoza					2	1	3	18
	Múrcia					1	2	3	27
	Santiago de C.						2	2	18
	Extremadura					3		3	27
Finland	Helsinki	1		1	3				
France	Alfort		2	2	7				
	Lyon	3		3	16				
	Nantes	1	1	2	12				
	Toulouse	2	2	4	20				
Italy	Milano		1	1	5	1	1	2	18
	Napoli						2	2	18
	Padova					2		2	6
	Sassari						1	1	3
Norway	Oslo		1	1	3				
Sweden	Uppsala		1	1	3				
Romania	Cluj-Napoca					2	1	3	9
Slovak R.	Kosice						2	2	6
Hungary	Budapest					1		1	3
TOTAL		7	19	26	250	15	15	30	195

9.3: STUDENT FLOW

Table 9.5 - Student flow

Of the students whose admission year was 1997/1998, were present in 2002/2003:

b.	1st year	2
c.	2nd year	1
d.	3rd year	1
e.	4th year	3
f.	5th year	18
g.	how many have graduated	69
h.	how many have dropped out or been asked to leave.	16
i.	how many are not in any identifiable year	0

Source: CME – Students database

Table 9.6 - Number of students graduating annually over the past five years

	Year	Number graduating
j.	2002/2003	98
	2001/2002	87
	2000/2001	88
	1999/2000	83
	1998/1999	92

Source: CME – Students database

Table 9.7 - Average duration of studies

The students graduating in year 2002/2003 (figure j of Table 9.6), have attended the veterinary training course for 4, 5, 6, 7, 8, 9, 10 years or more, as follow:

	Duration of attendance	number
k.	4 years	0
l.	5 years	0
m	6 years	69
n.	7 years	9
o.	8 years	5
p.	9 years	6
q.	10 - 13 years	8
r.	more than 13 years	1
Average duration of studies of the students who graduated in year 2002/2003:		6.9

Source: CME – Students database

Each student admitted to FMV registers in the first year. In the case of students transferred from other degrees of Veterinary Medicine, they will apply to the Scientific Council for equivalence of the disciplines already approved in their course of origin. Students are not allowed to register in the following year without passing all but two annual disciplines (or the equivalent number of semester disciplines) from the previous year. Furthermore, they are not allowed to register in the 3rd year without passing all but one 1st year disciplines; the same for 4th year registration regarding 2nd year disciplines, and so on (for details, see Table 5.2. in Chapter 5). They must succeed all curricular examinations before they are allowed to register for the final semester training period. This system substitutes that of precedence; *i.e.*, students are not forced to pass a specific discipline before registration in a subsequent one, even when the

continuing nature of the subjects would recommend so. Although several voices from teaching staff have asked for a change in this system, this is a decision of the Pedagogic Council, which has been approved and put into practice around ten years ago, and hitherto not changed.

Theoretically, after three attempts to pass a given subject in consecutive years, a student ought to leave the course and loose its registration in FMV. This has not been applied so far and students only loose their registration in FMV if they do not pay their fees or do not register in two consecutive years.

Nevertheless, students finish their 6 years degree in an average 6,9 years; 70,4% of which actually finish in 6 years.

2. COMMENTS

The ranking of students accessing University, given the mechanisms used and the popularity of the degree of Veterinary Medicine, has implications on the profile of students admitted to FMV. In fact, these are the highest standard students of all science courses in Portuguese Universities, only surpassed by Medicine students. The grades of the last student admitted to FMV have ranged from 17.38 to 17.75 out of 20 in the last five years. There is, however, a downside to this issue: a proportion of our students actually wanted to have been admitted to a Medical School and not to a Veterinary School. Motivation might be a factor hindering their success and progression in the course. Furthermore, a fair amount of these students manage to get transferred to a Medical School, increasing FMV's dropout rate.

The new premises of FMV at Alto da Ajuda were planned for an average of 80 students per year. This is actually the number of seats of the 3rd and 4th year classrooms. However, FMV could not maintain this *numerus clausus* from the year of the move, due to the financial constraints referred before.

For a course with the specificities of Veterinary Medicine, the greater the number of students, the lower the standards of training achieved. However, there is a factor to be balanced and taken into account, which is the funding of the costs of running such a course. The management of FMV has done its best, within the existing financial constraints, to adapt the facilities to the teaching objectives, aiming at taking full advantage of the buildings in the Alto da Ajuda site. Furthermore, protocols with several private and public institutions were signed, so as to create possibilities of extramural practical training opportunities for the students of FMV at low costs. Moreover, the priority of development of the animal Hospital and the ambulatory clinic was fully assumed, granting a higher level and more intensive exposure of students to clinical cases. The hiring of full-time clinical staff for the Hospital has also permitted the participation of this staff in the clinical training of our students, improving the number of elements involved in the educational process.

The Pedagogic Council, through class schedule adaptations, has privileged the access to practical training situations both inside and outside FMV walls. The revision of the curriculum in course by the Scientific Council will also allow a more thorough

adequacy of utilization of the facilities to the educational goals of FMV.

3. SUGGESTIONS

Although the ranking and admission centralised process in use by MCES guarantees a high standard of grades for FMV candidates, these grades do not reflect the future performance of these students during the course. A more vocational approach should be used for the selection and ranking of students, privileging motivation and problem-solving abilities, instead of memorization capacities. The problem is under scrutiny by FMV for some years, but the logistics of mounting a fair and personalized selection process for the hundreds of candidates applying each year falls out of the current possibilities of the Faculty.

Lowering the *numerus clausus* is not a feasible way of improving the quality of education, due to the impairing financial implications that would rise. This could only be surmounted by the adoption of different standard ratios and costs per student adopted by MCES, more in agreement with EAEVE recommendations. FMV is concentrating its lobbying efforts next to the Rector of UTL, the Council of Rectors of Portuguese Universities and the MCES to make this scenario a reality in the near future.

With a smaller number of students and consequent better teacher/student and teacher/support staff ratios, the quality of the educational process and, therefore, the indicators of its success would certainly improve drastically. This applies to dropout rates, average duration of studies and, of course, to the level of qualifications and proficiency of the professionals we are forming.

A higher motivation would also ensue, because of the prospective improvement in the labour market and, therefore, anticipated employment opportunities for young veterinarians. One cannot ignore the fact that the number of veterinary graduates has largely saturated the needs of society and that this fact is leading to the increase of unemployment within the veterinary profession. Veterinary students are the most attentive and anxious observers of this situation and this prospective undermines their motivation and willpower to succeed.

Chapter 10 - ACADEMIC AND SUPPORT STAFF

1. FACTUAL INFORMATION

The information provided below is for the academic year 2002-2003.

Table 10.1 - Personnel in the establishment

	Budgeted posts (FTE)	Non-budgeted posts (FTE)	Total (FTE)
1. Academic staff			
a) Teaching staff	69.6	0	69.6
b) Research staff	7.0	21.0	28.0
c) Others (please specify)	0	0	0
d) Total academic staff	76.6	21.0	97.6
2. Support staff			
e) responsible for the care and treatment of animals	0	3	3
f) responsible for the preparation of practical and clinical teaching.	30	26	56
g) responsible for administration, general services, maintenance, etc.	25	24	49
h) engaged in research work	0	0	0
i) others (please specify)	0	0	0
j) Total support staff	55	53	108
3. Total staff (d + j)	131.6	74.0	205.6

- Most teaching staff are budgeted posts. They are mainly involved in teaching, but almost all of them are also involved in research work;
- Some research staff is also occasionally involved in classes. They are mainly non budgeted posts;
- Besides animal caretakers, care and treatment of animals is also supported by people included in technical and clinical teaching staff;
- The high number of non-budgeted posts for practical and clinical teaching and administration staff results from the impossibility of supporting them by the MCES annual official budget. Laboratory and Hospital work needs a significant number of this kind of staff and that is not foreseen in the governmental allowance;
- Most staff considered in e) f) g) is also engaged in research work;
- Full professor is named "Professor Catedrático". Associate professor is named "Professor Asociado". Assistant professor is named "Professor Auxiliar". Assistant is named "Assistente" or "Assistente Estagiário". Others are named Invited professors. Administration includes staff that is not part of any department;
- DEMOC has a higher number of staff because it includes more disciplines and Hospital staff.

Table 10.2 - Allocation of personnel to the various departments

Name of Department	Academic staff				Other	Support staff		
	Full prof.	Associate prof.	Assistant prof.	Assistant		Technical/animal		Admin./ general
						Teaching	Research	
DEMOC	8	6	16	10		46	5	1
DE TSA	2	5	9	2		10	17	1
DPA	3	2	8			3	6	2
Administ.								45

Table 10.3 - Personnel responsible for undergraduate teaching

A.	Number of budgeted and non-budgeted teaching staff involved in undergraduate teaching	69.6
B.	Number of research staff involved in undergraduate teaching (see explanation to this table above)	0.3
C.	Total number of personnel responsible for undergraduate teaching (A + B)	72.6

Ratios

Ratio: teaching staff/undergraduate students

$$\frac{\text{number of teaching staff}}{\text{number of undergraduate students}} = \frac{69.6}{625} = \frac{1}{9.0}$$

Ratio: teaching staff/support staff

$$\frac{\text{number of teaching staff}}{\text{number of support staff}} = \frac{69.6}{108} = \frac{1}{1.55}$$

- Ratios were calculated considering teaching staff as 69.6 (Table 10.3)
- Ratio teaching staff/undergraduate students is 1:9.0 if we consider students as being 625 (including ERASMUS students and excluding students in final training, which is extra mural work).

Allocation of staff

Teaching staff is allocated according to the needs of each subject or Department as judged by the Scientific Council in plenary session. The needs are identified and brought to the Council by professors or by any of the management boards of the Faculty (e.g. Departments, Dean’s Office, Pedagogic or the Scientific Council itself).

Hiring new teaching staff is also dependent on Government Directives about pre-established ratios teaching staff/student, which for Veterinary Medicine is 1:9 and on the availability of financial resources by the Faculty.

Administrative staff is hired and allocated by the Dean’s Office. Non-teaching staff, other than administrative, is hired and allocated by the Directive Council, sometimes after hearing the Presidents of the Departments or the professors responsible for each discipline or unit.

Staff evolution trends

The number of teaching staff has increased significantly in the last two decades accompanying the increase of the number of students. As a whole, the profile of teaching staff has changed towards a more fully dedicated professorial body (more than

90% of faculty members are exclusively dedicated to teaching and research) and the teaching staff level of qualifications has also increased (more than 80% have a doctorate degree). Most of the teaching staff enrolled FMV as Assistants (on probation), getting their PhD or MSc degrees, respectively, indispensable for pursuing their academic careers, while they were teaching and doing other tasks.

In the last few years, whenever there was an opportunity, the Faculty has been trying to recruit teaching staff at a PhD level, except for the clinical disciplines, as the professors responsible for these disciplines prefer people trained under their supervision. With the stabilisation of the number of students, the total number of teaching staff has also stabilised.

As a rule, new staff has been contracted only to fill vacancies. However, in the last few years the Faculty increased the teaching and the technical staff of the Clinical Area, to strengthen these disciplines and to assist in the Hospital work.

The present situation does not make foreseeable that the Faculty will be able to increase much more either the veterinary medicine students or the number of the teaching staff, unless major changes occur in University National policies.

Most of the technical staff of the Faculty is not paid by the Government budget, creating a difficult situation. As such, a way of solving this situation has to be envisaged in the near future.

Support staff hiring constraints

The major constraint in hiring support staff is the low standard ratio attributed to Veterinary Medicine by MCEs, which restricts the number of budgeted posts funded by the government. Besides these, FMV can hire support staff, but only if there are enough funds generated by FMV's own services to cover for their wages. Furthermore, the contracts with this type of non-budgeted staff are for maximum periods of 3 years, after which they have to be laid-off. FMV has circumvented this constraint by transference of the contracts to private companies, which are partners of the faculty: ACIVET and ADUL. Nevertheless, FMV has still to support the costs of the contracts by its own revenues.

Financial provisions for academic staff

The financial provisions for the academic staff to attend scientific meetings are generally provided by CIISA, as it will be explained in Chapter 13, whenever

an oral communication or a poster is accepted for presentation. Other possibilities of getting funds to attend scientific meetings include:

- a) Research Grants;
- b) UTL Rectorate funding;
- c) The Faculty services, like the Hospital for the clinicians that work in it.

Academic staff does not often use the sabbatical leave. Usually there are no special provisions to face the possible demanding of sabbatical leave. Professors of the same Department assure the teaching duties of people leaving on Sabbatical.

2. COMMENTS

The number of teaching staff in relation to the students is below the ratio set by EAEVE.

Veterinarians form the large majority of the academic staff, as only three academic staff members have a different degree.

Academic salaries are not competitive with both practitioners or industry companies.

Academic career has not being very attractive for the top-class young graduates. Most of them seem to have more opportunities in applying for scholarships for research field or enter a drug or food industry career and, in both cases, are better motivated by the conditions offered.

However, there are no difficulties in recruiting personnel for the academic field at the bottom of the career. It is more difficult to recruit at professorship level, as there are not many candidates available with both a PhD and a Veterinary Medicine degree.

3. SUGGESTIONS

The Faculty should continue to try to get a more favourable teaching staff/student ratio from the Government, as well as an adequate teaching/non teaching staff ratio, which would allow for a larger number of budgeted posts for support and technical staff, leaving a margin for investment in equipment from FMV's own revenues.

Chapter 11 - CONTINUING EDUCATION

1. FACTUAL INFORMATION

11.1: CONTINUING EDUCATION COURSES HELD AT THE ESTABLISHMENT

Table 11.1 - Courses organised by the FMV in 2002/2003

Title of course	Number of participants	Total number of hours of the course
FMV/UTL Laboratory Technician's Course – "New Applications in Genetics"	11	35
Training for technicians in biochemical analysis (2 nd edition)	25	50
Cytology for Veterinary Clinicians	15	8
Clinical Analysis and Public Health	100	15
Fluid therapy in cattle and horses	20	12
Orthopedic shoeing in horses	100	15
Quality and Food Safety (Funchal, Madeira)	15	45
Risk Analysis	10	16
Chemical Residues in Foods	3	14
Quality Control of Food	4	12
Prevention of Occupational Zoonoses	4	16
Evaluation of Food Catering Facilities	8	16

Table 11.2 - Courses organised by the FMV in 2001/2002

Title of course	Number of participants	Total number of hours of the course
Cytology for Veterinary Clinicians	15	8
Fluid therapy in cattle and horses	20	12
3rd Course of the IP - "Quality assurance of meat products"	33	60
Training for technicians in biochemical analysis (1 st edition)	25	50

Table 11.3 - Courses organised at the FMV by outside bodies in 2002/2003

Title of course	Organising entity	Number of participants	Total number of hours of the course
Gastroenterology and Endoscopy in the Dog	Ed. Vade-Mécum	Aprx. 100	10
Feline Medicine and Surgery	Ed. Vade-Mécum	Aprx. 100	16
Seminar on Exotic and Zoological Animals	AEFMV	+ 100	23
III International Seminar on Food Safety	Ed. Vade-Mécum	40	18
Practical approach racing pigeon clinics	SNMV	23	26,5
Rehabilitation of the Marine Fauna	Ed. Vade-Mécum	Aprx. 100	15
Surgery and Emergency Procedures	Ed. Vade-Mécum	Aprx. 100	17
Seminar on Nutrition	AEFMV	+100	8
Workshop on Theileriosis and establishment of tick colonies	IHMT	12	18
Introduction to Aquiculture	Ed. Vade-Mécum	Aprx. 100	20
Emergency and Intensive Care in Small Animals	Ed. Vade-Mécum	Aprx. 100	30
Electro-cardiography	Ed. Vade-Mécum	30	18
Practical Course on Soft Tissues Surgery (two editions)	Ed. Vade-Mécum	25 x 2	18

SNMV - Portuguese Veterinary Union

Table 11.4 - Courses organised outside the FMV in which faculty members were involved in 2002/2003

Title of course	Number of participants	Total number of hours of the course
4 th Course of the IP - "Environmental effects on animal reproduction and production" Uppsala, Sweden	31	60
Gastroenterology and Endoscopy in the Dog**	Aprx. 100	10
Seminar on Exotic and Zoological Animals**	+ 100	23
Practical approach to racing pigeon clinics**	23	26,5
Foot diseases of the dairy cattle	20	10
III Internacional Seminar on Food Safety**	40	18
Diagnostic of Trichinellosis	90	36
Animal Welfare (two faculty members involved)	18	48
2 nd International Workshop on Microbial Risk Assessment and Mitigation, Alfort, France	31	8*
La patologia bovina y su prevencion, Canárias, Spain	50	8
Tuberculosis, Brucellosis, Leucosis and Peripneumonia, DGV, Venda Nova	12	7
Physiopathology of reproduction and artificial insemination	12	105
Program "Ciência Viva" 2002	12	4*
Workshop in Molecular Biology applied to Human and Veterinary Infectious Diseases	15	5*
Evaluation of meat quality for food trade supervisors	15	32
"Food Quality" in Course of Specialisation in Public Health	15	4*
Post graduation in Food Quality	20	210
Emerging Parasitic Zoonosis	10	4*

*Number of hours taught by Faculty members, as part of a course, which total duration is not known

** Organized at the FMV by outside bodies

Besides formal courses, FMV provides practitioners with practical refresher courses of Clinical Haematology, Biochemistry, Cytology and Bacteriology at the Clinical Pathology Laboratory. Periods of training range from 60 to 520 hours, in part-time or full-time schedules, arranged according to the conveniences of trainees. Five Veterinarians carried out such practical courses in 2003.

11.2: DISTANCE LEARNING (INCLUDING VIA INTERNET)

In the past and under the supervision of one of the present Vice-Rectors, UTL has organised an e-learning group in which FMV has been involved. A training course in order to help to prepare specific Internet contents has been thought about, but so far it is only a project.

An Anatomical Pathology Atlas has been prepared by some Faculty members with the help of students and may be accessed at the site <http://atlas.fmv.utl.pt>. To the best of our knowledge this site is also used by veterinary students from other veterinary and zootechnical schools in the country.

the Junta premises involving children from families considered at risk which were also invited to the FMV animal premises.

2. COMMENTS

There is a growing demand on Continuing Education. Involvement of FMV in Continuing Education has been moderate, with some projects in hand but with production difficulties. However, the initiatives held in different domains have been very successful, and were promoted repeatedly, such as “Training for technicians in biochemical analysis”, “Cytology for Veterinary Clinicians” and “Fluid therapy in cattle and horses”.

FMV interacts with the local communities, running specific programs such as the one linked with Junta de Freguesia da Ajuda on improving companion animal care. This is due to the abandoning of animals (specially dogs) due to relocation of the owners. Some sessions were organized to teach how to handle and care for animals. This was performed in

3. SUGGESTIONS

FMV must be able to respond to an appropriate level to the needs of veterinarians in continuing professional development, expanding the existing post-graduate courses and encouraging new ones, with close collaboration with the entities representing the profession. That is the case of the specialization process and continuing education activities under implementation by the OMV, in which FMV has been actively involved from the start.

A specific organising committee should be created to facilitate and stimulate the process.

Education projects involving the general public should also be addressed, especially with neighbouring communities.

Chapter 12 - POSTGRADUATE EDUCATION

1. FACTUAL INFORMATION

12.1: POSTGRADUATE CLINICAL TRAINING (INTERNS AND RESIDENTS)

There are currently no formally accredited positions for interns or residents. The information on Table 12.1, relates to training of veterinary surgeons that applied for specific training. They are not entitled to a

diploma or title but receive a certificate from the Hospital Director describing the nature and the duration of the training.

Table 12.1 - Postgraduate clinical training courses

Clinical discipline	Duration of training	Number enrolled		Diploma or title anticipated
		Full time	Part time	
1. Medicine	1.5 month	4		certificate
2. Surgery	1.5 month	4		certificate

12.2: TAUGHT POSTGRADUATE COURSES

Five postgraduate courses (four MSc and one Diploma) take place at or have the co-operation of FMV, as shown in Table 12.2. One of the MSc courses (Veterinary Public Health) is organised and run by the Faculty. The course on Animal Science in Tropical Environment is organised in co-operation with the IICT. The course on Animal Production is a joint organisation of the FMV and the ISA, in co-operation with EZN. The MSc on Food Science and Engineering and the Diploma on Food Quality are inter-school organisations directly dependent on the Technical University of Lisbon.

All MSc courses have identical structure, consisting of a lective year of formal lectures (24 to 31 credit units) and one year for research and writing of a thesis. After approval in the academic component the students are entitled to a diploma, and orientated to research projects inside or outside the University. Thesis should be submitted within the second year for public examination. Approval of the thesis entitles the student to a Master degree. Most of the students submit the thesis within the time period allowed, but some of them ask for an extension. The Diploma on Food Quality consists on lectures corresponding to 14 credit units. People with this diploma willing to progress to the MSc course on Food Science and

Engineering, benefit from the credits obtained in the diploma.

Admissions for MSc courses take place every two years and maximum number of students per course is 20, except in the case of the courses on Animal Science in Tropical Environment and Livestock Production that allow admittance of 25 and 15, respectively. Participants can have degrees in veterinary medicine or in biological and agricultural sciences. Most are Portuguese, some come from Portuguese speaking countries.

Specific information on each of the MSc courses:

MSc on Veterinary Public Health: this course is organised by the DETSA (now DPASA, and the Department of Animal Health - DSA). It was started in 1990 and the main subjects included in the program are Epidemiology, Biomedical Activities, Zoonosis, Environmental Protection, Food Hygiene and Project Management (ten compulsory and a minimum of four optional disciplines for a total of 31 credit units are necessary for admittance to the research phase).

MSc on Animal Science in Tropical Environment: This course has been previously organised by FMV in co-operation with IICT and named Tropical Veterinary Medicine and Animal Production. It has been recently reorganised and the new edition (after 4 previous courses) will take place in 2003/2005. The course includes 24 credit units in formal lectures during one semester, and the following scientific areas are

included in the program: tropical environment and feed resources; animal health; livestock production and animal adaptation to tropical environments; food processing and food quality; research and economic development. The research component can be extended to a maximum period of 18 months, including submission of the thesis.

MSc on Animal Production: it is presently organised by the DPASA and the ISA in co-operation with EZN. This course started in 1985. At that time it was organised only by FMV in co-operation with EZN. It was a three-year full time course and most of the teaching and experimental work went on at the EZN. In 1992, in accordance with new legislation, the course changed its format to a two-year course. In 1998, with the objective of optimising the human resources and facilities, it was decided to join this course with the Master Course on Animal Nutrition, that was taught at the ISA. From then on, the course has been organised by these two faculties, always in co-operation with EZN. The main subjects included in the program are nutrition, physiology, breeding and genetics, animal behaviour and welfare, livestock production systems, rural economy and statistics.

MSc on Food Science and Engineering: it is an inter-school MSc course promoted by UTL. The Faculty is one of the co-operators, presently through the DPASA. The academic program includes compulsory and optional subjects presented within the following areas: Basic Sciences, Food Engineering, Food Quality, Business Strategy, corresponding to 26 CU.

Diploma in Food Quality: it is also an inter-school organisation promoted by UTL. The aim of the course is to provide specialised scientific formation on food production, transformation, preservation, distribution and marketing. The course program includes compulsory subjects (Quality in Food Industry, Food Microbiology, Statistics, Hygiene, Food Safety and Quality Control, Certification and Accreditation, Consumer's Rights) and optional subjects (Food of Animal and of Vegetable Origin, Drinks, Restaurants and Catering, and Pet Foods). Several DPASA staff members co-ordinate and lecture in this course.

Course on Laboratory Animal Science: it was not run in 2002-2003, but it took place in previous years and it is programmed to take place again.

Table 12.2 - Taught postgraduate courses

Course	Duration of training	Number enrolled	
		Full time	Part time
(a) Diploma level			
1. Veterinary Public Health	1 year (31 CU)		20
2. Tropical Vet. Medicine and Livestock Production	1 sem (24 CU)		0*
3. Animal Production	2 sem (27 CU)		17
4. Food Science and Engineering	2 sem (26 CU)		20
5. Food Quality	1 sem (14 CU)		20
(b) Masters level			
1. Veterinary Public Health	1 year		11 (6)
2. Tropical Vet. Med. Liv. Prod.	1 year		9**
3. Animal Production (n° underway)	1 year		17 (12)
4. Food Science and Engineering	1 year		20

* It was not run in 2002 / 2003;

** Theses from the previous edition; Figures into brackets are n° underway

Table 12.3 - Postgraduate research training programmes

(a) Masters Level Indicate discipline and/or department.	Duration of training	Number enrolled	
		Full time	Part time
1. Biochemistry	1 year		6
2. DETSA	1 year	1	
3. Epidemiology	1 year	1	
4. Food Inspection	1 year		2
5. Food Technology	1 Year		4
6. Microbiology	1 year		3
7. Nutrition	1 year	2	
8. Parasitology	1 year		2
9. Physiology	1 year		1
10. Reproduction	1 year		1
11. Zootechny	1 year		2
(b) PhD level Indicate discipline and/or department.	Duration of training	Number enrolled	
		Full time	Part time
1. Anatomical Pathology	3 years	1	3
2. Anatomy	3 years		2
3. Biochemistry	3 years		1
4. DETSA	3 years	1	
5. Epidemiology	3 years	1	1
6. Food Inspection	3 years	2	
7. Food Technology	3 years	1	4
8. Genetics	3 years		2
9. Infectious diseases	3 years	3	2
10. Medicine	3 years		3
11. Nutrition	3 years	3	1
12. Parasitology	3 years	1	3
13. Pharmacolgy	3 years		1
14. Physiology	3 years		1
15. Radiology	3 years		1
16. Reproduction/Obstetrics	3 years	2	1
17. Reproduction/Physiology	3 years	2	
18. Surgery	3 years		2

12.3: POSTGRADUATE RESEARCH PROGRAMMES

Postgraduate research training, both for MSc and PhD, is generally linked to research projects financed by CIISA or by outside sources. All MSc training programs shown in Table 12.3 relate to students who developed the research work at FMV. All of them had a grant or salary and 15 of them were veterinary medicine graduates.

PhD is a course based on research training followed by submission of a thesis. It is a 3-5 year course, but

generally students spend 4-6 years until the submission of the thesis. Members of the teaching staff are allowed a maximum of six years because of teaching duties.

PhD degrees are offered in Veterinary Sciences (reserved for students graduated in veterinary medicine; 28 of the 43 PhD students) and in Animal Science and Technology. Most students develop the research training at FMV, but there are cases where part or all of the research work is developed outside the Faculty under supervision of a Faculty Professor (2 of those in Table 12.3) or even under supervision

of an outside Professor (1 of those in Table 12.3). In this case the supervisor has to be previously approved by the Scientific Council. Sixteen of the PhD students are covered by grants, and 28 are employed and have salaries. Ten of the 43 PhD students are members of the Faculty teaching staff and two of the remaining finished the degree recently enrolling FMV staff in the disciplines of Biochemistry and Reproduction.

2. COMMENTS

OMV is presently promoting the implementation of three specialization colleges (Small Animal Clinics, Large Animal Clinics and Veterinary Public Health) and of an accreditation system based on curricular up-dating evaluation for the renewal of professional permits.

Such initiatives are being developed with the support of a joint collaborative effort of OMV and all Portuguese veterinary education institutions, including FMV.

It is expected that both the professional accreditation system and the colleges of specialists initiatives will promote a rapid and diversified offer of postgraduate activities at our Faculty.

Postgraduate education offered by the Faculty has been more relevant in research leading to Master or PhD degrees than in training leading to specialisation. However, training programs in clinical and related areas are expected to progressively develop with the increase of clinical work that is taking place at the Hospital and the Mobile Clinic.

The implementation of more post-graduate courses is one of the highest priorities, as shown in a document produced by the Faculty "The FMV Plan of Development up to 2006", where the following courses are programmed:

- Master Course in Companion Animals Clinics;
- Short-duration postgraduate courses on: Reproduction in dogs; Cytology for Veterinarian Practitioners; Clinical Oncology; Food microbiology; Applied molecular biology; Ruminant Fluid therapy.

Furthermore, modules of the present MSc courses are being re-organised in order to make possible the attendance of selected modules to professionals not interested in a diploma or master degree. This has already been done in the Veterinary Public Health MSc 2002-2003 edition, that offered the following postgraduate modules for MSc non-registered candidates: Risk Analysis, Chemical Residues in Food, Planning of Veterinary Services, Quality Control, Prevention of Occupational Zoonosis, and Evaluation of Food Catering Facilities. The MSc on Animal Production is also programming to offer the modules: Beef Production, Dairy Cows Production, Small Ruminants Production, Pig Production, Horse Production, Fowl Production and Aquaculture.

Postgraduate education and training courses are also being organised in co-operation with the OMV in order to give qualifications recognised by the National and European Colleges of Specialists.

There are three FMV professors that are accredited members of European Colleges of Veterinary Specialisation (Veterinary Pathology, Veterinary Public Health and Animal Nutrition).

3. SUGGESTIONS

The Faculty is aware that clinical postgraduate education should be strengthened.

Courses in this area should be offered to professionals for development of appropriate skills and for achievement of a deeper understanding of their field of work in order to maintain a critical approach to their own work.

The courses should have a modular structure, spaced along the year, in order to satisfy the requirements of people working in practice.

The courses should lead to a diploma and should obey to European requirements for specialist certification.

FMV should promote and collaborate in the promotion of professional veterinary education and training.

Chapter 13 - RESEARCH

1. FACTUAL INFORMATION

Research at FMV is conducted through CIISA, the Centre for Interdisciplinary Research in Animal Health. The centre was established in 1991/1992, to develop, integrate and articulate research activities, framed within the following main areas or fundamental objectives:

A – Animal Health and Prevention

In which the following nuclei find expression:

- Epidemiology and Veterinary Public Health
- Infectious Diseases
- Virology and Immunology
- Bacteriology and Mucosal Immunology
- Parasitology, and Wild, Feral and Zoo Animals .

B – Food Safety and Technology

Comprising the following nuclei:

- Food Inspection
- Food Biochemistry
- Pharmacology and Toxicology
- Technology of Products of Animal Origin.

C – Pathology and Medicine

Comprising the following nuclei:

- Anatomy
- Pathology and Histology
- Teaching Hospital and specialty clinics:
 - Surgery, Medicine, Imagiology
- Large Animal Medicine.

D – Biotechnology and Animal Production

Comprising the nuclei of:

- Physiology and developmental biology
- Reproduction
- Nutrition and Biotechnology
- Animal Production
- Tropical Animal Science.

CIISA has been pursuing these objectives successfully, as revealed by the number of research projects in course or already concluded, funded by several Institutions and in close collaboration with national and international partners. International teams have officially visited the centre for evaluation at three occasions: 1996, 1999 and recently in 2003. We are proud to say that the first two teams had rated CIISA with a classification of “Good” and the last one with a classification of “Very Good”, based on objective parameters such as the number and quality of international publications and the diversity and relevance of research lines.

The centre is constantly undergoing a considerable evolution, both quantitatively and qualitatively in terms of facilities, research teams, and lines of research. At present, virtually all areas of the veterinary science and subjects taught within the curriculum of the DVM education are supported by consistent research nuclei, and the vast majority of FMV professors are involved in both education and research. As most subjects have practical classes and labs, most biological materials used and techniques taught in class are extracted from the correspondent research environment. This fact forms the basis of the exposure of undergraduate students to research activities. In addition, a number of disciplines, mainly in more advanced years have the students involved in small research projects, sponsored by CIISA, as a mandatory parameter of evaluation. Such is the case of Toxicology and of Public Health, and a considerable number of research nuclei have students voluntarily involved in research, not only during the five years of school but also in their final training stage. We would risk, as an educated guess, that by the time undergraduate students complete their studies, all students (100%) have had contact with research conducted by CIISA to some extent. The percentage of time spent in this involvement is highly variable individually, from 2-10% of their study time.

A much significant involvement in research occurs with graduate students, at both MsC and PhD levels. CIISA has developed a policy of funding research projects internally, leading to academic degrees. Current projects include experimental work leading to PhD thesis and smaller projects that allow the identification of relevant research areas that may be considered for external funding.

Most of externally funded projects carried out by team members benefit from the existing facilities. The inter-

institutional scope of the majority of these projects allow the optimisation of technical and human capital, using CIISA's infrastructures and also the resources of institutions that, at a regional level, have a better insight on the local problems. Projects carried out in collaboration with African countries also contribute to the development of research and community services, for example in S. Tomé e Príncipe and Angola. As an example of such cooperation, CIISA has just funded a project that consisted on a mission to Angola by a team of professors and undergraduate students, to participate on a bovine vaccination campaign, and also aiming at collecting samples to monitor various infectious and parasitic diseases. Recent reports from that mission indicate that a number of similar actions involving undergraduate students will occur in the near future.

2. COMMENTS

A typical veterinary student is usually strongly motivated to get involved in clinical activities and less enthusiastic to undergo research projects. However as their studies progress and as they get increasingly acquainted with the complexity of the biological phenomena, their interest for research, not only in clinics but also in other areas of veterinary intervention, increases proportionally. Professors have a very important role in stimulating this evolution and we believe that their awareness of this responsibility is also rising. Therefore, the future will most certainly bring a remarkable increase in the involvement of undergraduate students. CIISA's coordination team is very much aware that this influx of new blood to the research team is not only desirable but also crucial for expansion and consolidation of research activities.

The modern societies are more and more confronted with animal health related issues that, in the last few years, were shown to have considerable impact in the global economy and in public health. In addition, claims for the development of novel environmental sustainable systems for animal production and agriculture are justifiably increasing.

CIISA is in a privileged situation to study the main aspects related to animal health and production, considering the multidisciplinary of its research teams. The main contributions of this centre to significantly improve animals' and consumers' quality of life, are noticeable in four main fields: health and prevention, quality and safety of animal products, pathology and clinics and biotechnology and animal production.

Major impacts of CIISA's research are expected in the future, in the development of novel diagnostic strategies and therapies, innovative biotechnological products, new sustainable production systems and to significantly improve food safety and nutritional quality of animal products.

Basically each of the above-mentioned nuclei counts at least with one research laboratory. In addition, five general research units were established for common use by all CIISA researchers, in the following areas: 1. Molecular biology, 2. Instrumental analysis, 3. Microscopy and image, 4. Pathology and clinics, and 5. Culture and manipulation of cells and embryos.

Maintaining the philosophy of common usage of research equipment, CIISA has recently applied for a FCT re-equipment program aiming to strengthen research capacity through the acquisition of new instrumentation. Strategic or programmatic funding has been also requested to allow expansion and renewal of the research team.

3. SUGGESTIONS

An enforcement of financial support for small internal research projects, directed specifically towards attracting young vocations, is guaranteed.

Encouragement of young scientists to apply for research initiation programs, intensifying involvement of undergraduate students in research projects, optional subjects and periods of training (already foreseen for the new curriculum), in close contact with graduate students (PhD and MSc) and post-docs, within CIISA research lines.