SUBJECT REVIEW REPORT

DEPARTMENT OF
BASIC VETIRINARY SCIENCE

FACULTY OF VETERINARY MEDICINE & ANIMAL SCIENCE
UNIVERSITY OF PERADENIYA

13th to 15th February 2006

Review Team :
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1. Subject Review Process

This review was carried out from the 13th to the 15th of February, 2006 by a team comprising the following persons.

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The terms of reference for the review team were according to those described in the Quality Assurance Handbook of the CVCD and UGC (page 13 to 16 and Annex E).

The team based its findings on the following documents and activities:

1. A Self Evaluation Report prepared by the Head of Department and Staff
2. Meeting with Department academic staff for an in-depth assessment of the contents of the curriculum and the teaching/learning methods used
3. Observation of classroom teaching (Lectures and Practicals)
4. Records of Student Z scores and performance in year one
5. A survey of facilities available for teaching
6. A tour of academic support facilities such as Library and computer Unit
7. Interactions with the following personnel:
    a. The Dean of the Faculty
    b. The Academic and academic support Staff of the Department
    c. The non-academic staff of the Department
    d. Undergraduate students from the 1st, 3rd and final years
    e. Academic Staff from other Departments in the Faculty
8. Perusal of miscellaneous documents related to teaching activities

2. Brief History of the University, Faculty and the Department

The Department under review is one of four Departments in the Faculty of Veterinary Medicine and Animal Science (FVMAS) which, in turn, is one of seven Faculties at the University of Peradeniya. The University of Peradeniya, established on 1st July, 1942, is presently a mature University with a developed infrastructure, trained academic staff,

equipped laboratories and all the specialized units and accessories of a modern University. It is also the largest in terms of student enrolment and the most complete with respect to the number and range of Faculties, in Sri Lanka. It is also the only residential University in the Island located in spacious grounds, exceptionally pleasant surroundings and a mild climate.

The FVMAS is the only Faculty in the Sri Lankan University system that offers a degree program in Veterinary Science. Veterinary education in Sri Lanka commenced in 1947 with the establishment of a Department of Veterinary Science in the University of Ceylon. At the outset, students in Veterinary Science followed their foundation courses in subjects such as Anatomy, Physiology, Biochemistry, general Pharmacology and Pathology with their counterparts in the MBBS program at the Faculty of Medicine in the University of Ceylon in Colombo. They then moved to the campus at Peradeniya to study paraclinical and clinical aspects of Veterinary Science. From 1954, the Department of Veterinary Science at Peradeniya formed part of a Faculty of Agriculture and Veterinary Science of the University of Ceylon, although the teaching of Veterinary Anatomy, Physiology and Biochemistry remained with the Faculty of Medicine in Colombo. In 1966, following the establishment of a Faculty of Medicine at Peradeniya, these activities were transferred and since then, all veterinary undergraduate training has been carried out at Peradeniya

In the year 1973, the single Department of Veterinary Science was expanded to three Departments of study, namely, Veterinary Preclinical, Paraclinical and Clinical Studies, upgraded as the School of Veterinary Science and included together with Medical and Dental Schools to form a Faculty of Medical, Dental and Veterinary Sciences of the Peradeniya Campus of the University of Ceylon. In the early 1980s, the undergraduate training in Veterinary Science was accorded full-faculty status with an additional Department, namely, Animal Science. At the same time, the newly formed Department of Veterinary pre-clinical studies undertook all the teaching of basic subjects part of which had hitherto had been taught at the Faculty of Medicine. Finally in October 2000, the FVMAS was restructured and the Departments renamed as Basic Veterinary Sciences (D/BVS), Veterinary Pathobiology (DNPB), Veterinary Clinical Studies (D/CLS) and Farm Animal Production and Health (D/FAPH).

The DBVS, therefore, is the successor to the Department of pre-clinical studies and is responsible for the subjects originally taught at the Faculty of Medicine first in Colombo and later at Peradeniya. They have, in addition, been entrusted with teaching Animal Nutrition and two non-core subjects, namely, Fish Biology and Wildlife Biology.

The students in Veterinary Science pass in stages first through the Department of Basic Sciences, then the Department of Paraclinical studies and on to the two Departments dealing with clinical aspects and production. All four Departments contribute together to the undergraduate program. The role of the first two Departments is essentially to prepare the students for the latter. This structure is common to many professional courses, in particular, Medicine and Dental Science and different from those in the Science or Arts Faculties in which the individual Departments are usually based on disciplines.

In this context, it is somewhat difficult to assess the Department of Veterinary Basic Sciences in isolation or to consider our task as a subject review. Indeed, at the initial discussion with the Dean, he stated that in such a review, the entire Faculty program should be assessed rather than individual Departments. The task of the review team, therefore, was to make an assessment of the success of the program in the DBVS in teaching the subjects assigned to them in preparation for their later studies.

3. Aims and Learning Outcomes

The aims and learning outcomes of the First BV.Sc. program as given in their SER are shown below:

3.1. Aims

- To impart a sound knowledge on the structure, functions and biochemical processes of the mammalian body,
- To develop among veterinary undergraduates an appreciation of the importance of knowledge in basic veterinary sciences for learning applied veterinary and animal production sciences, and
- To develop learning, communication and social skills, which are of vital importance to succeed in the BV.Sc. study programme, and to later function as socially responsible citizens within and outside the university environment.

3.2. Learning Outcomes

First BVSc Programme

a) *Physiology (core)*

- Know the functions of the mammalian cell.
- Appreciate the physiological properties of nerves and muscles.
- Understand the blood circulatory mechanism and microcirculation.
- Know the defense mechanisms of the body against injurious agents (injury, disease causing agents, allergens, etc).
- Understand how homeostasis is maintained by the respiratory and renal systems
- Understand how homeostasis in the body is achieved by body systems (including behavioural changes) and how animals adapt to extreme weather conditions.
- Know the digestive processes of ruminants, mono-gastric animals and avian species.
- Understand the different reproductive patterns and mechanisms of animals and their lactation process.

b) *Anatomy* (core)

- Know the structure of animal cells, tissues and organ systems.
- Be able to identify cells, tissues and organs and understand their histology in order to appreciate the normal functions of the organs.
- Know the topographical and gross anatomy of organ systems in detail as it is necessary for clinical purposes.
- Understand the embryonic development of organ systems and appreciate how related malformations are brought about.
- Be able to differentiate organs of different domestic animals from one another.

c) *Biochemistry (core)*

- Know the ultra-structure of mammalian cells, transport of substances across the cell membrane and metabolic processes of the body.

- Be able to appreciate the enzymatic and hormonal mechanisms of the body.
- Know the plasma electrolytes and buffering systems present in the body and how they help in homeostasis of the body.
- Be able to understand the requirements of vitamins and minerals for bodily functions.
- Understand the clinical importance of bile, plasma proteins, digestive processes of ruminants and non-ruminants.
- Understand the role of the kidneys and liver in disease diagnoses.
- Know the basic principles of molecular biology field and different molecular techniques.

2nd BVSc Program

d) *Fish Biology (non-core)*

- Know the anatomical features and physiological mechanisms of fish species, feeding and feeding patterns, reproduction and lifestyles and economic importance of fish.
- Understand the importance and status of aquaculture in Sri Lanka; types and techniques of aquaculture, culturing of fish and shrimp.1
- Understand the ornamental fish industry, fish products and marketing.(*together with the course on Aquaculture offered by the Department of Farm Animal health and Production*))

e) *Wildlife Biology and Ecology (non-core)*

- Know the important wildlife species, their habitat and feeding adaptations.
- Know the reproductive patterns and their population dynamics.
- Learn wildlife habitat management.
- Understand the basic principles of conservation and appropriate methods of conservation of wildlife in Sri Lanka. (*After following the course on Wildlife Management and Conservation offered by the Department of Veterinary Clinical Studies)*

f) *Animal Nutrition*

- Know the feeds available for animal feeding.
- Know the nutritional requirement for different animal species (mono-gastric, ruminants, avian and fish) for different metabolic functions.
- Understand the methods of pasture and fodder establishment and conservation of feed resources.
- Know the basis and methods of feed formulation.
- Be able to formulate rations for different poultry types, mono-gastric animals and ruminants.
- Be able to advise the owners on feeding management to achieve optimum production.

4. Findings of the Review Team

With regard to the aims and learning outcomes, the review team had the following observations.

The core courses or traditional subjects of Anatomy, Physiology and Biochemistry which form the majority of the teaching in the Department, are in general, adequately covered, although there may be certain specific areas of knowledge or skill that need more attention. These will need to be identified with the help of the Departments downstream, in particular those teaching clinical and animal production subjects.

In the case of the new subjects taught in year 2, the DBVS needs firstly to train academic staff for them. The responsibility of teaching the non-core courses on fish and wildlife is shared with other Departments but the entire responsibility for the core subject of animal nutrition lies with the DBVS. The team felt that the teaching of this important subject needs to be revised and reorganized. Several aspects of the discipline are not covered in the list of learning outcomes whilst others that are listed are more appropriately taught in the final year. The team also observed that the basis for animal breeding – principles of genetics and population genetics – should also be taught at the basic level.

Overall, although the Department prepared students with the basic knowledge and skills for the paraclinical, clinical and animal production Departments, the feedback and

general interaction between them appeared to be minimal. Improvement in such interactions would also assist the DBVS to realize their second aim of making the basic studies more relevant to the students. With regard to their third aim, the team found that although there were no formal mechanisms in the curriculum towards this end, the students had improved their learning and communication skills as well as their general motivation for the Veterinary course by the end of their first year.

On a more positive note, the team noted that the Department has the necessary staff to carry out its mandate and that they are very committed to the task. The Department is also well organized and managed with good interpersonal relationships and appears to run smoothly.

4.1. Curriculum Design, Content and Review

The BVSc degree program consisted of 14 core subjects and 11 non-core subjects of which the DBVS is responsible for 4 and 2 subjects, respectively. Since all courses are compulsory, the difference between the two groups is that the former comprises the traditional subjects in a Veterinary course – and comprise the bulk of the material taught – whilst the latter were introduced at a recent revision in order to broad base the degree program. Three of the 4 core subjects, namely, anatomy, physiology and biochemistry are taught in year 1 and examined at the 1st Examination. The other core subject, Animal Nutrition, and the two non-core subjects, namely fish biology and wild life biology, are taught in the 2nd year and examined at the 2nd BVSc examination together with other paraclinical subjects taught in that year.

It should be noted that no credits are assigned to the courses and the term “course” here refers to disciplines or subjects. Since several staff members were involved in the teaching of a subject, an “informal” coordinator has been appointed for each subject. There was some integration in the teaching of the 3 subjects so that each system was dealt with at about the same time in each subject, generally in the order, anatomy, then physiology and finally biochemistry. This arrangement was welcomed by the students. As a further step, system-based modules are currently being developed within each subject. In the long-term, it would be best to consider further integration including the

merger of the three subjects into system-based modules that would ideally be taught as course units.

The curriculum for the 3 basic subjects, anatomy, physiology and biochemistry, was originally based on the traditional model followed in the UK at the Royal College of Veterinary Surgeons more than 60 years ago. Although it has been revised several times, most recently in the year 2000, it basically remains true to the original, time-tested model. With 120 hours of lectures for each subject and corresponding periods of time devoted for practical training, the coverage of the 3 subjects is quite adequate. More interaction with the Departments downstream will help to uncover any gaps that need to be filled.

The curriculum for Fish and Wildlife biology will be developed further with the training of academic staff to teach these subjects. The Animal Nutrition curriculum needs to be revised and the different component redistributed. For example, aspects related to feeding management should be taught in the final year whilst areas such as feed processing, clinical nutrition and dietetics need to be introduced.

Judgment – Good

4.2. Teaching, Learning and Assessment Methods

Teaching is conducted through lectures supported by discussions, tutorials, practical classes, clinical demonstrations and field visits. The lecture forms the core of the teaching/learning process and depending on the teacher, is conducted using the traditional chalkboard as well as through newer audio-visual techniques, the latter being preferred by the younger staff members. Lecture topics were available for each subject but no lecture outlines were given; only supportive handouts such as statistics and graphs. Specific learning objectives have been developed for physiology.

Assessment of the teaching/learning outcome is done via in-course assessments (including "signatures" for anatomy), End-semester examinations and year-end examinations. The examinations consisted of written papers, practicals and orals.

In general, students were very satisfied with the teaching and learning methods in the Department including those for English. The ELTU prepared the students for the modules

by explaining the terms beforehand. They felt, however, that learning objectives should be given at the beginning of the semester. Students are more motivated to learn some of the DVBS subjects by exposure to the clinics, and it was felt that there are not sufficient "live animal" classes for all 3 subjects.

The students showed a very positive attitude towards self-learning. There is a need, however, to develop such self-study components to cut down on lectures and increase student-centered learning. In addition, the use of interactive videos and other self-learning materials would also be very effective. A Computer course was given to students only in the 5th semester and as a result, no computer-based assignments are given in the 1st year.

The senior technicians available for Physiology and Biochemistry, respectively, managed these laboratories including the ordering of chemicals and the maintenance of equipment. They played the major role in preparing for the practical classes. In addition, they participated in research activities where laboratory analyses were involved and were often included as co-authors in publications. Some of the problems identified by the technicians were the need for laboratory safety practices and training on general laboratory management and safety aspects for the laboratory labour as well.

Judgment – Good

4.3. Quality of Students, including Student Progress and Achievements

The Department, as in the case of others in the University system has no direct control over the quality of students that enter. The Z zcores for entry into the Veterinary Science course are below those for Medicine and Dental Science but above all other science streams. This has been the pattern over several decades and it can be expected that the overall standards of the students entering for the Veterinary Science is above average. Moreover, the Z scores of students who enter for Veterinary Science are fairly uniform so that their technical knowledge would be similar.

Their proficiency in English – the language of the course – and IT, however, were quite variable at entry. Following an orientation program of 10 weeks duration, the variation in English is reduced to a narrower range, but it can be expected that the primary factor affecting their ability to learn in the first year would be their proficiency in English. By

the 2nd Semester most students appear to have developed the necessary comprehension skills to understand the course material and technical books. A course in IT was given, however, only in the 3rd year and it may be expected that any variation in computer skills at the point of entry would remain up to that time.

Analysis of the completion rates in the Department showed that between 70 and 80% were successful at the first attempt in the terminal examination and most of the balance later passed at the repeat examination that is held in 4 weeks time. Only a very few students were unable to complete the DBVS program.

Being the Department that has initial contact with new students, it clearly has an important role in shaping their learning skills and also in dealing with the new entrants many of whom, being disappointed at not having entered the Faculty of Medicine, are poorly motivated. During their first year in the Department, the students clearly improved their learning ability, thinking prowess and overcame their initial disappointment. By the end of this year, most had developed the correct attitudes and were in a position to commence their studies in the Departments downstream.

Judgment – Good

4.4. Extent of Student Feedback, Qualitative and Quantitative

Although obtaining student feedback is not a formal practice in the Department, two members of the staff said that they obtained such a regular feedback. Other members of the Department no doubt obtained some feedback during lectures and practical classes in an informal manner.

Judgment – Satisfactory

4.5. Postgraduate Studies

Several staff members participated in externally funded research projects which had several research students. All academic staff members carry out some research in their respective fields of interest and in this respect, the Staff were continuing a well established tradition since the Department has a long history of research. There is little

doubt that this research would have benefited the teaching program and the development of the Department from its inception.

All of the academic staff supervised final year undergraduate student projects and at present, the 7 members of the staff supervised 24 student projects. These undergraduate research projects, however, are more in the nature of assignments rather than properly planned and executed research programs. For example, they commence in the 3rd year and are carried out over a period of two years. They are also not credited for the degree and there is no time slot allocated for the purpose.

The Staff were also involved in teaching at postgraduate institutes in the University – Agriculture and Science. Overall, the level of research and postgraduate activity in the Department were considered adequate for the purpose of this review. It would be best if the past research is reviewed, documented and the results incorporated into the undergraduate teaching program.

Judgment – Satisfactory

4.6. Peer Observation

Peer observation of not practiced in the Department.

Judgment – Unsatisfactory

4.7. Skills Development

Although there is little doubt that the students do pick up certain skills in the first year, it appears that there is no focus on developing specific skills. There was no list of required (transferable) skills, or programs to teach and evaluate their acquisition. It seems important that veterinary students learn the skills to identify the "normal" anatomy and physiology of animals in their basic studies so that they are able to appreciate abnormalities in later years. They will also need to acquire, among others, certain laboratory skills including the interpretation of reports.

Judgment – Satisfactory

4.8. Academic Guidance and Counseling

Although there is no formal system of academic guidance, the staff members were always "available" to the students. Students were very positive about the accessibility of staff and sought their advise on a regular basis. Academic guidance to students was also provided at tutorials. Since the system was not formalized, however, there was no documentation of such counseling or mentoring activities.

The University of Peradeniya has a full-time, trained counselors and the Faculty of Veterinary Science was part of this system. There was a team of counselors for the Faculty who met monthly and their activities were recorded at Faculty Board meetings. In addition, there was a monthly meeting of the counselors. A mentoring program (one per 3 students) had also been commenced this year but no documents were made available to us on this activity.

Judgment – Good

5. Conclusions and Recommendations

The Department of Veterinary Basic Sciences has a mature academic program that is up to acceptable academic standards and employs several "good practices" that have been highlighted in this report. They have developed good facilities for teaching and, overall, an excellent environment for teaching and learning. Some of the weaknesses identified by the team have also been described in the report and these include aspects such as insufficient interaction with other Departments and inadequate focus on skills development.

A list of suggestions for improvement based on our observations, are listed below for consideration:

- Revision and reorganization of the animal nutrition component
- Introduce a course on principles of genetics
- Fully integrate the basic subjects into system-based modules and adopt a course unit system
- Document the research carried out in the past

- Introduce an IT course in semester I and use more student-centered learning methods
- More focus on Identifying, teaching and evaluating transferable skills that should be acquired by students in year 1
- Develop a formal system of student feedback
- Utilize peer observation as a method of improving the teaching/learning process
- Closer interaction between DBVS academic staff and clinicians in order to obtain a feedback.
- More hands on practical classes with "normal" live animals to develop anatomical and physiological skills
- Greater emphasis on Clinical biochemistry and clinical nutrition
- DBVS staff to participate in the field activities of the Department of Farm Animal Health and Production

Based on the observations made during the visit by the review team, the eight aspects were judged as follows:

Aspect Reviewed	**Judgment Given**
Curriculum Design, Content and Review	Good
Teaching, Learning and Assessment Methods	Good
Quality of Students including Student Progress and Achievements	Good
Extent and Use of Student Feedback, Qualitative and Quantitative	Satisfactory
Postgraduate Studies	Satisfactory
Peer Observation	Unsatisfactory
Skills Development	Satisfactory
Academic Guidance and Counseling	Good

Overall Judgement – Suspended