SUBJECT BENCHMARK STATEMENT
IN
VETERINARY MEDICINE AND ANIMAL SCIENCE

Quality Assurance and Accreditation Council
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FOREWORD

The work in connection with the development of Subject Benchmark Statements was begun in August 2003 as a part of the overall quality assurance framework that supports academic standards and the furtherance and dissemination of good practices among Universities in Sri Lanka.

Subject Benchmark Statements will support and promote quality and standards of a subject discipline by:

- Providing universities with a common and explicit reference point for internal and external programme approval and review;

- Guiding and promoting curriculum development, especially in new departments and new universities, and in other institutions of higher education;

- Evolving over time to take account of changes and innovations that reflect subject development and new expectations;

- Providing an authoritative and widely recognized statement of expectations of what is expected of a graduate in a specific (or designated) subject area in a form readily accessible to students, employers and others with a stake in higher education;

- Providing a clear and transparent reference point for External Examiners;

- Assisting international comparison and competitiveness of higher education awards and student achievement.

SUBJECT BENCHMARK STATEMENT
VETERINARY MEDICINE AND ANIMAL SCIENCE

1. INTRODUCTION

Scope of SBS:

Subject benchmarking is an essential component of quality assurance in the University system. This Subject Benchmark Statement (SBS) in veterinary medicine provides guidelines and an academic reference point for the course leading to the award of Bachelor of Veterinary Science (B.V.Sc.) degree in Sri Lanka. It describes the essential characteristics which will enable a graduate in veterinary medicine to function effectively, on satisfactory completion of a six month internship period, as a veterinarian in state or private sector institutions providing independent primary care for animals, or as a trainee in a postgraduate programme leading to further specialization. The SBS is meant to be used as a guideline and is not prescriptive.

Authority

This SBS has been prepared on the authority of the University Grants Commission by a group of senior lecturers of the Faculty of Veterinary Medicine and Animal Science (FVMAS), University of Peradeniya, in consultation with representatives from the Sri Lanka Veterinary Council (SLVC), the Sri Lanka Veterinary Association (SLVA) and the Society of Companion Animal Practitioners of Sri Lanka. Similar SBS statements are being prepared in respect of other courses leading to the award of a degree within the Sri Lanka University system.

The degree covered by SBS

This statement deals with the professional degree course of 4 bisemester academic year duration leading to the award of the B.V.Sc. degree. This is the undergraduate degree in veterinary medicine awarded by the FVMAS, University of Peradeniya, Sri Lanka. The FVMAS is encouraged to develop their own innovative approaches in designing and delivering their course within the broad framework described here.

Role of Sri LankaVeterinary Council (SLVC)

The veterinary surgeons and practitioners Act No. 46 of 1956 empowers the SLVC to formulate regulations for the maintenance of minimum standards of veterinary education including standards relating to courses of study, examinations, staff, equipment, accommodation, training and other facilities at the University which grant or confer any qualification which entitles a person to obtain registration under the Act. The SLVC recognizes courses of study leading to a veterinary degree with

a minimum duration of four years, following which graduates have to undertake a period of internship of six months, in specified specialties in veterinary science. On successful completion of internship, they are entitled to obtain the registration to practice.

Internship

The B.V.Sc. degree is awarded on sucessful completion of the Final B.V.Sc. examination. Internship training is needed only for registration with the SLVC.

Professional Development

A graduate is entitled to independent practice after successful completion of six months internship and registration with SLVC. Continuing professional development is essential for all graduates regardless of specialization. If they wish to specialize, graduates will have to undertake further study in order to achieve the final professional status in their chosen field.

Academic Standards – Veterinary Science

Definition

Veterinary science is the study, diagnosis, treatment and prevention of disease in animals both as individuals and as groups. There is also a key role for members of the profession as guardians of human health in the context of health hazards transmitted from animals or animal products to man.

Historical and current perspective

Once early man had moved from hunting to herding animals, he had an interest in the health and husbandry of his stock. By the time of the ancient civilizations there is evidence of close interaction between man and animals in contexts which are still familiar today including the use of animal for production, draught, ceremonies, war and increasingly, as human companions. There is a reference in the *Mahavamsa* to medical treatment of birds and animals in the reign of King *Buddhadasa* (1st Century AD). The King himself is said to have been a specialist in Veterinary Medicine. The *Kautilya Arthasastra* also records some information about Veterinary Physicians (dated 4th Century B.C.) The first book of the modern era devoted to veterinary medicine. 'Artis Veterinariae', was produced by Pubulis Vegetius Renatus in the second half of the 5th century. The 'veterinarii' were the animal doctors of ancient Rome, and the word came back into use in the 17th and 18th centuries as the veterinary profession emerged from its origins amongst the farriers. By the 18th century several veterinary texts had been published and the first veterinary school in Europe was established at Lyon in 1762. The first to be established in the United Kingdom was the Royal Veterinary College in 1792.

Although the term 'veterinary surgeon' is widely used, the term 'veterinarian' (first used in the English Language in 1646) is employed here.

The veterinary workplace has changed in the last century with less emphasis on the horse (especially as a draught animal), an increasing emphasis on companion animals kept for pleasure, and greater veterinary involvement in production animals, public health and food hygiene. The role of the profession in protecting the health and welfare of more diverse groups of species such as laboratory animals, zoological collections, wildlife and, indeed, the contribution to conservation of endangered species, continues to grow. There is also an increasing body of specialists, both in individual species and in disciplines which cut across species groups, as opportunities for training and the demand for specialist services have grown. The comparative approach of Veterinary Medicine & Animal Science will continue to provide insight and support for basic scientists and contribute to the understanding of human disease.

The beginning of the 21st century finds the veterinary profession and its work held in high esteem by the general public and a source of considerable interest, with unprecedented exposure of veterinary matters in the popular media. Veterinarians are regarded as guardians of animal health and welfare, and the veterinary schools have a responsibility to continue to produce graduates in whom the public will have confidence.

Most applicants are attracted in the first instance by the prospect of veterinary clinical practice with its unique combination of science, art, practical skills, human-animal and interpersonal interaction. However, an increasing number follow other career paths as they become aware of the diverse opportunities provided by a veterinary degree.

Careers in Veterinary Science

Veterinary Graduates have a wide range of career options.

- Most graduates are employed in general practice. Practitioners act as physicians, surgeons, anaesthetists, radiologists, livestock advisors, laboratory specialists and pharmacists.

- Practitioners who choose to work on companion animals are likely to find that individual animals are their patients and will find scope for preventive medicine and advisory work, including rabies control. There are a number of veterinary hospitals, which carry out diagnosis and treatment at different levels of sophistication. There are a few referral clinics where more sophisticated diagnostic methods and specialized treatment are available.

- Practitioners who join the state sector are mainly concerned in dairy and poultry production, with preventive medicine in herds and flocks in addition to the

treatment of individual animals. They are knowledgeable in feeding, management, breeding and the associated problems in addition to controlling diseases. They also advise on the production of safe, wholesome food and the associated animal welfare issues. They are responsible for administration, implementing legislation, training and extension activities.

- Veterinarians who join the poultry industry have opportunities in diverse sub-sectors including feed manufacture, breeder management, hatchery management, buy-back operations, processing plants, pharmaceuticals and biologicals. Veterinarians in the poultry industry must be familiar with computer use, records on health and production, associated hazards to the environment, and the methods of ensuring food safety to meet the required standards of domestic and international markets.

- Practitioners who join the inland and marine fisheries sector must be familiar with feeding, breeding and management of fin-fish and shell-fish, while preventing and treating diseases, and be able to advise on avoiding environmental hazards.

- Veterinary graduates who are employed in the health services of local government institutions and who are responsible for public health by controlling zoonotic and food borne diseases through such activities as, meat inspections, market inspections and implementing the respective legislation.

- Veterinary graduates who work with wild-life or captive animals are responsible for their health care, treatment, breeding and management of diverse species and they should be conversant with the methods for avoiding occupational hazards. Additional responsibilities include providing care during transport and to take part in ecodevelopment and conservation programmes.

- Graduates who choose a career in research and/or teaching, and are required to obtain appropriate postgraduate degrees. Veterinary scientists are employed in the FVMAS and in Faculties of Medicine Agriculture and Science, as well as in the Veterinary Research Institute and the Medical Research Institute.

- Additional opportunities available in the state sector include human resource development, continuing education, regulatory, quarantine and administrative activities in the Department of Animal Production & Health or other relevant Ministries.

1. Defining principles

The *Veterinary Surgeons and Practitioners Act* No. 46 of 1956 regulates the veterinary profession, with the SLVC being the statutory Authority responsible for implementing this Act. The FVMAS at University of Peradeniya is at present the

only institution authorized to offer the B.V.Sc. degree programme in the country. Overseas graduates who intend to practice in Sri Lanka need to qualify through an examination conducted by the SLVC.

The B.V.Sc. degree offered by FVMAS is reviewed by the institutional and subject review groups authorized by the Committee of Vice Chancellors and Directors and the University Grants Commission, Sri Lanka.

Veterinary Medicine & Animal Science is an integrative subject providing breadth and depth to complement the discipline-based biological sciences. Veterinarians have a broad range of knowledge, understanding and skills enabling clinical disciplines to be learnt within the context of a firm foundation in basic sciences. It is this understanding of the scientific basis of clinical medicine which underpins most veterinary activity. In addition to the practicing arm of the profession, holders of a professionally recognized degree in Veterinary Medicine & Animal Science are well qualified to enter positions in scientific research, public health and commercial areas allied to medicine and veterinary medicine.

The B.V.Sc. degree programme comprises pre-clinical, para clinical, clinical and production components, which are designed to develop knowledge, skills and attitudes in a progressive and cumulative manner. An alternative approach would be to develop a curriculum which allow total integration of curricula and permit students to take modules from other Faculties of the University. It is also important that graduates are well equipped for lifelong learning, with the requisite knowledge and attitudes for continuing professional development.

The objectives of the veterinary curriculum are such that students acquire and develop:

- a spirit of intellectual curiosity and academic enquiry;
- an understanding of research techniques and critical evaluation of published work;
- ability to be good administrators and managers;
- problem solving abilities;
- motivation for a professional career;
- understanding of the anatomy, physiology and biochemistry of healthy animals in their normal environment;
- understanding of the biology and conservation of wild life and aquatic species;
- understanding of the immunological system which enables successful disease prevention through immunization programmes;
- understanding on balanced feeding systems for diverse species in different productive states;
- understanding of different disease-causing agents, their isolations and identification;
- understanding of pathological processes;
- ability to adapt public health measures with respective legislations;

- ability to identify and to avoid occupational hazards to human health and threats to the environment;
- ability to adapt measures to ensure food safety;
- ability to commence a food industry for livestock and aquatic specieis, while maintaining good quality;
- ability to make a rational decision on therapeutic and vaccination regimes based on an understanding of pharmacology and immunology;
- ability to arrive at differential and clinical diagnoses on individual animals;
- ability to arrive at differential and clinical diagnoses along with epidemiological studies aimed at disease management of herds or flocks;
- ability to improve the economic benefits of farming or production enterprises;
- an understanding of the biological and welfare needs of animals, and how management systems meet those needs;
- skills in handling and examining animals;
- a knowledge of the economics of food production;
- a sense of care and responsibility to patients and their owners and a welfare ethic for animals in general;
- a knowledge of the business context of veterinary practice;
- communications skills with staff, colleagues and the general public;
- interpersonal skills and ability to work in teams;
- a good professional attitude and a high standard of professional behaviour.

2. SUBJECT FRAMEWORK: THE NATURE AND EXTENT OF THE SUBJECT

The framework within this section is an aid to articulating those attributes and capabilities that a veterinary graduate might be expected to demonstrate at the point of registration. It falls into three parts, but clearly this is for identification and presentational purposes only, since the essence of the competent veterinarian is the capacity to integrate scientific understanding, professional knowledge, skills and personal competencies.

Part 1 of the framework provides a means for describing the knowledge and understanding of the relevant subjects that are essential to underpin the informed, safe and effective practice of veterinary science.

Part 2 provides a means for describing the principles, skills and capabilities associated with professional practice that are applied to secure, maintain or improve animal health and well being.

Part 3 provides a means of describing the expectations that the profession, employees and the public at large have of veterinary graduates.

Part 1: Subject knowledge and understanding

The new veterinary graduate should be able to demonstrate knowledge and understanding in the following areas as the basis for the study and practice of clinical veterinary science:

Structure and function of animals from molecules to populations

- molecular and ultra-structural basis of cellular function;
- macroscopic and microscopic structure of tissues and organs;
- physiological and biochemical basis of organ function and homeostasis;
- biology of the whole animal individually and in groups.
- principles of animal behaviour;
- the molecular basis of animal genetics and its practical application;

Health and husbandry of domestic animals

- scientific foundations of animal nutrition and its practical application;
- physiology and endocrinology of animal reproduction; maximizing reproductive efficiency in commercial populations;
- husbandry and housing of domestic animals;
- biological and management of strategies in limiting animal disease, requisite biological knowledge and knowledge of management strategies
- management strategies in avoiding hazards to health and environment.

Understanding animal disease

- pathogenesis - the processes by which disease may develop;
- the biochemical and cellular basis of immune and inflammatory responses;
- principles of oncogenesis and tumor biology;
- macroscopic and microscopic changes in pathological processes as a basis for recognizing and managing clinical disease;
- the epidemiology of animal diseases.

Disease causing agents

- structure and function of prions, viruses, bacteria, fungi and other parasites;
- biology, population dynamics, transmission and pathogenicity;
- agents causing diseases in animals and those which may also cause disease in man.
- food borne pathogens antimicrobial resistance and their epidemiology.

The principles of pharmacology and toxicology

- structure, mode of action and pharmacokinetics of active compounds;
- scientific basis of safe and efficient use of veterinary drugs;
- ethical, environmental and human health implications of veterinary drug usage;
- Regulatory aspects of pharmacology and toxicology.

Legal, environmental and ethical considerations

- the economic, environmental and public health consequences (beneficial and otherwise) of keeping animals;
- the law and ethical codes relating to animals and to food hygiene;
- statutory requirements for animal transport, slaughter houses, cutting plants and the storage of meat products;
- the importance of research for the extension of the knowledge base in veterinary science;
- the relationship between veterinary science, medical science and other biosciences;
- sourcing and synthesis of information; the principles of biological statistics and their correct application.

Part 2: Application of subject knowledge and understanding

The new veterinary graduate should be able to apply the knowledge and understanding outlined in Part 1 to clinical practice. Thus he or she will be able to:

- handle and restrain animals safely and humanely whilst ensuring personal safety and that of others in the vicinity;
- obtain an accurate and relevant history of the individual animal or animal group and its environment;
- perform a thorough clinical examination including non-specialist examination of all major body systems;
- collect, preserve and transport samples, perform standard laboratory techniques, interpret laboratory results (and results of other ancillary diagnostic aids) and integrate them with clinical information;
- assess the nutritional status of an animal and be able to advise on appropriate husbandry and feeding;
- demonstrate a practical ability to apply knowledge of disease processes within a clinical environment;
- assess the reproductive efficiency of an animal or group of animals and advise on reproductive management, including obstetrical problems;
- advise on animal management, welfare and ethics and understand the importance of animal health economics in the context of acceptable animal welfare;
- provide emergency care to all species of animals;

- obtain and record data for current and/or retrospective assessment and analyze animal health and production records;
- understand the need to minimize the risks of contamination, cross-infection and predisposing factors leading to the accumulation of pathogens in veterinary premises and in the field;
- apply imaging techniques, and advise on their safe use. Interpret the results of imaging techniques in the pursuit of a diagnosis;
- recognize the indications for medical and/or surgical intervention;
- advise on and administer appropriate treatment for disease in individuals and groups;
- advise on preventive veterinary medicine including the promotion of optimum health and production;
- safely perform sedation, general anaesthesia and regional analgesia; assess and control pain;
- sterilize surgical equipment, correctly apply the principles of surgical techniques and carry out basic surgical procedures on animals;
- demonstrate an understanding of veterinary public health issues and the procedures to follow with notifiable and zoonotic diseases;
- recognize when euthanasia is appropriate whilst showing sensitivity to the feelings of owners and others by humanely performing euthanasia on animals, ensuring personal safety and that of associated personnel; advise on carcass disposal;
- perform ante-mortem inspection of animals destined for the food chain and be able to recognize conditions affecting the quality and safety of animal products;
- perform a basic gross post-mortem examination, record findings, sample tissues and safely store and transport them.

Part 3: Professional and personal skills

The knowledge and skills outlined in parts 1 and 2 should be applied within a framework of good personal and professional behaviour. The new veterinary graduate should, therefore be able to:

- conduct himself/herself in a professional manner with regard to the veterinarian's professional and legal responsibilities and understand and apply the ethical codes as set out in the Guide to Professional Conduct produced by the SLVC;
- work effectively as a member of a multi disciplinary team in the delivery of services to clients and employers.
- communicate effectively with the public, professional colleagues and appropriate authorities;
- respond as appropriate to the influence of economic and emotional pressures;
- foster and maintain a good professional relationship with clients and colleagues, developing mutual trust and respecting their professional views and confidentiality;

- demonstrate an awareness of the role of veterinarians in the community, particularly in relation to ethical principles;
- be aware of the use of alternative treatment methods and be understanding of clients who choose to use such practices:
- demonstrate competence in information technology including the use of computers for word processing, data handling and information retrieval;
- produce reports in a form that is satisfactory and understandable to the intended audience;
- recognize their own limitations.
- recognize when to seek assistance and understand the protocols for dealing with second opinions;
- demonstrate knowledge of the organization and management of a veterinary practice.
- understand the benefit, need and professional obligation for managing a programme of continuing professional development (CPD) throughout their professional life;
- be aware of the career paths, other than general practice, open to holders of a veterinary degree.

3. TEACHING, LEARNING AND ASSESSMENT

The teaching programme is continually evolving to meet the changing demands on veterinary graduates, and in consequence, teaching, learning and assessment must evolve in parallel with curricula. The institution must be able to justify its choices in terms of the learning outcomes, and the methods and grading criteria must be made explicit to the students taking the courses.

Teaching, learning and assessment methods have been designed to encourage and enable students to develop as independent learners, thus preparing them for a lifetime of continuing professional development.

In addition to obtaining the knowledge and skills as outlined in the subject framework, the veterinary programme fosters development of graduate key skills (eg problem solving, working in a team, communication). Specific courses on communication skills are evolving in the veterinary programme, but these and other key skills are largely embedded within the curricula to ensure that they are learned in the appropriate context. How they learn these skills are made explicit to students through statements of aims and objectives for each course.

A variety of teaching and learning approaches are used in the veterinary programme. These include formal lectures, practical classes, tutorials, directed self learning, problem-based learning, problem solving exercises, field visits and case-based sessions. Case-based learning is an essential part of clinical and paraclinical training, in which individual students or very small groups take responsibility for

clinical cases under appropriate supervision. In order to increase the opportunities for hands-on clinical experience, the second semester of the final year veterinary programme is largely lecture-free. The FVMAS maintains a teaching hospital, an ambulatory clinic for large animals and a livestock farm, in which a range of clinical and husbandry skills can be taught, learned and assessed.

During the clinical training period, and also at some earlier stages in the curriculum, the students are allowed to select areas for in-depth study (often referred to as 'projects'), which may be based within the host institution or, increasingly, may involve external placements. Such projects within curricula are increasingly used both to encourage students to take responsibility for their own learning and to enable particular interests to be pursued in depth.

The veterinary programme includes both formative and summative assessments. Formative assessment plays an essential role in student development by providing feedback on achievements and progress, but may also contribute to summative assessment on which the award is based. Both types of assessment involve a variety of forms to match the diversity of learning outcomes. Assessments will include many (but not necessarily all) of the following:

- essays and reports to examine the ability to synthesize an argument concisely and clearly, and to solve problems;
- multiple choice and extended matching item questions to test factual and deeper knowledge across the breadth of the subject area;
- written case report studies, presentations and a project report followed by an oral presentation, to examine the ability to observe, analyze critically and communicate clearly;
- practical and oral examinations to assess the ability to observe and deduce and apply clinical skills: these may be laboratory-based or objective structured clinical examinations.

Assessments take place at defined points in the course and may also take the form of in-course assessment. Assessment is of cumulative knowledge and understanding. For this reason, students must expect assessments held at any stage to call upon the understanding, knowledge and skills acquired in any part of the course up to that point.

4. STANDARDS

Graduation with a veterinary degree acknowledges high achievement in a lengthy and demanding clinical science course occupying more than four years at university and an additional equivalent of six months undertaking internship training. Therefore, this *subject benchmark statement* refers to a minimum threshold for the award of the qualification, which is recognized by the SLVA as sufficient for the automatic conferment of membership. This embraces the practical skills required for the new graduate and the competences necessary to promote reflective experiential learning throughout a future professional career, whatever-path that may take.

As emphasized throughout this statement, an integrated understanding of the biological and other sciences that underpin and advance clinical veterinary practice is fundamental to the veterinary curriculum. Clinical skills and knowledge build upon a scientific foundation equivalent to that obtained from a biosciences undergraduate course. Thus graduates must:

- have a comprehensive understanding of the basic sciences allied to veterinary medicine, knowledge of the key principles in biological science relevant to the clinical sciences, and the ability to locate, search and summarize primary and secondary sources for further information, as their professional obligations require;
- have demonstrated competence in a range of biological and clinical techniques, including collection, analysis and critical interpretation of data; and communicate the scientific aspects of their work in a way appropriate to an audience;
- be able to construct reasoned arguments to support their actions and positions on the ethical and social impact of Veterinary Medicine & Animal Science and the allied biosciences.

Such clinical and professional skills should be developed in an intellectually challenging scientific context, such that the graduate can apply these principles, skills and techniques in novel situations. The ability to tackle and solve problems is essential for graduation. In particular the new graduate must be able to;

- collect and analyze patient data from a variety of sources, and synthesize such information to gain answers;
- deal with complex issues (for example weighing welfare, economics, animal and public health demands, sometimes emotionally charged situations), make informed and reliable judgements in a professional manner, even in the absence of complete data;
- move between different cognitive modes ranging from pattern recognition and rapid decision making to more reflective problem solving;
- communicate their views, advice and decisions clearly to both specialist and non-specialist audiences.

5. PROFESSIONAL DEVELOPMENT

The veterinary programme recognizes the constantly changing nature of professional life, and the need for veterinary graduates to stay abreast of scientific, medical, veterinary and technological advances. Elements within the veterinary curriculum encourage a particular knowledge, or set of skills, in a speciality, and an awareness of issues at the forefront of that discipline. The new graduate should be capable of:

- obtaining information from a variety of sources including the use of new technology;
- discriminating between reliable sources and information of a lower quality.
- maintaining a broad and up-to-date knowledge and understanding of basic biological and clinical sciences, the social and legal context of professional practice;
- adding to and developing their practical skills to embrace new technologies, and new approaches to diagnosis and therapy.

Graduates require a knowledgeable, mature and compassionate approach to dealing with domestic animals, their owners and keepers, in the interests of animal health and welfare, as well as a clear recognition of the importance of animals in public health. They require the ability to conduct all their affairs with integrity and in a professional manner which meets the high expectations of society.

The following documents were consulted in drawing up this benchmark statement

1. Quality Assurance Agency, United Kingdom – Benchmarking Veterinary Science
   http://www.qaa.ac.uk/academicinfrastructure/benchmark/honours/vet_sci.pdf
2. Subject Benchmark Statement in Medicine for Sri Lanka Universities
3. Veterinary Surgeons and Practitioners Act No. 46 of 1956, Supplement Part II of July, 30 1993
4. Guide to Professional Conduct for the Veterinary Surgeon (2001) issued by the Veterinary Council of Sri Lanka.

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