CVCD

SUBJECT BENCHMARK STATEMENT

IN

BOTANY

Committee of Vice-Chancellors & Directors

and

University Grants Commission

Sri Lanka

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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 practice in Universities in Sri Lanka.

Subject Benchmark Statements will support and promote quality and standards 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 qualifications;
- 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
BOTANY

1. INTRODUCTION

1.1 Subject Benchmark Statement

Benchmarking of academic standards is an essential component of quality assurance in the University system. Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programmes in a specific subject.

Subject benchmark statements are used for a variety of purposes.

Primarily they are important as they describe the nature of the subject area, the expected attributes and capabilities of award holders, and the minimum standards for the award of the degree, and provide:

- Academic staff and institutions with a framework for developing and specifying the intended learning outcomes of programmes;
- Institutions with a minimum standard for the award of a degree in a subject area;
- Peer reviewers with a point of reference, among others, for making judgments about the appropriateness of academic standards within institutions in pursuit of internal quality assurance;
- Professional and statutory bodies with academic and practitioner standards that should be expected of graduates.

Benchmarking academic standards may also provide information for:

- Students, employers and others about the range of provision in particular subject/discipline areas, the qualities developed in graduates, and the standards that would be expected of graduates in those areas;
- The public at large about the nature of higher education awards.

This Subject Benchmark Statement for Botany has been undertaken as an activity of the Quality Assurance (QA) Project of CVCD/UGC by a subject benchmarking team drawn from full Professors and Heads of Departments of Botany in the University system on behalf of the subject community. This Benchmark statement refers to the Bachelors Degree.

The statement is not a syllabus and is not intended to prescribe the time devoted to each component or the order in which the components are to be taught.

This statement represents the first ever attempt to provide general academic standards of a Bachelor's degree in Botany or with Botany as a subject in Sri Lanka. In due course the statement will be revised to reflect developments in the subject and the experiences of institutions and academic reviewers who are working with it.

1.2 Nature and Extent of the Subject

Botany is the study of life of plants and microorganisms from molecules to populations. Plants dominate all terrestrial communities from forests to pastures from agricultural lands to deserts. They provide food for all living forms as well as much of our shelter, clothing and medicines. Without plants, life on earth ceases to exist. The study of plants encompasses nature, variety/diversity, functions and processes of plants and microorganisms, their interactions with environment, human, plants and other organisms and economic uses of them and their products.

Botany includes areas (e.g. Genetics Molecular Biology and Biotechnology, Bio-informatics etc.) in which rapid change and development are evident and where new knowledge and technologies are swiftly spread through the subject. Thus there is an increasing requirement to prepare graduates carefully for continuing their self-education and development after graduation to maintain their knowledge and understanding of rapidly changing areas.

Botany is essentially practical and experimental subject. Consequently, appropriate opportunities to participate in collecting data by undertaking experiments and practical investigations and integral to any scheme of study in this area. The appreciation of hypothesis formation and testing is also often developed by project work in the various subject areas. Group work, problem based learning exercises in practical situations and placements have important generic training benefits.

Currently, Botany is taught as one of the subjects in two levels in the Universities in Sri Lanka, viz. in 3-year general degree programmes and 4-year special degree programmes. In most Universities the subject is offered as courses with compulsory core courses and electives. Students in Agriculture and allied sciences frequently share some courses with students of Botany and this should not be inhibited by the constraints of any benchmark.

2. SUBJECT AIMS

The main aims of a degree programme in or including Botany as a major component are:

- To provide training in the principles of Botany and their application appropriate to the type of degree concerned: single honours, joint honours, combined studies for a general degree;

- To stimulate students intellectually through the study of Botany and lead them to appreciate its application to a range of problems and its relevance in a variety of contexts;
- To develop in students the ability to apply the knowledge and skills they have acquired to the solution of theoretical and applied problems in Botany;
- To develop in students a range of transferable skills that will be of value in employment and self-employment;
- To provide students with analytical skills and an ability to develop simplifying frameworks for studying the real world.

3. SUBJECT KNOWLEDGE AND UNDERSTANDING

To achieve these aims any degree programme in Botany or including Botany as a subject normally should comprise the following areas:

- Plant Diversity and Evolution
- Cell Biology and Biochemistry
- Genetics and Plant Breeding
- Ecology and Natural Resources
- Plant Forms and Function
- Plant Systematics
- Microbiology and Plant Pathology
- Bio-statistics and Experimental Design
- Economic Botany
- Molecular Biology and Bio-technology

This may constitute the core-curriculum, which provides the essential knowledge and understanding, technical skills and professional attitudes, which are required by any graduate in order that they may practice as teachers in schools and universities, researchers, technical staff in laboratories, entrepreneurs, S & T Managers and other positions in relevant institutions.

It is recognized that content will be adapted to suit the nature and objectives of the degree programme.

The programmes should include

- A broad base core covering the above areas together with specialized in-depth study of some aspects of the discipline. Interdisciplinary and multidisciplinary approaches should be encouraged;
- Engagement with fundamentals, major concepts, principles and theories associated with Botany;
- Understanding of information and data and their setting within a theoretical framework with critical analysis and assessment to enable understanding of the subject as a whole;
- Familiarity with terminology, nomenclature and classification systems;
- Methods of acquiring, interpreting and analyzing information related to Botany;

- Awareness of the contribution of Botany to the development of knowledge about the diversity life and its evolution;
- Knowledge of a range of practical and experimental techniques and methodology related to Botany;
- The applicability of Botany to the careers to which graduates will be progressing;
- Engagement with some of the current developments in Botany and their applications and the philosophical and ethical issues involved and to relate this to the quality and sustain ability of life.

4. SKILLS AND ATTITUDES

There is a range of skills and attitudes, which a Botany graduate will have acquired during the programme of study. These are:

- Generic Skills
- Graduate or Key Skills
- Attitudes

A Botany graduate will be aware of the need for compliance with health and safety policies, good laboratory practice, and importance of quality control and quality assurance.

4.1 Generic Skills

- An appreciation of the complexity, diversity and aesthetic value of plant life and the role of plants as the nutritional base of life;
- Ability to read and use appropriate literature on the subject with a full and critical understanding;
- Capacity to give a clear and accurate account of the subject;
- Critical and analytical skills;
- Ability to apply a variety if methods of study in investigational recording and analyzing material;
- The ability to think independently set tasks and solve problems.

4.2 Graduate or Key Skills

- Intellectual skills to analyze synthesize and summarize information, obtain and integrate evidence to formulate and test hypothesis, recognize need for ethical standards and professional codes of conduct;
- Practical skills - designing, planning, conducting and reporting on investigations in laboratories, and/or field; undertaking investigations of living systems in a responsible safe and ethical manner;
- Numeracy, communication, information technology skills;
- Interpersonal and team work skills;
- Self-management and professional development skills - which includes developing skills necessary for self-managed and life-long learning; developing and adaptable, flexible and effective approach to study and work.

4.3 Attitudes

- Proactive approach
- Ethical practices

5. TEACHING AND LEARNING STRATEGIES

The primary aim of teaching and learning strategies is to equip students with the necessary subject knowledge and skills appropriate to their chosen area of work. Learning process should establish an environment that fosters learning styles that create active deep learning opportunities and to develop problem-solving skills and higher-order skills of reasoning and analysis in a structured and supportive environment. The teaching and learning strategies should be designed to progressively encourage the transition from a teacher-centred (dependent learning) to learner-centred (independent learning) so that students become increasingly responsible for their own learning as the programmes advance.

A balanced selection of the following teaching and learning techniques can be used

- Lectures with audio-visual aids (traditional and interactive)
- Laboratory classes/Field work/Project work/Computer sessions
- Excursions
- Projects
- Seminars/Discussions/Workshops/Tutorials
- Problem-based learning
- Self-directed study and set assignments
- Distance learning approaches to include print material, electronic multimedia, videos, broadcasting
- Internet based resources/research papers

The above list is not intended to be prescriptive or exhaustive.

The relevant contribution of these strategies will differ from programme to programme and should be appropriate to the institution, the course, the students and availability of resources.

6. ASSESSMENT STRATEGIES

Assessment strategies are integral to teaching and learning. They should be designed to match intended learning outcomes. They should aim to test subject knowledge, skills acquired and to provide the sort of information about candidates that will be useful to employers.

A variety of assessment techniques may be employed to measure the knowledge, competence, understanding and ability of students within specified criteria.

The methods may include,

- Closed and/or Open Book Examinations
- Practical Assessments/Laboratory Skills
- Seminar Presentations
- Project or Dissertation Reports/Laboratory Reports
- Work Experience Reports
- Essays/Asignments
- Oral Pesentations/Viva-voce Examinations
- Case Studies

The above list is not intended to be prescriptive or exhaustive.

The assessment method must be chosen according to its appropriateness to the course. A combination of continuous assessment and end-of-course assessments should be preferred. Where possible students should be given feedback on their progress and attainment.

7 STANDARDS

It is recognized that Botany programme designers will achieve the goals set for standards in various ways. The achievement of the knowledge and skills described in this statement is monitored by such measures as

- involvement of external examiners
- periodic subject review
- interaction between the course teachers and professional societies.

8. STUDENT ATTAINMENT AND BENCHMARK LEVELS

Student attainment is the achievement graded from the minimum acceptable knowledge and skill level in the areas specified in this statement (Threshold Level) to an excellent performance where graduates have demonstrated range of competencies and skills at an enhanced level (Good Level).

The benchmark levels proposed below are for both a special degree and general degree where Botany is one of the subjects.

(i) Threshold Level

- Be able to access Botany information from a variety of sources and to communicate the principles in a manner appropriate to the programme of study;
- Have ability in a range of practical Botany techniques including data collection, analysis and interpretation of those data, and testing of hypotheses;

- Have an understanding of the explanation of botanical phenomena at a variety of levels (from molecular to ecological systems) and be able to explain how evolutionary theory is relevant to their area of study;
- Be able to plan, execute and present an independent piece of work (eg. a project) within a supported framework in which qualities such as time management, problem solving, and independence are evident;
- Have some understanding of ethical issues and the impact on society of advances in Botany;
- Be able to record data accurately, and to carry out basic manipulation of data (including qualitative data and some statistical analysis when appropriate);
- Have developed basic strategies to enable them to update their knowledge of Botany.

(ii) Good Level

- Be able to access and evaluate information on Botany from a variety of sources and to communicate the principles both orally and in writing (e.g. essays, laboratory reports) in a way that is well-organised, topical and recognizes the limits of current hypotheses;
- Demonstrated ability in a range of appropriate practical techniques and skills relevant to research in Botany. This will include the ability to place the work in context and to suggest lines of further investigation;
- Have a secure and accurate understanding of the explanation of botanical phenomena at a variety of levels (from molecular to ecological systems) and be able to understand the relationship of evolutionary theory to their area of study;
- Be able to plan, execute and present an independent piece of work (eg. a Research project) in which qualities such as time management, problem solving and independence are evident, as well interpretation and critical awareness of the quality of evidence;
- Be able to construct reasoned arguments to support their position on the ethical and social impact of advances in Botany;
- Be able to apply relevant advanced numerical skills (including statistical analysis where appropriate) to botanical data;
- Have well-developed strategies for updating, maintaining and enhancing their knowledge of Botany.

Appendix 1 - Members of the Benchmarking Panel

1. Prof. Urma Coomaraswamy (Chair)	The Open University of Sri Lanka
2. Prof. Gamini Vidanapathirana (Co-Chair)	University of Kelaniya
3. Dr. Preeni Fernando	University of Sri Jayewardenepura
4. Dr.Sirima Gajameragedara	Rajarata University of Sri Lanka
5. Dr.Tissa R. Herath	Rajarata University of Sri Lanka
6. Prof.Kshanika Hirimburegama (Rapporteur)	University of Colombo
7. Dr. Boniface Peiris	University of Kelaniya
8. Dr. M. Printhan	Eastern University Sri Lanka
9. Mrs. Lilani K Senaratne	The Open University of Sri Lanka
10. Prof. Morley de Silva	University of Ruhuna