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# **CONTENTS**

Introc	duction	02		
1.	The Purposes and Aims of the Subject Review Process			
2.	Background of the University and the Department			
3.	3. Aims and Learning Outcomes			
	3.1 Aims	04		
	3.2 Learning Outcomes	05		
4.	Judgments on the Eight Aspects Reviewed	06		
	4.1 Curriculum Design, Content and Review	06		
	4.2 Teaching Learning and Assessment Methods	09		
	4.3 Quality of Students including Student Progress and Achieven	nents 12		
	4.4 Extent and Use of Student Feedback, Qualitative and Quantit	ative 14		
	4.5 Postgraduate Studies	15		
	4.6 Peer Observations	16		
	4.7 Skills Development	16		
	4.8 Academic Guidance and Counseling	17		
5.	Conclusions	18		

# Introduction

The review team consisted of Prof. S. A. Kulasooriya (Senior Professor of Botany, University of Peradeniya), Prof. Morley De Silva (Professor of Botany, University of Ruhuna) and Prof. (Mrs.) D.C.Bandara (Professor of Agricultural Biology, University of Peradeniya). Prof. Kulasooriya served as the review chair.

The review team visited the Department of Botany of the University of Kelaniya, during the period 5<sup>th</sup> to 7<sup>th</sup> April, 2006, and initiated the peer review process. The purpose of the visit was to search for evidences and observe those pertaining to the aims and the intended student learning outcomes as stated in the self evaluation report of the department and evaluate them according to the set guidelines.

On 05<sup>th</sup> morning the review team had a meeting with the Dean of the Faculty, Prof. K. D. Jayasooriya at the Dean's office along with the Head of the Dept. Prof. D.M.Sirisena and Prof. L. R. Jayasekera, Professor of Botany. Prof Colin N. Peiris, Quality Assurance Specialist and Dr. J. L Ratnasekera, Consultant to the Quality Assurance project, introduced the members of the review team to the faculty members.

The Dean of the Faculty briefed the members on the history of the faculty, it's present status and future development plans. Later the review team gathered at the Seminar room of the Department along with the academic staff of the Department. The Head of the Department made a presentation which summarized the information that had been compiled in the self evaluation report covering information pertaining to the structural and organizational aspects and facilities of the department, organization of teaching programs, curricula revisions, evaluation procedures, teaching and learning processes, research programs, post graduate activities etc. The review team then met with other members of the academic staff and had the opportunity to discuss different aspects of the quality assurance program. Data were gathered additionally by meeting with the non-academic staff, undergraduate and postgraduate students, and observing a teaching class, a laboratory class and a students' seminar. The review team also went through relevant documents, inspected facilities provided by the department including lecture theatres, laboratories, herbarium room, equipment room the Botanical Garden and other general facilities such as the Library and the IT centre available at the UoK. In between these activities, the review team constantly met together and discussed the outcomes of their observations. Each reviewer took the lead responsibility for different aspects of provision while all contributed to the writing of the report and making judgments on the eight aspects.

The review team wishes to thank the Dean of the Faculty, the Head and all members of the academic staff of the Department of Botany for the excellent arrangements, cooperation and hospitality extended to it throughout the review process. The reviewers also thank all members of the technical, other non academic staff and students who helped them in numerous ways to successfully carry out the review process during these three days.

# 1. The Purposes and Aims of the Subject Review Process

The exercise of a subject review evaluates not only the quality of the student learning experience/education at the subject level, but also the entire the program offered by an academic department. It is in this context, that the review team evaluated the quality of both undergraduate and postgraduate programs in Botany, at the University of Kelaniya. The Department of Botany of the University of Kelaniya has laid down the principles, set the aims and expected learning outcomes in the teaching of the subject of Botany in its self evaluation

report, and present review is primarily based upon the information provided in this report supported by evidence gathered during the review visit.

The following aspects of education/provision were evaluated during the present review:

- 1. Curriculum design, content and review
- 2. Teaching, learning and assessment methods
- 3. Quality of students, including student progress and achievements
- 4. Extent and use of student feedback
- 5. Postgraduate studies
- 6. Peer observation
- 7. Skills development
- 8. Academic guidance and counseling

The reviewers followed the guidelines set by the Quality Assurance and Accreditation Council of the U.G.C., for subject evaluation.

# 2. Background of the University and the Department

The University of Kelaniya has its origin in the historic Vidyalankara Pirivena, founded in 1875 as a centre of learning for Buddhist monks. The Vidyalankara Pirivena became the Vidyalankara Campus of the University of Ceylon and eventually established itself as the University of Kelaniya in 1959 under the Universities Act No.45 of 1958. Today it is one of the major Universities among the 14 national universities under the University Grants Commission. Located just outside the municipal limits of Colombo, in the historic town of Kelaniya, it has two major campuses, six faculties and four institutions. The Faculty of Science started functioning in October 1967 with the intake of the first batch of students numbering 57. Formal approval for the Faculty was given by the Minister of Education in 1968. The Faculty of Science was the first among the National Universities to initiate the change over from the traditional three subject (general) degree with the end of year examinations to a more flexible Course Unit System, i.e a modularized credit based system within a two-semester academic year with the end of semester examinations. Presently the Faculty of Science consists of eight departments, including the Department of Botany. The academic disciplines offered by the Faculty for the General Degree include Applied Mathematics, Biochemistry, Botany, Chemistry, Computer Studies, Electronics, Industrial Management, Information Technology, Molecular Biology and Plant Biotechnology, Microbiology, Operations Research and Information Technology, Physics, Pure Mathematics, Statistics and Computer Science and Zoology.

The Department of Botany (DoB) of the University of Kelaniya (UoK) was founded in 1967 by the late Professor I. Balasooriya. Academic activities within the department commenced the following year. The current department is part of the Biological Science subject group (Botany, Microbiology and Zoology) which in turn is based in the Faculty of Science (FoS).

The DoB offers academic programmes of study at both undergraduate and postgraduate levels. Undergraduate courses are offered in two discrete sub-disciplines namely, Botany (BOTA) and Molecular Biology & Plant Biotechnology (MBBT). Continuation of these subject specialist areas is also available at postgraduate research levels.

The mission of the DoB is to produce highly qualified botany graduates with a range of relevant employability skills, and who are adaptable, productive citizens capable of enriching

ongoing development within their communities and at national level. In pursuit of this mission, the department is committed to providing a positive and innovative learning environment where students can fulfill their potential and achieve the highest levels of success.

The following programmes of study are offered by the DoB.

## 1. B.Sc (General) degree with Botany as a subject

2. B.Sc. (Special) degree in Botany

#### 3. M.Sc in Biodiversity and Integrated Environmental Management

Programme	Duration	Current student number
B Sc (General) degree	03 academic years	Level 1 - 110
	-	Level 2 - 45
		Level 3 - 30
B Sc (Special) degree	04 academic years	23
M Sc in Biodiversity and		
Integrated Environmental	02 academic years	16
Management		

Students Following B Sc (Special) Degree Programme in Botany

Academic	No. of students following B Sc (Special) degree in Botany program			% students specializing in
ycai	Botany	Other subjects	Total	Botany
2002/2003	11*	66	77	14.3
2003/2004	06	41	47	12.8
2004/2005	06	41	47	12.8

<sup>\*</sup>double batch

# **3.** Aims and Learning Outcomes (extracted from the Self Evaluation Report)

# 3.1 Aims

- The aims of the Botany undergraduate degree program are:
- To enhance learning experience of students at University,
- To provide the students with opportunities to understand the concepts and principles of Botany and their applications appropriate to the type of degree concerned, i.e. B Sc (General) or B Sc (Special),
- To develop attitudes in students to appreciate and respect the living world,
- To equip students with modern knowledge, necessary skills and attitudes that can fit them into a wide variety of jobs available locally and internationally,
- To develop in students the ability to apply the knowledge and skills gained by solving problems through the process of analysis, synthesis and evaluation,

- To develop in students transferable skills, self confidence, entrepreneurial attitudes and skills that can create job markets, and
- To produce graduates who are adaptable and socially responsible.

The aims of the postgraduate programs are:

- To generate knowledge through research, and to contribute to human resources development in the new millennium at M Sc, M Phil and Ph D levels, Whereas those of the taught M Sc program are:
- To enhance appropriate skills on holistic approaches/ techniques for environmental management and to enhance environmental awareness among decision-makers, resource managers, junior level field workers of government and non-government institutions pertaining to natural resources management.

At present, there are several sub disciplines in which M Phil or Ph D research programs could be undertaken by successful graduates.

## **3.2 Learning Outcomes**

3.2.1. B Sc (General) degree program

Learning outcomes within the general degree program are linked to four key areas:

- Knowledge and understanding
- Intellectual skills
- Subject-based practical skills
- Transferable/generic skills

Learning outcomes of each and every course unit offered under Botany are clearly specified in the Syllabi of the Biological Science Stream 2004/2005. Upon successful completion of the B Sc (General) degree program with Botany as a main subject, the students should be able to demonstrate knowledge and understanding of:

- Plant taxonomy and plant diversity from an evolutionary point of view,
- Plant form and function, including cellular biology and biochemistry,
- Ecology, soil biology and natural resources and their management including the use of Geographical Information Systems (GIS),
- Genetics,
- Microbiology and plant pathology,
- Molecular biology and biotechnology,
- Basic biostatistical applications,
- Modern horticultural applications, and
- Post-harvest biology and technology.

In terms of intellectual qualities, the Botany program is keen to foster student achievement in relation to skills linked to analysis, data synthesis, problem-solving and evaluation. Course unit learning outcomes address these areas as relevant. Students need also to demonstrate learning achievements linked to subject-specific practical skills and transferable/generic skills.

#### 3.1.2 B Sc (Special) degree program

Details of learning outcomes are specified in the Syllabi of the Biological Science Stream 2004/2005. In general, students should be able to demonstrate knowledge and understanding at an advanced level, in addition to a range of other subject-specific practical and transferable skills (Section 9.0).

Particularly important are the following:

- Molecular biology and biotechnology
- Plant functioning under extreme conditions
- Plant systematics and bioinformatics
- Plant population ecology and GIS
- Plant pathology and applied microbiology
- Economic botany and plant breeding
- Research Project /Dissertation the student should be able to demonstrate competence in

   (a) planning and carrying out a research project scientifically,
   (b) presenting the research
   in the form of a dissertation, and
   (c) defending the work carried out and its outcomes.

Term paper - which is a self-directed assignment, the student should be able to develop skills in analysis, synthesis and presentation.

# 4. Judgments on the Eight Aspects Reviewed

#### **Overall Judgment - Suspended**

The findings of the team and discussion of strengths and weaknesses of each of the eight aspects of provision are documented below (from 4.1 - 4.8).

#### 4.1 Curriculum Design, Content and Review

The curriculum of the DoB is designed to cater to the 3 year B.Sc. (General) Degree program, and to the 4 year B.Sc. (Special) Degree program. A credit valued course unit system is in operation since 1994 at the DoB. An academic year consists of two semesters, viz: semesters 1 and 2. The duration of a semester is 15 weeks. After 15 weeks of teaching, a study leave period of 3 weeks is given, followed by written examinations conducted within a period of 3 weeks. Examinations of laboratory course units are usually conducted either during the last week of study or during the study period. All students following the Biological Stream are provided with a copy of the *syllabi of subjects offered in the Biological Science stream* and a *Faculty of Science Hand Book* at the commencement of level 1. The syllabus of each subject provides all information pertaining to that subject specifically on compulsory, non-credit compulsory, elective and core course units. In addition to general information, the handbook provides information to students at the commencement of academic work supplementary to the orientation program is a good practice.

The introduction of non credit compulsory course units such as *English for communication and further studies*, the elective course unit on *industrial training* can be viewed as positive developments in the general syllabi of biological science students.

Another good practice is the provision of recommended reading under each course unit of the Botany curriculum. However, the recommended reading lists need regular revisions.

## Design

All students entering the Biological Science Stream of the UoK are required to follow five compulsory BIOL course units in Basic Microbiology (BIOL 11012), Genetics (BIOL 11022), Introductory Biochemistry (BIOL 11033), Biochemistry Laboratory (BIOL 11041) and Computer Literacy (BIOL 11062) during the first semester of Level I. These course units have been designed to provide opportunities to understand basic concepts and principles in Biology, and to acquire the required ICT skills for the study of Biology. The introduction of Microbiology, Genetics and Biochemistry (in Sinhala medium) at the very commencement of the university career of students has to be viewed with some caution and it would be worthwhile to carefully monitor the performance of students in these courses for the next few years. There were no documents on student performance after these practices have been introduced during the 2004/2005 academic year. However the students whom the reviewers met did not specifically mention any difficulties with the present curriculum design. In fact they requested the necessity for considering their performances (for example in microbiology), during the semester 1 of year 1, to be used as a selection criterion for the competitive microbiology course. The reviewers wish to draw the attention of the DoB to explore the possibility of filling any vacancies available in the more attractive degree courses on Microbiology and Molecular Biology & Biotechnology on the basis of student performance in the said compulsory courses.

In general, the curricula of the offered courses are well designed to provide adequate knowledge to students in the fundamentals of Botany as well as in specialized areas. The main areas in the curricula are the following:

- Plant taxonomy and plant diversity from an evolutionary point of view,
- Plant form and function, including cellular biology and biochemistry,
- Ecology, soil biology and natural resources and their management including the use of Geographical Information Systems (GIS),
- Genetics,
- Microbiology and plant pathology,
- Molecular biology and biotechnology,
- Basic biostatistical applications,
- Modern horticultural applications, and
- Post-harvest biology and technology.

The design of most of the course units can be rated as good.

# Content

#### General Degree program

The curriculum offered to the General Degree Students contain all subject areas necessary to give a good basic knowledge in Botany such as Morphology, Anatomy, Taxonomy of Angiosperms, Plant diversity etc. From the course contents it is evident that current developments in some areas of the subject have been incorporated into the syllabus. These include such fields of current interest as biotechnology, molecular biology, molecular

genetics and gene technology, post harvest biology and ecology and environmental resources management.

The introduction of the Environmental Licensing, GIS as a tool for environment management in both theory and practices have broadened the scope of direct applicability of the gained knowledge. However whether environmental problems specific to Sri Lanka have been given adequate priority in the course on environmental science was not evident. It was also not evident whether a good basic knowledge in microscopy has been given to the students at the commencement of their studies. All course units are adequately supported by practicals, assignments and field work. None of the courses are intended to give training in research project planning and writing a research report. It is desirable to introduce such a course unit even to the General Degree students. However the reviewers observed group work at a practical session on ecology which helps to incorporate the development of team work abilities. Introduction of such mini assignments to the curriculum needs to be further strengthened within the available resources.

#### Special Degree Program

Most of the topics dealt within the curriculum are well designed to give specialized knowledge in the most important fields of Botany. Students are also required to undertake an individual/group research project on a subject agreed with a member of staff at Level 3. The reviewers consider the curriculum as well balanced and that it could achieve the set learning outcomes.

#### Post-graduate courses

The Dept. of Botany offers one Post-graduate program by course work. This is the M. Sc Program in *Biodiversity and Integrated Environmental Management*. According to the SER, the major objectives of the M Sc program are to foster better understanding of the environment with a view to promoting sustainable use of natural resources and their conservation. The program consists of taught course modules with an individual dissertation and the duration is two years. During the first year, the program includes lectures, seminars, tutorials, laboratory work and field studies, comprising a minimum of 425 student contact hours in accordance with the Sri Lankan Credit and Qualifications Framework-2004 (SLCQF). The second year is devoted to carrying out a research project of 10-12 month duration and production of a dissertation on the work. The reviewers did not have the opportunity to meet any of the students from this program. However according to the SER and other documents presented, the course contents seem to be well organized to achieve the aims and objectives of the program.

In addition the DoB offers individual Research Projects Leading to M Phil and Ph D. Degrees. The reviewers had the chance of meeting 4 students who are presently engaged in post-graduate research for M.Phil degrees. According to the SER, post graduate students are engaged in research relevant to National Development. There was evidence to show that some of them have been able to draw external funding. The reviewers feel it would be useful to present pre-proposals of the research programs for open discussions to a panel of academics/scientists from the department and outside institutions prior to the commencement of postgraduate research activities.

#### Review

The SER indicated a well organized system within the university for the purpose of curricula review by the Senate Sub-Committee on Curriculum, Learning, Teaching and Evaluation (CULTEC). All Senior professors and Heads of Departments are represented in the CULTEC under the chairmanship of the Vice-Chancellor. The reviewers were informed that all members of the academic staff of the DoB meet to review curricula when the necessity arises and make recommendations for improvements. According to the SER, stake holders such as employers, experts in relevant fields, students (selected through staff-student committees) are involved in the curriculum revision process. The recommendations are reported to the Faculty. It is however not an agenda item of the Faculty Board meetings. There was some evidence that curricula had been discussed at staff meetings, but not in a regular manner. Information to support whether curriculum revisions have been discussed at the departmental level could not be obtained. The implementation process of the proposed curriculum revisions seemed however satisfactory since curriculum revisions have been incorporated on a regular basis. The last major curriculum revision according to available information has been in 2002. However there was evidence to show that with the introduction of the modularized course unit system, there had been ongoing curriculum revisions as the need arose e.g. the introduction of Microbiology, Molecular Biology, Genetics and Biochemistry during the 1<sup>st</sup> Semester of Level I since 2004/2005. There was also evidence for obtaining student views through questionnaires on specific course modules (e.g. English for Biology) which is a good practice that needs to be extended to all course units in the future.

The judgement on Curriculum design, content and review is Good.

#### 4.2. Teaching, Learning and Assessment Methods

Current teaching methods practiced at the Botany Department include lectures, tutorials, seminars, group work, practical laboratories, field work and research projects. It is evident that traditionally the DoB still largely practices teacher-centred teaching methods. However the HoD indicated that steps are being taken to incorporate an increased level of studentcentered active learning approaches. From the 2005/2006 academic year onwards, Computer-Assisted-Learning (CAL) will be introduced as a new teaching/learning method with the strengthening of the computer facilities through the IRQUE project. The general and special degree programs incorporate a diverse range of assessment methods, both formative and summative. These methods include written examinations, practical examinations, oral presentations, report writing, research projects etc. The reviewers were informed that at the beginning of the undergraduate degree program each new entrant is provided with a handbook containing course unit outline including syllabi, learning outcomes, course content, methodology, method of assessment and recommended reading for all course units offered for biological science students by the FoS, University of Kelaniya (Syllabi of Biological Science Stream, 2004/2005). The reviewers were able to confirm this good practice at the students' meeting. It was evident that from the second semester of the Level 1, the medium of instruction is English. The students are supported with an English language enhancement program through a compulsory course unit (GNST 14082) English for Biology which according to the SER provides the opportunity to improve the necessary skills to listen to academic discourse, take notes, write answers and conduct preliminary research. All academic activities in respect of the B Sc (Special) Degree program in Botany are conducted in English. The student's meeting with the reviewers indicated that the standard of English at all levels is satisfactory and students expressed their happiness over the introduction of English medium as early as in semester 2 of level 1.

The practice of maintaining log books to record the coverage in lecture and laboratory titles, dates and duration of teaching, functions as a satisfactory method of keeping track on the progress of the course units in a given academic year. Examination of documents confirmed this practice. Besides the conventional teaching methods, the reviewers observed that some interactive teaching methods such as field exercises and field visits, study guides and laboratory manuals, audio-visual aids such as CD-ROMs are currently employed by the DoB .The current field visits/exercises are meant to provide the students of Botany practical experiences in many biological processes such as sampling plant specimens, biological data collection, vegetation analysis/ ecological interactions and environmental assessment etc. The reviewers observed that the study guides and laboratory manuals are already available for a majority of course units to facilitate the teaching and learning process. According to the HoD, a sufficient number of master copies of each study guide are made available to the students before the commencement of academic activities of a particular course unit and the preparation of the rest of the study guides is to be completed by year 2007. The reinforcement of the teaching process by using video tapes, VHS material, slides, teaching CD-ROMs and transparencies of the standard textbooks facilitates teaching to a good extent. The HoD made the reviewers to understand that a series of interactive teaching CD-ROMs are to be purchased by the DoB in the near future to further strengthen the teaching and learning process through the funds available from the IRQUE-QEF project. Text books appear to form a major component in the teaching methods used in the DoB. The students however brought to the notice of the reviewers that copies of standard texts stored in the library are insufficient. The HoD brought to the notice of the reviewers that a series of modern text books are to be acquired in early 2006 through the IRQUE-QEF project. Computer-assisted learning (CAL) has been introduced to a few selected course units in Botany to give the teaching at the department a more learner-centered approach, enhancing the interactivity between students and staff, which is a current global trend in education. Local Area Network (LAN) with appropriate capacity has already been installed at the DoB, and the department hopes that it will be fully functional by the first quarter of 2006. It is hoped that interactive multimedia materials such as teaching CD-ROMs on a range of topics in Botany will be made available in the near future. These CD-ROMs which act as stand-alone resources will be installed in all the computers in the newly set up computer unit in the DoB which the reviewers observed, during the first half of 2006.

Another good practice, is the incorporation of GIS to the course content of Ecology and Environmental Management (BOTA 31014 and 31022) at Level 3 to provide the students with skills in using modern electronic techniques in gathering, analysis, interpretation and presentation of ecological data and information for successful environmental management.

The research projects assigned to B Sc (Special) degree students is known to enhance planning, outlining and carrying out a research project scientifically. There is a good practice of presenting the research proposal at the initial stage of research and defending the work carried out on completion of the research component and also to carry out such research on problems of national importance in collaboration with national research institutes. The reviewers had the opportunity to observe presentation of a term paper and could confirm the fact that term papers enhance the students' ability for self-directed learning, and skills in oral communication. Furthermore the seminar observed by the reviewers indicated the

enhancement of skills in information literacy, and communication. During seminars and term paper presentations, peer observation was practiced to a very satisfactory level.

At a discussion held with students (Section C), it became evident that they were satisfied with the methods of teaching adopted in the different classes. Although the majority of teaching was vet teacher centered based upon the traditional lecture method, the students appreciated the use of different teaching aids such as the multi media, overhead projector, hand outs etc. They also thought that assignments and tutorials were helpful in their learning. It appeared they used the library and internet facilities to obtain necessary information although the lecture notes still seemed to predominate. The inquiring minds of students to retrieve and search for new knowledge need to be harnessed to a higher degree since this is an essential component of higher learning. They were quite focused about the learning outcomes of field trips. It is appreciated that the department makes a concerted effort to educate the students about the expected outcomes of such field trips and attends to the necessary pre-preparations. The students welcomed the fact that they had the opportunity to go on at least one field trip per semester. The students' knowledge and communication skills in English were remarkable. This gives them as well as the department a high potential to utilize new and innovative teaching/learning strategies to achieve the vision and mission of the Faculty. They were also confident in the use of IT for obtaining information and for presentations during their undergraduate career. However they welcomed the idea of obtaining some assistance in effective presentation skills and hopefully the department could fulfill this expectation as the students did show a significant degree of confidence during their seminar and term paper presentations witnessed by the reviewers.

The students expressed slight concern regarding some practical classes where they have to make drawings of specimens. They inquired whether they could obtain digital images so that they could use them for continuous reference. The reviewers explained the importance of scientific drawing in a degree study program as opposed to artistic, superficial reproductions, but appreciated their suggestion since it could improve the learning outcome. The possibility of saving such knowledge in a CD was a good suggestion made by the students. They also inquired whether consideration could be given to include extra curricular subjects such as music or art in to the study program time table even on non credit basis. Even though the tight schedules of the department to complete the intended outcomes of the degree program is a high priority, this request of students must be given serious consideration since such accomplishments greatly contribute to personality development, social harmony and enhance their employability. As the faculty of Science has already accommodated such extra-curricular activities in its IRQUE project, it may be possible to include them as non-credit courses which appear in the transcripts of the students.

#### **Assessment Methods**

It was evident that assessment strategies adopted by the DoB are course unit-specific and most are conventional methods. As indicated in the SER no provision is available for student accreditation of prior learning (APL). Assessment methods are designed for the appraisal of student performance in relation to specified learning outcomes.

Students are strongly advised to attend and actively participate in lectures and laboratory classes of all course units in which they are enrolled. Eighty percent (80%) attendance is a requirement for the laboratory classes to obtain the best grade achievable. If the attendance at a laboratory course unit is 50-80%, the best grade obtainable is C and for less than 50%

attendance the attainable grade would be D (For the details of the grading system, see Student Handbook - 2004/2005, FoS, University of Kelaniya).

A theory course unit is assessed by an end-of-course unit summative written examination, the duration of which depends on the credit value of the course unit. A laboratory course unit is assessed by formative (e.g., quizzes, laboratory/assignment reports and presentations) and summative (end of course practical examination) methods, as described in the Student Handbook - 2004/2005. In the case of a lecture cum practical course unit, the method of assessment will be a combination of the above assessment methods. Moves are afoot to introduce a host of formative student-centered assessment methods into the theory course units as well, providing regular feedback on assessed work to the students.

Assessment methods are informed to the students at the commencement of each course. Teachers are expected to release the results within two months and failure to do so is reported to the higher authorities.

All the examiners (first examiner and moderator/second examiner) are nominated by the HoD and approved by the FoS, the Senate and finally by the Council of the UoK (Records are available at the DoB). Only senior academic staff members are appointed as examiners, while probationary lecturers are required to work under the supervision of the HoD. In order to ensure verification of the assessment process, question papers prepared by the first examiners are carefully moderated by the moderator/second examiner. In the case of the B Sc (Special) degree programme, the moderator/second examiner is always from outside the UoK. The first examiner prepares the assessment criteria and marking schemes and assesses the answer scripts of students, which are then scrutinized by the moderator/ second examiner in order to ensure reliability. The appointment of an overall external examiner in respect of the B Sc (General) degree program to scrutinize and advise on the conduct of the examinations is being under consideration.

In order to develop skills in scientific writing, students are requested to prepare laboratory reports according to the basic format of scientific report writing, the guidelines for which are discussed during the first laboratory session. Students are assessed based on the reports submitted by them after a field exercise which had been carried out under the supervision of a senior academic staff member. The reports submitted after completion of each laboratory exercise are assessed by the assistant lecturers/demonstrators under the guidance of a senior academic member in-charge of the course unit, where 25% of the total marks are taken towards the calculation of the final grade of the laboratory course unit.

The course units, Research Project-Dissertation (BOTA 43078), Term paper/ Presentation (BOTA 43092) and Herbarium (BOTA 43082) offered at Level 4 are assessed at the completion of each unit according to the assessment criteria developed by the DoB.

The details of the calculation of the grade point average (GPA) and the award of the degree and classes are described in Student Handbook - 2004/2005, FoS, University of Kelaniya.

The judgement on Teaching, Learning and Assessment methods is Good.

#### 4.3 Quality of Students including Student Progress and Achievements

#### **Student profile**

Those who fulfill the necessary University Grants Commission admission requirements based upon the results of the General Certificate of Education (GCE) Advanced Level (AL) examination (Section: 2.1) are eligible to enter and register at the FoS of the University of Kelaniya to follow B Sc degree progammes. The results of the GCE - AL examination are categorized on the 'Z' score obtained by the students. The required 'Z' scores to register in the Biological Sciences degree programs vary depending on the districts of residence of the students and this leads to considerable diversity of standards among the new entrants. This is reflected in the following Table presented in the SER.

Academic Year	Range	Average 'Z' Score
2002/2003	0.92 - 1.80	1.45
2003/2004	1.20 - 2.09	1.46
2004/2005	0.73 - 2.00	1.58

Table 5.1:Student 'Z' Score at the GCE-AL (Range and Average)

(Source: Office of the Faculty of Science, UoK)

A wide variation in the competency of the students in the use of the English Language is also noted in the SER. On the basis of surveys conducted by the English Language Teaching Unit (ELTU) of the UoK, a compulsory tailor made English course for Level I Biology students (GNST 14082), has been introduced from the academic year 2004/2005. Furthermore, it is planned to offer an advanced English course (ELTU 22032) for Level II students. The aim of this course is to improve English competency among students that would enable them to obtain a score above 500 marks in the TOEFL test. These steps are certainly positive ones that would assist students to follow the teaching programs conducted by the department entirely in the English medium from Level I, 2<sup>nd</sup> semester onwards. They will equip them to participate in self learning programs and successfully embark upon postgraduate education both in Sri Lanka and abroad. English competency among the current students following the subject of Botany became evident during the discussion the review team had with them. They spoke with a lot of confidence and expressed themselves quite freely clearly showing that competency in English has also strengthened their personalities.

A group of 12 students from all 4 years were present at this discussion with the reviewers. They have entered the university from five different districts. It is unfortunate that the number of participants was so small that the validity of the findings may be open to question. This limited participation was because the review was held during the vacation which is a period of study leave for students. The Quality Assurance and Accreditation Council of the UGC should take these into consideration when arranging subject review activities in the future.

When questioned whether they knew what was expected of them in relation to the vision and mission statements of the University, the Faculty of Science and the Department of Botany,

they responded that although they had some idea about these from a speech made by Prof. Sirisena, (HoD), they had not given serious thought about it. However, when the significance of such statements was explained they agreed that it was important to be aware of these and to work towards achieving them. When questioned as to whether they expected a different approach to learning when they entered the University, they all answered positively. Regarding a question as to whether their expectations were met they answered that since they did much more independent learning using the library, computer center etc, they experienced a difference in the teaching and learning strategies. This is a noteworthy indication of the quality of the students and that their mindset is in the right direction. The department should capitalize on this correct frame of mind of the students for university learning.

From the evidences submitted in SER (Tables 5.2 and 5.3) student progress appears to be satisfactory. However, the latest information on student performance presented in the SER is for the year 2003/2004 for the Special Degree, and the latest GPA's of students offering Botany is for the year 2002/2003. A more realistic analysis could have been arrived at, if the performances of more recent students were included. This is warranted particularly in view of the significant improvements to teaching and learning methods introduced during the year 2004/2005. Perhaps such information was not available at the time the SER was prepared by the department.

Nevertheless, the performances of the students during their term paper/seminar presentations and the meeting with the review team, were of a high standard and is an indication of the positive effects of the novel approaches to teaching. It is however difficult to draw firm conclusions from interactions with a relatively small number of students that may not be quite representative of the larger cohort following courses in Botany. Nonetheless, the DoB should be encouraged by the positive developments among their products that was observed by the review team.

The judgement on Quality of students, including student progress and achievement is good.

#### 4.4 Extent and use of student feedback, qualitative and quantitative.

It appeared that the DoB considers student feedback as an important component of academic activities and several steps have been taken to encourage it throughout the teaching/learning process. A Faculty Board approved course evaluation questionnaire is distributed among the students at the end of each course unit and collected by the teacher after 15 minutes. After scrutinizing the responses the teacher and the HoD discuss outcomes and take appropriate action, where necessary. Also, student responses to the questionnaires are given back to the teachers before the results of the course evaluations are released. To a question by the reviewers teachers responded that this practice did not cause any bias or partiality in grading the exams.

While this practice has regularized student feed back, the review team feels that the authenticity of the student responses could be improved by the adoption of the following steps to ensure student anonymity that will strengthen confidentiality.

- Evaluation forms are not handled by the course instructor himself/herself.
- Students are given the option to submit type written/computer printed responses.
- A ranking system for teacher evaluation is introduced.
- All work connected with this exercise be handled by non-academic staff under the supervision of the HoD and/or the Dean of the Faculty.

Such procedures would certainly increase the workload of personnel in the administration. Therefore, a request for additional support staff could be justified because this would clearly enhance the quality of the study program. In this manner besides in class teaching (lectures), field trips and practical classes can also be evaluated in order to improve their efficiency.

The practice of having staff-student committees (SSCs) is clearly an activity in the right direction of improving relationships among students and staff as well as a two way process in order to improve curricular and extra curricular activities. The student members to this committee are selected by the staff and the reviewers sincerely hope that the criteria for these selections are transparent. On the contrary, selection criteria could be stated/posted and students could apply for such positions providing greater democracy to participate in these committees. Teachers could then select the student representatives from the applicants. As reported in the SER (p 35) the activities implemented arising out of these committees is commendable.

The judgment on extent of student feed back qualitative and quantitative is satisfactory.

#### 4.5 Postgraduate Studies

Except for the single M.Sc. program offered by the DoB, all other postgraduate studies appear to follow the conventional pattern of certain academic staff members securing research funding and obtaining the services of graduate students to work under such grants. Thus the number of postgraduate research students is determined by the grants available and this perhaps accounts for the entire department having only four research students.

The role of the Faculty of Graduate Studies (FGS) therefore appears to be purely administrative. Perhaps the FGS at the UoK is still young and in its formative stages. Nevertheless it has to play a more proactive role such as fund raising and initiation of new inter-departmental and inter-faculty taught postgraduate programs, if it were to justify its existence.

The reviewers had the opportunity to meet only the 4 postgraduate students and all of them were at different stages of their research degree programs. Thus our observations are based purely on the discussion with them although the SER reports of a MSc taught course on *Biodiversity and Integrated Environmental Management* with an enrolment of 16 students.

All four students were quite happy and contended with the guidance and advice received from their supervisors. They appear to enjoy their work and are hopeful of completing their programs on schedule and gaining profitable employment. The facilities available to them for self-learning, discussions, relaxation etc. obtained through ADB funding, are exceptionally good. However they encounter difficulties due to the current practice of sharing limited laboratory facilities with undergraduate students. The DoB should explore the possibilities in consultation with the FGS, to allocate some additional lab space for these research students.

Compared to the undergraduate students, the postgraduates appeared to be less confident and require more personality development. Since their work is largely independent learning with guidance from their supervisors the latter could make a significant contribution to the improvement of this aspect. It is necessary that they are motivated and nurtured to think and act independently to a larger degree than at present since they would be expected to serve the community and contribute to the working world at a higher capacity.

It would be good if the department could make provision for research pre-proposal presentations and periodic progress review presentations by graduate research students. This would not only improve their communication skills, but also enable the improvement of their research protocols (if necessary), and increase the chances of publishing their findings.

The judgment on Postgraduate studies is satisfactory.

#### 4.6 Peer Observations

The reviewers observe that there is no formal procedure for peer observations either in the Department or the Faculty. However, the junior staff of the Department conducts all practical classes under the purview of a senior academic who is the lecturer responsible for the particular course unit. There was some indication that peer observation occurs when probationary lecturers conduct lectures and tutorials. Students are occasionally given the opportunity to make peer observations of their teachers through a questionnaire (see *Section D on student feed back*). The results of this exercise are conveyed to the respective teachers by the HoD.

Based on the observations of the documents made available to them, the reviewers strongly recommend the regularization of the peer observation process among the teachers. It is understood that this is a sensitive exercise and should be implemented with the consent of all academic staff. Perhaps the FoS with the assistance of the Quality Assurance Unit of the University should conduct a series of workshops to instill confidence on peer observation among all staff members.

There was some peer observation at the research seminars and term paper presentations by the special degree students which the reviewers attended. The reviewers also noted that undergraduate examination papers of the General Degree students are scrutinized by a second examiner from the DoB itself. In the case of special degree students, the final year examination papers are sent to an external examiner who is generally a University teacher nominated from another University. Nominations of all external examiners have to be approved from the Faculty Board. The extent of peer observations with reference to examinations, are accepted by the reviewers as adequate in a modularized system as that at the DoB. However there is a need for the introduction of a formal peer observation process in the DoB with reference to the conduct of lectures, lab classes and field activites.

The judgment on Peer observation is Satisfactory.

#### 4.7 Skills Development

The DoB employs a range of teaching/learning strategies to develop the different skills required in the graduate profile. The different skills are assessed through formative and summative assessments and they are reflected in the final results. The SER has identified the disciplinary skills very comprehensively. It is important that teachers have the necessary training on skills analyses in order to impart such skills to students and hopefully such exercises are included in the staff development programs of the UoK.

At a simulated laboratory practical for the review team it was heartening to note that the teacher emphasized the skills to be developed in the effective domain, giving equal emphasis to this important segment of personality development as to the actual psychomotor skills. It

would be productive if the skill itself is taught by the senior teacher concerned while the supporting team of temporary staff assists the students during their practice. In this respect it would be helpful if the senior teacher has a prior session with the assistant teachers as to how best the skill could be taught, how the skill could be broken down into stages, the method to follow, the key points to be kept in mind and the essential knowledge students need to have in order to learn the skill. Also it was good to note that team work and cooperation was built in to laboratory and field classes. A note of advice would be that when such attitudes are to be inculcated and stated as learning outcomes, that assessment methods have to be adopted to assess such attributes and that students who actually work well in teams and also those in whom these attitudes are naturalized are rewarded and appropriate merit is granted.

The same would have to be practiced where presentation and communication skills are the learning outcomes. The DoB already have assessment criteria worked out for such skills and they are acceptable. Since the reviewers once again witnessed a simulated session, it is hoped that the standards shown by students are representative of real situations.

The judgment on Skills development is satisfactory.

#### 4.8 Academic Guidance and Counseling

In accordance with the UoK's policy, the DoB has recognized the importance of guidance and counseling of students and have taken adequate steps to implement a system to provide these services throughout the study programs. The FoS has one Deputy Senior Student Counselor and other Student Counselors, in addition to 3 Senior Academic Advisors for the three study streams. Also, one Academic Advisor per department is nominated by the respective HoD and appointed by the Dean. Thus, the DoB has an adequate number of personnel appointed officially to conduct an effective academic guidance and counseling program. In addition each student has a Personal Tutor who could advice students regarding personal problems/situations where students would need some assistance.

In the week long orientation program for new entrants, the students are briefed by Dean/Science regarding the degree program, facilities available, students' services and he also introduces the academic staff members. The academic advisor would then address the students regarding the course unit system of instruction, course selection procedures and registration of course units. After the meetings with the academic advisors and counselors new entrants have to select the course combinations and subjects they intend to pursue within a framework introduced by the Faculty.

The reviewers raised the question as to why students are made to select the subjects they would like to pursue during the first week of their study program itself. The reviewers felt this was not the most conducive or effective arrangement. It was suggested that this opportunity be given to the students at the end of the first semester since all students follow the same courses during the first semester. The staff pointed out certain logistical problems to implement such a practice. However the reviewers strongly recommended and encouraged the staff to explore all possibilities to overcome such problems and give the students to select their career path once they are more accustomed to university education.

Selection to certain degree programs such as Microbiology and Molecular Biology & Biotechnology to which the demands are higher, is currently based upon the G.C.E. (AL) 'Z-score' and the District of admission and are finalized within the 1<sup>st</sup> week of the 1<sup>st</sup> semester.

Due to limitation of resources these programs have only limited placements and some scheme of selection has to be employed. At the meeting the reviewers had with the students it was pointed out placements are not completely full in these courses, but there is no provision to fill such vacancies after the initial selection. A special request was made by the students for the introduction of a scheme through which such vacancies can be filled at the end of the  $1^{st}$  semester during which all students follow compulsory courses relevant to these subjects. In fact the selection criteria could be the performance in these courses which would be far more reasonable and fair than the 'Z scores' and District quotas. This justifiable request by the students was proposed by the reviewers at the concluding meeting held with staff members of the DoB. It is strongly recommended that a procedure be worked out to fill such vacancies at the commencement of the  $2^{nd}$  semester, as otherwise the resources allocated to these highly rated courses remain under utilized.

The judgment on academic guidance and counseling is Satisfactory.

# 5. Conclusions

The summary of the judgments on the 8 aspects are as follows:

#### 1. Curriculum Design, Content and Review: Judgment – good

Provision of all information regarding course contents, course options, assessment methods etc, to the students at entry is a good practice. Introduction of compulsory English and ICT during the 1<sup>st</sup> semester at level I also, is a positive step which the students appreciated. The offering of elective courses in Industrial Training, Environmental Licensing and GIS strengthens the students' generic skills and make them more employable.

The introduction of Microbiology, Molecular Biology & Biochemistry during the 1<sup>st</sup> semester at level I has to be monitored carefully in order to ensure that such practices do not cause unnecessary difficulties to 1<sup>st</sup> year students gaining entry from sub-urban areas. On the other hand, if student performance does not indicate such hindrances, then the benefits should be given to the students by considering their grades in these courses as selection criteria to fill vacancies in these specialized courses which have a special demand. As the courses on Microbiology and Molecular Biology & Biotechnology commence only from the 2<sup>nd</sup> semester, implementation of such a procedure should not be difficult.

#### 2. Teaching, Learning and Assessment Methods: Judgment – good

Although majority of teaching still follows the traditional teacher centered methods, certain steps have been taken by the Department to increase student centered techniques, and significant improvements can be expected particularly with the enhancement of resources and facilities through the IRQUE project. Currently all theory or lecture based work is assessed on a summative basis at the end of a course and this does not make any provision for the students to identify their weakness/short comings and adopt remedial measures during a course. It is suggested that some formative methods of assessment are adopted, but this may require strengthening of teaching staff man power.

#### 3. Quality of Students, including Student Progress and Achievements: Judgment – good

Despite the wide variation of the quality of students at entry, their results at the completion of the degree programs appear to be satisfactory. A more accurate analysis would have been possible if the results of the more recent graduates were included in the SER. Nevertheless, the novel improvements introduced during the year 2004/2005 appear to have had a positive effect judging by the performance of the 12 students who interacted with the reviewers. However, because of the small size of this group this inference has to remain inconclusive. It would have been very useful if a discussion with a group of recently passed out graduates was arranged with the review team. This would have not only enable a more accurate assessment of the products, but also gained realistic insights into the working of the department as the responses provided by such a group is bound to be less inhibited.

#### 4. Extent and Use of Student Feedback: Judgment – satisfactory

A system of considering student feed back to improve the activities of the department is in place and functioning. The effectiveness of this system is limited by the dearth of confidentiality and anonymity of the responding students. The suggested changes of implementation would certainly make the exercise more accurate and serve as a reliable index to improve the overall functioning of the department.

#### 5. Postgraduate Studies: Judgment – satisfactory.

Currently the department offers one postgraduate taught course and has only four students reading for research degrees. The course content of this M.Sc. course as presented in the SER, is satisfactory. However, the review team is unable to make any comments on student progress as it did not have an opportunity to meet these students. There is certainly room for improvement in postgraduate studies and the FGS should play a more active role especially in the formulation and implementation of taught postgraduate courses. It should also arrange generic skills development courses and other activities common to all postgraduates. Such programs will strengthen self confidence and enhance personality development among the postgraduates produced by the UoK.

#### 6. Peer Observation: Judgment – satisfactory

The review team did not find a formal peer review system operating among the teaching staff of the department. Informal arrangements and interactions between senior and junior staff have resulted in some peer scrutiny, but there is lot of room for improvement. Peer observation of teachers is alien to our culture, is a very delicate issue and should be implemented with due caution after securing a consensus of opinion among a majority of staff members. The QA unit of the UoK should conduct a series of workshops, discussions and training programs etc. to convince the staff members of the positive aspects of peer observations.

#### 7. Student Skills Development: Judgment – satisfactory

The DoB has introduced a number of skills enhancement programs from the academic year 2004/2005. The introduction of compulsory courses on English for Biology students and ICT in the 1<sup>st</sup> semester has strengthened skills needed for student centered learning. Inclusion of Environmental Licensing, GIS and Industrial Training in the undergraduate programs not

only enhances generic skills but also significantly improves the personalities and thereby the employability of the students. The simulated lab/field class observed by the review team was inadequate to properly assess subject specific skills development. The senior teacher who introduced the class was competent and well prepared to communicate to the students the development of skills in them expected by this exercise. The temporary staff participation in the conduct of the class appeared to be less interactive. The team was informed that additional resources such as microscopes, computers, library books, CD-ROMs etc have been ordered through the IRQUE project funds and significant improvements in skills development could be expected in the future.

#### 8. Academic Guidance and Counseling: Judgment – Satisfactory

The FoS has a well organized system in place for guidance and counseling and a number of staff members from the DoB are involved in these activities. With a Faculty Senior Deputy Counselor and other Student Counselors, Senior Academic Advisors and Personal Tutors, the students have plenty of opportunities to seek assistance and discuss their problems and difficulties. A major weakness observed is, that the students are made to select their streams of study and the courses to follow within the 1<sup>st</sup> week of their admission to the university. Despite all the guidance available, these students fresh from school are certainly not competent enough and are immature to decide on the courses to follow that would enable them to achieve their career goals. It is strongly recommended that some opportunity is provided for the students to finalize their course programs at the end of the 1<sup>st</sup> semester of level I. As all the courses offered during the 1<sup>st</sup> semester are compulsory, course selection need not be finalized as soon as the students enter the university. In fact, performance in some of the compulsory pre-requisite courses could be useful for the staff as well as the students to assess their competencies and accordingly make appropriate course selections for the rest of their undergraduate careers.

#### *Strengths* (Good Practices) observed in the system and study program.

- 1. Student /staff relationships are good.
- 2. Student satisfaction in the department is high.
- 3. The Head of Department and all academic staff members are enthusiastic, highly committed to student well being and work as a cohesive team.
- 4. Funds from the IRQUE project appears to have been well spent, focusing on needs to strengthen student centered learning.
- 5. The Botanic Gardens of the department is maintained in a show piece condition and is well equipped to support the practical classes in Botany, Ecology and Landscaping.
- 6. Students are well informed of the study programs, course contents, assessment methods etc at the very beginning of their university education.
- 7. Introduction of compulsory courses on English and ICT during the initial stages of their university career enables skills development needed for student centered learning.
- 8. Provision of training opportunities to technical staff has not only strengthened the supporting services, but also led to work satisfaction among this category of staff.
- 9. Documentation of departmental teaching and other programs, assessment schemes and results is well maintained.
- 10. Judging by the limited number of students met by the review team, the products of the Department of Botany appear to be good.

# *Weaknesses* observed in the system and in the study program:

- 1. Infrastructure facilities particularly laboratory space is limited.
- 2. The laboratory equipment especially microscopes are inadequate and outdated.
- 3. Finalization of course selection by students is early and pre-mature.
- 4. Cleanliness of the departmental buildings has room for improvement.
- 5. Junior non-academic staff capacity (laboratory attendants) is inadequate. Can be strengthened by the re-distribution of labourers in the department.
- 6. Peer review processes of teaching are ad hoc and not formalized.
- 7. Postgraduate taught courses and opportunities for research degrees are inadequate.

# **RECOMMENDATIONS**

- It is recommended that the Department prepares a phased out, long-term infrastructure development plan.
- The Review Team feels that the Postgraduate teaching programs should be strengthened with the assistance of the Faculty of Graduate Studies.
- Contacts with prospective employers, research institutions and Alumni association need to be made more viable through the establishment of closer links. Workshops and seminars with these stake holders need to be regularized on a Faculty basis to enable such contacts to be strengthened.
- It is recommended that the Career Guidance Unit of the University plays a more active role to involve students to make use of the facility from the commencement of their academic career at the University. That may enable the students to orient themselves better to be knowledgeable on their future employment prospects.
- The departmental Botanic Garden is a very good facility available for the Botany students. Introduction of more plants of botanical interest, especially lower plants, endemic species, availability of a brochure, etc. could be further considered to improve the facility.