SUBJECT REVIEW REPORT

DEPARTMENT OF STATISTICS

FACULTY OF SCIENCE
UNIVERSITY OF COLOMBO

07th to 09th April 2007

Review Team :
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1. SUBJECT REVIEW PROCESS

Subject review process involves evaluating the quality of education within a specific subject or discipline, focusing on the student learning experience and on student achievement. This subject review process evaluates the quality of the undergraduate program. It is understood that the final responsibility for quality and standards remains within the institution itself, since it alone has the powers to control and to change existing practices.

Subject review process at the Department of Statistics (DST) of the University of Colombo was conducted following the guidelines provided in the Quality Assurance Handbook for Sri Lankan Universities, published by the CVCD and the University Grants Commission in July 2002. The quality of education was reviewed according to the aims and learning outcomes given in the Self-Evaluation Report of the department.

The following eight aspects of education were reviewed at the departmental level:

- Curriculum Design, Content and Review
- Teaching, Learning and Assessment Methods
- Quality of Students including Student Progress and Achievements
- Extent and Use of Student Feedback (both qualitative and quantitative)
- Postgraduate Studies
- Peer Observation
- Skills Development
- Academic Guidance and Counseling.

The Review Team visited the DST for three days from May 07th to May 09th 2007. The agenda of the three-day visit was discussed with the Head of the DST and amended to suit the ground realities (see Annex 1). The information related to the above eight aspects were collected by:

- Discussions with the Dean, Head of the DST, members of the academic and non-academic staff (see Annex 2 for List of persons that attended the meetings) and undergraduate students (special degree and IS & MF) and general undergraduates (all three batches) (53 were present in total)
- Peer observation of the teaching process (three lectures and two tutorial/practical sessions were observed – see Annex 3)
- Observation of the facilities at the Department/Faculty/University (see Annex 4)
- Examination of the documents provided by the DST.

Each of the eight aspects was judged as good/satisfactory/unsatisfactory, noting the strengths, good practices and weaknesses. Having considered the individual category judgments, an overall judgment is reported at the end of this report on the following scale: confidence/limited confidence/no confidence; in the academic program.

2. BRIEF HISTORY OF THE UNIVERSITY, FACULTY AND THE DEPARTMENT

The University of Colombo, whose antecedents go back to the University College in Colombo, was established in 1913. It became the University of Ceylon in 1942 and a section of the University moved to Peradeniya in 1949. Several changes later, a university with the present corporate name came into being in 1978. Currently, the University consists of 8 Faculties/Schools: Arts, School of Computing, Education, Management and Finance, Sciences, Medicine, Law and Graduate Studies. These faculties offer BA, B.Sc., B.Com, MBBS, M.Sc, M.Phil and PhD degrees as well as various diplomas and certificates through internal and external programs.

The Department of Statistics (DST) was formed in June 2001 by bifurcating the then Department of Statistics and Computer Science into DST and the University of Colombo School of Computing. Although DST is a young department, undergraduate and postgraduate courses in Statistics have been offered since 1974 by the then Statistical Unit of the Department of Mathematics. External links in the form of assistance by the University of Reading, UK, led to significant development of the courses offered by this unit which led to the establishment of the Department of Statistics & Computer Science in 1985. The DST is the first Statistics Department in the Sri Lankan University system.

The vision of the DST is "*to be the center of excellence in statistical studies in Sri Lanka*".

The mission of the DST is "*to produce quality graduates who are; employable and capable of using statistics effectively in a variety of fields and/or be competent in carrying out basic and applied research in the field of statistics*".

The DST offers Statistics as a separate subject from the first year onwards. It currently offers special degrees in "Statistics" (ST) and "Statistics with Computer Science" (ST + CS). In 2006 the DST and the Department of Mathematics commenced a new degree program "Industrial Statistics and Mathematical Finance" (IS & MF). This program was designed to produce graduates who could cater to the needs of the industry and the financial sector.

DST has also been conducting a postgraduate course in Applied Statistics (M.Sc. Applied Statistics) since 1976, which converts non-statistics graduates with little practical experience in the use of statistics to become professional statisticians. This is one of the oldest postgraduate programs in statistics in Sri Lanka.

3. AIMS AND LEARNING OUTCOMES

3.1. Aims

The specific aims of each level of study program are given below.

Undergraduate program

- Provide an intellectually stimulating environment;
- Help students to develop key intellectual skills;
- Provide a challenging education in statistics and its applications;
- Produce high-quality graduates who are well prepared for professional life either in research or in a career;

- Provide courses based on statistical theory and its applications suitable for students aiming for a career involving statistics;
- Give students an understanding of the principles of statistics and the opportunity to study in depth areas which are of interest to them;
- Enhance students' problem-solving skills and the ability to study independently;
- Enhance students' communication skills (oral, written and IT skills);
- Help students' personal development by extending and broadening their intellectual abilities.

M.Sc. Program

- To attract well qualified students;
- Provide courses which help students to convert to statistics from other areas of study;
- Introduce students to a range of topics and technical skills in their chosen area leading to a variety of potential applications and career opportunities;
- Inculcate an insight into current practice in the chosen area particularly techniques relevant to professional practice;
- Provide an appreciation of the link between theory and application in the chosen area of study.

M.Phil./Ph.D. Program

- To attract well qualified students;
- Provide an environment for developing research skills;
- Encourage publication of work;
- Develop independent thinking abilities of students.

3.2. Learning Outcomes

On successful completion of any one of the study programs, students are expected to have

- Gained knowledge of the main areas of their subjects and pursued same topics in greater depth;
- Enhanced their problem solving skills;
- Gained transferable skills (oral, writing);
- Had the opportunity to study units which benefit from the research interests and professional activities of staff;
- Enhanced their career opportunities;
- In the case of the more successful, developed skills necessary to pursue academic research or further study;
- Developed skills in formulating and solving both theoretical and applied problems and in presenting logical agreements;

- Acquired skills in Information Technology (IT);
- Acquired independent study and working skills.

To promote these objectives, the DST provides the following

- Appropriate programs of teaching and learning opportunities;
- Tutorial and practical support;
- Advice and guidance to students in their selection of courses and options and advice on their attainment during the course;
- A system of recording and monitoring students' progress;
- Opportunities for industrial training;
- Opportunities for a final year research project;
- Regular reviews of study programs at monthly departmental meetings.

The details of the programs the DST is heavily involved in are given in Table 1.1.

Table 1 - Descriptions of Programs *

Program	**Duration**	**Current no. of students per batch**	**Component of Statistics**
B.Sc. (Physical Science) General Degree	3 years	First 2 years : 130	1/3
		3rd Year: max. 240 *	1/3
B.Sc. (Statistics) Special Degree	4 years	10	1/3 in 1st & 2nd years and total in 3rd & 4th years
B.Sc. (Stat. & Comp.Sc.) Special Degree	4 years	10	
B.Sc. (Math, Stat. & Comp.Sc.) Special Degree	4 years	10	1/3 in all 4 years
B.Sc. (Industrial Statistics + Mathematical Finance)	3 years	60	1/2 in all three years
M.Sc. in Applied Statistics	2 years	22	Total in 2 years

* Includes students from general and other special degrees

4. FINDINGS OF THE REVIEW TEAM

4.1. Curriculum Design, Content and Review

Strengths

Curriculum design, content and structure are consistent with the aims, objectives and vision of the DST. There are a number of mechanisms through which program design, content and organization is monitored and evaluated to keep the programs up-to-date. Some of these mechanisms are: monthly departmental meetings, Curriculum Design & Evaluation Committee (CDEC), Faculty Board, through foreign experts working collaboratively and in consultation with external examiners.

The curricula of special degree programs (ST and ST+CS) and the new degree program (IS & FM) offer students the opportunity for continued personal development, by means of industrial placements (an 8 week training program), case studies, assignments / practical, presentations, viva-voce at several stages of the program.

Ability to introduce new topics of current interest and importance through course module titled "special topics" is an added strength.

Knowledge of ST to CS students and vice versa could be a strong point in the ST+CS program.

Weaknesses

Number of electives for "Statistics with Computer Science" (ST+CS) is much lower than the number of electives in other "special" degrees.

It was revealed in discussions with students that students of certain subject combinations (e.g. P1, P3, P5) do not have opportunity to learn certain course modules (e.g. ST 2002 Hypothesis testing/Data analysis I) which are pre-requisites for some elective courses that they can take (e.g. ST 3003 Regression Analysis I). This makes it difficult for them to follow those electives.

ST+CS program creates students who are neither unique to ST nor CS.

4.2. Teaching, Learning and Assessment Methods

Strengths

Strategy for teaching is a blend of techniques for most course modules. Well qualified academic staff adds to the teaching learning environment.

Teaching/learning methods include lectures, tutorial discussions, statistical lab/practical sessions, research supervision, and occasional seminars. Power point presentations at lectures are made use of when appropriate.

Making use of young instructors in small tutorial classes is welcome as generally students do not hesitate to ask questions from them.

It was observed that modern methods of teaching are used in lectures and practicals. Handouts are given to students.

For the special students, the eight-week industrial training is an integral part of their learning process.

All end-of-semester examination papers are moderated and second-marked by internal and external examiners.

Weaknesses

Number of academic staff is insufficient. This will be more acutely felt when the full contingent of IS & FM students are admitted to the DST.

Data analysis and therefore examination of the same is part and parcel of the learning process of the statistical methodologies. This is vital in training students to make applications in the "real world". This learning method is important as it is often said that statistics is the least understood subject by its users. Use of calculators is fast disappearing now with the costlier computers occupying that place and more physical space as well.

Currently there are no computer based in-course examinations, although they are done in take-home assessment. Discussion with the academic staff revealed that this is due to lack of computer facilities to hold such examinations and it can be rectified when the proposed new building for computer labs is completed.

4.3. Quality of Students including Student Progress and Achievements

Strengths

The Faculty of Science gets physical science students with higher Z-scores. The best 130 students among them (based on Z-scores) are selected to do statistics as a subject.

In the case of IS & MF students, the z-scores of incoming students are higher than the physical science cutoff Z-Scores.

The quality of "special" degree students is exemplary. The demand for "special" degree programs in DST is very high.

Several students and graduates have achieved recognition locally and abroad.

Weaknesses

The progression of "General" degree students needs more attention. Lack of facilities is a deterrent factor for this group of students when compared with the "Special" students.

4.4. Extent and Use of Student Feedback, Qualitative and Quantitative

Strengths

Formal and informal feedback processes exists. Students' willingness to come forward for a "feedback" on various aspects of their program is a good sign of trust, especially among the "Special" students.

Weaknesses

Discussion with general degree students revealed that the informal feedback system is not effective.

SER indicates that course evaluation forms are given to the students at the end of each course module by each staff member. However, discussion with general degree students revealed that they did not get course evaluation forms for some course modules.

Although student feedback questionnaires are collected, no proper mechanism to analyze them seems to exist.

4.5. Postgraduate Studies

Strengths

A well established M.Sc. program in Applied Statistics and research postgraduate programs (M.Phil/Ph.D) exist. This is said to be one of the oldest such programs in Sri Lanka.

Well prepared set of guidelines, rules and regulations are in place. There appears to be high demand for the postgraduate program conducted by the DST.

Weaknesses

Time taken to complete the M.Sc. degree is much longer than the stated 2-year period for a considerable number of students. Furthermore, completion rate is rather low.

Students stated that there is a lack of application-oriented courses and lack of computer based practical. They expressed their disappointment over the lack of Library facilities. Training in SPSS/SAS is a desirable matter.

No formal evaluation system seems to exist.

4.6. Peer Observation

Strengths

Indirect/informal mechanisms such as second marking, external moderation, etc, are currently practiced by the DST.

Weaknesses

Currently the DST does not have a formal system of peer review of lecturing and course notes prepared by lecturers.

4.7. Skills Development

Strengths

Case studies and assignments aid special degree students to develop and practice a range of personal skills such as data handling, analysis and interpretation, oral and written communication, time management and team work.

Through industrial training presentations special degree students learn to summarize the essentials and also get the chance to improve their presentation skills (voice control, eye contact, etc.). Furthermore, the final year projects provide special degree students an opportunity to improve their research skills.

A student-run "Stat Circle" is well established in the DST. The "Stat Circle" organizes student-centered activities including career fairs which help the students (especially "Special" students) develop their soft skills.

A well-established Career Guidance Unit at the University level is available to help students develop their soft skills.

Weaknesses

The main emphasis of skills development is on special degree students. It was revealed in discussions with general degree and IS and FM students that opportunities for them to improve presentation skills and communication skills is limited.

Lack of adequate numbers of computers discourages hands-on practical experience and learning of computer-based problem solving.

4.8. Academic Guidance and Counselling

Strengths

The formal mechanism: at the beginning of student entry to University and at the time of selecting "Special" degrees is well established.

Weaknesses

A formal mechanism to assign students to academic counselors was practiced earlier but was not made use of, by students.

Our discussions with General degree students revealed a need for formal mechanism to get academic guidance and counseling.

5. CONCLUSIONS

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

Aspect Reviewed	Judgment Given
Curriculum Design, Content and Review	GOOD
Teaching Learning and Assessment Methods	GOOD
Quality of students including student progress and achievements	GOOD
Extent and use of student feedback, qualitative and quantitative	SATISFACTORY
Postgraduate studies	GOOD
Peer observations	SATISFACTORY
Skills development	GOOD
Academic guidance and counseling	GOOD

6. RECOMMENDATIONS

Based on our reading of the SER, discussions with academic/non-academic staff and students and the inspection of supporting documents, we wish to make the following recommendations.

- A major handicap is the lack of space, academic staff and facilities – especially IT facilities – in the DST. Considering that the Statistics study programs have high demand, lack of the above facilities make it difficult for the DST to increase the number of places for "Special" degree students. The problem will be more severe when the full quota of IS & MF students are enrolled. It is strongly recommended that the University authorities provide space and IT facilities to the DST on a priority basis.
- It is recommended that more collaborative research be carried out in the DST. Our discussions with the staff revealed that one of the limiting factors is the lack of time, exacerbated by the long gap between end of teaching and end of examination (long periods for study leave and examinations). It is recommended that the study leave and examination period be completed within 11 weeks (for both semesters).
- The DST has identified the need of an overall curriculum review. The problem that some combinations not being able to get necessary background knowledge to follow some electives should be taken in to account.
- Adequate numbers of copies of recommended textbooks need to be made available in the library

- Course modules to improve the communication skills especially for "General" and IS & MF students are recommended
- It is recommended that the Career Guidance Unit organize specific programs for Statistics general degree students to direct them to available careers requiring knowledge in statistics.
- The Review Team recommends that all lecturers should use standard student feedback forms. Perhaps optical readers to read the student feedback questionnaires could facilitate the analysis process.
- A formal peer evaluation process is recommended to be started at the earliest
- A permanent mechanism to formally receive on-going student feedback is recommended
- A workable mechanism to get academic guidance/counseling is needed especially for "General" students. A web-based system was suggested by the students. Formal meeting with batch representatives is suggested.

7. ANNEXES

ANNEX 1 – AGENDA FOR THE REVIEW VISIT

Day 1 – Monday 07th May, 2007

08.30 – 09.00 Private Meeting of Review Panel with QAA Council Representatives
09.00 – 09.30 Discuss the Agenda for the Visit
09:30 – 10:00 Meeting with Dean, Faculty of Science
10.00 – 10.30 Tea
10.30 – 11.30 Department Presentation on the Self Evaluation Report
11.30 – 12.30 Discussion
12.30 – 13.30 Lunch
13.30 – 14.00 Observe Departmental facilities
14.00 – 15.00 Observe Other Facilities (Lecture Halls, Computer Centre, Resource Centre, Library, Career Guidance Unit)
15.00 – 16.30 Meeting with Academic Staff
16.30 – 17.30 Meeting with Undergraduate Special Degree Students (3rd & 4th year)
17:30 – 18:00 Brief Meeting of Reviewers

Day 2 – Tuesday 08th May, 2007

09.00 – 10.00 Observe Lecture / Practical Class – IS 1004 Dr. MDT Attygalle
10:00 – 10:30 Observe Teaching – Special Degree Students, Dr. WN Wickremasinghe
10.30 – 11.00 Meeting with Non-Academic Staff
11.00 – 12.30 Meeting with Undergraduate Students – (General degree & IS &MF)
12:30 – 13:30 Lunch
13.30 – 14.00 Observe Practical Class – Ms. WWM Abeysekera
14:00 – 15:00 Observation of documents
15.00 – 16.00 Meeting with Postgraduate students (Working tea)
16:00 – 17:00 Observation of documents (cont'd.)
17.00 – 17.30 Meeting of Reviewers

Day 3 – Wednesday 09th May, 2007

09.00 – 10.00 Observation of documents
10.00 – 10.30 Meeting with Student Counselors and Academic Advisors
10.30 – 11.00 Reviewers Private Discussion
11.00 – 12.00 Meeting with Head and Staff for Reporting
12.00 – 13.00 Lunch
13.00 – 17.00 Report Writing

ANNEX 2. LIST OF PERSONS MET DURING THE VISIT

Dean, Faculty of Science

Prof. R.L.C. Wijesundara

Members of the Academic Staff

Dr. D.R. Weerasekera, Head, Dept. of Statistics (DST)
Prof. (Mrs) M.R. Sooriyarachchi
Mrs. A. Karunaratne
Dr. W.N. Wickremasinghe
Dr. (Mrs) M.D.T. Attygalle
Mr. E.R.A.D. Bandara
Mrs. J.H.D.S.P. Tissera
Ms. D.P. Kuruppumullage
Mr. H.A.S.G. Dharmarathne
Ms. K. Sayanthi
Ms. H.D.D.G. Henadheera
Mrs. D.R.T. Jayasundara
Mr. N.G.T. Gunaratne
Ms. W.W.M. Abeysekera
Ms. R.S. Udugampola
Ms. M.V.D. Perera
Ms. J.K.A.M. Sanathani
Ms. D.C. Hewage
Ms. R.V. Jayathilake

Members of the Non-Academic Staff

Mrs. S. Peiris
Mr. H.K.T. Nanayakkara
Mr. W.S. Fonseka

Discussions were also held with 53 undergraduate (general, IS &MF and Special) and 4 postgraduate students.

ANNEX 3. LIST OF TEACHING SESSIONS OBSERVED

8th May, 2007

- Lecture/Practical – IS 1004 – Dr. M.D.T. Attygalle
- Lecture – Special Degree Students – Dr. W.N Wickremasinghe
- Practical – Computer Applications – Ms. W.W.M. Abeysekera

ANNEX 4. LIST OF FACILITIES OBSERVED

- Department
- Lecture Halls
- Computer Centre
- Library (UCSC and Science Faculty)
- Career Guidance Unit