SUBJECT REVIEW REPORT

DEPARTMENT OF STATISTICS AND COMPUTER SCIENCE

FACULTY OF APPLIED SCIENCES
UNIVERSITY OF SRI JAYEWARDENEPURA

3rd to 5th March 2010

Review Team :

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1. SUBJECT REVIEW PROCESS

Having recognized the importance and the need for formal quality assurance processes in Sri Lankan higher education, in the year 2000 the Committee of Vice Chancellors and Directors (CVCD) was formed with the objective to take necessary initiatives. The University Grant Commission (UGC) and the CVCD published a handbook titled "Quality Assurance Handbook for Sri Lankan Universities" in July 2002 with the assistance of several experts. Following the subsequent deliberations, the Councils and the Senates of Sri Lankan Universities accepted and agreed to conduct Quality Assurance activities in respective Higher Education Institutions (HEI) under the Guidelines given in the Handbook. The Quality Assurance & Accreditation Council (QAAC) was established with the support of the IRQUE project and it links to the state university system through the UGC Standing Committee for Quality Assurance (SCQA). The QAAC designed and introduced the procedures for the Quality Assurance Process for HEI in Sri Lanka.

The QAAC conducts four types of review processes as listed below in HEIs.

1. Subject Review Process
2. Program Review Process
3. Institutional Review process
4. Library Review process

The Subject Review Process and Program Review Process are designed to evaluate the quality and the relevance of the undergraduate and postgraduate programs offered through HEIs on the following eight aspects.

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

Subject/Program Review Process

The Team appointed by the Quality Assurance and Accreditation Council to conduct Subject Review in the Department of Statistics and Computer Science (DSCS), Faculty of Applied Sciences (FAS), University of Sri Jayewardenepura consists of following members inclusive of expertise both in Statistics and in Computer Science to facilitate reviewing of academic programs conducted in both disciplines.

Subject/Program Review Team

1. Prof. Sarath Kulatunga - University of Kelaniya
2. Dr. Sarath Peiris - University of Moratuwa
3. Dr. Prasad Wimalaratne - University of Colombo School of Computing
4. Dr. Prasad Jayaweera - University of Ruhuna

The key features of the subject review process include the critical analysis of the Self Evaluation Report (SER) prepared by the academic department concerned, peer observation

of teaching, observation of documents, observation of the facilities available, and gathering information on activities towards quality assurance through discussions with as many stakeholders as possible. The Team makes judgments on each of the eight aspects as Good, Satisfactory or Unsatisfactory.

The SER prepared by the Department was made available to the Review Team in advance by the QAAC. The team carried out the review process from 03rd to 05th March 2010. The review process was started by meeting the Vice-Chancellor/University of Sri Jayewardenepura (SJP) together with the Chairman/Internal Quality Assurance Unit of SJP, Chairman/Curriculum Development and Quality Assurance Committee of Faculty of Applied Sciences. In this meeting, the Vice-Chancellor highlighted the importance of quality assurance process based on social and cultural roots of the country and also briefed the review team of the present situation at the University. The review team then finalized the agenda [**Error! Reference source not found.**] for the review visit together with Head of the Department. The team then had a meeting with the Dean of the FAS, followed by the presentation of SER by the Head of the DSCS.

During the review process the review team critically evaluated the position of the eight aspects in line with the aims and intended outcomes of programs specified in the SER.
The complete list of documents observed during the review process is annexed in page [0]. The Peer observations carried out during the review process includes observing teaching both in theory & laboratory classes and the opportunities that the review team received can be found in the agenda in page [**Error! Reference source not found.**]. The list of stakeholders with whom discussions were held is given in page [0].

On 03rd March 2010 morning, the review process was started with a meeting among the Vice-Chancellor/University of Sri Jayewardenepura (SJP), the Chairman/Internal Quality Assurance Unit of SJP, Chairman/Curriculum Development and Quality Assurance Committee of Faculty of Applied Sciences, Head/Department of Statistics and Computer Science together with the review team. In this meeting, the Vice-Chancellor stressed the importance of HEIs' quality assurance processes based on social & cultural roots of the country and further, briefed the review team with the present situations at the University. The review team then finalized the agenda for the review visit together with Head of the Department. The team then had a meeting the Dean of the Faculty of Applied Science that was followed by the presentation of SER by the Head of the department. The complete agenda that was followed by the team for the three days is given in the annex [**Error! Reference source not found.**].

2. BRIEF HISTORY OF THE UNIVERSITY, FACULTY AND DEPARTMENT

The Vidyodaya University of Ceylon was established in 1959 at Maligakanda. It was shifted to Gangoawila in 1961. It was renamed as the University of Sri Jayewardenepura (USJ) in 1978. The vision of the university is 'vijja upapatatham setta' - 'among all that arise knowledge is the greatest'.

The Faculty of Applied Sciences (FAS) of the Vidyodaya University was started in 1959. At the beginning all the physical science and biological science students of the FAS studied

Mathematics as a subject for their degree. Statistics and computer programming were introduced as parts of the Mathematics curriculum in 1967.
The Department of Mathematics (DM) was established in 1968. The first ever postgraduate program in Sri Lanka, the postgraduate Diploma program in Statistics, was started by the DM in 1968. Accordingly, Statistics and Computer Programming have a long history at the FAS.
Statistics was introduced as a separate subject by the DM in 1980. Computer Programming was compulsory for physical and biological science students until 1985. In addition to Computer Programming, some Computer Science courses were introduced in to the Mathematics curriculum in 1986.

The demand for Statistics as well as Computer Science grew rapidly by the mid 1990. Because of the difficulty in offering a wide range of course units in Statistics and Computer Science under the single Department of Mathematics, the need for a separate department was felt. A proposal to establish the Department of Statistics and Computer Science (DSCS) was made in 1997. Without waiting for the establishment of the DSCS, the special degree program in Statistics was started and the postgraduate diploma program in Statistics was upgraded to the M.Sc./Postgraduate Diploma program in Applied Statistics in 1997.

The DSCS was established in 1998. At the beginning, 7 Lecturers, who were teaching Statistics and Computer Science at the DM, joined the DSCS. Professor R.A. Dayananda, who was the first professor in Statistics in Sri Lanka, was the first Head of the DSCS. Now it has 14 lecturers. The DSCS has made a significant contribution since its inception. Computer Science was introduced as a separate subject in to the general degree program in 1998. As a result, two new subject combinations, containing Statistics and Computer Science, were created and the student intake was increased by 40. The Special degree program in Computer Science was started in 2002.

In addition to the large number of general degree graduates with Statistics and Computer Science knowledge, the DSCS has produced 57 special degree graduates in Statistics and 21 special degree graduates in Computer Science up to now. The DSCS has also produced 17 M.Sc.'s and 42 Postgraduate diplomas in Applied Statistics since 1998. Most of its graduates and postgraduates have rendered a valuable service to the country. They have served, and are serving as Lecturers, Statisticians, Directors, Executives, Managers, and other key personnel in government and private institutions, organizations and companies in Sri Lanka and abroad.

The DSCS has links with the community inside the university as well as outside the university, through a number of ways. Its academic staff offers services as consultants, visiting lecturers, external supervisors, examiners, research reviewers, resource persons etc. Its students offer free services to researchers through the statistical consultancy unit. Students and the industry are connected through the recently started industrial training programs and both parties are benefited from each other.

3. AIMS AND LEARNING OUTCOMES

The DSCS conducts study programs in two completely different subjects; Statistics and Computer Science. The DSCS is the only such department in the FAS. It offers five study programs; three in Statistics and two in Computer Science.

Statistics:

(a) the general degree program in Statistics (3 years),
(b) the special degree program in Statistics (4 years),
(c) the M.Sc./ Postgraduate diploma program in Applied Statistics (2 years).

Computer Science:

1. the general degree program in Computer Science (3 years),
2. the special degree program in Computer Science (4 years).

3.1 Aims

The mission of the DSCS is to produce high quality graduates and postgraduates in Statistics and Computer Science, who can contribute to the national development and to the development of the two disciplines. The program-specific aims and learning outcomes of the above 5 study programs are given below. (The names of the course units offered to achieve the aims of undergraduate programs in Statistics are given within brackets). The course-unit-specific objectives and learning outcomes are given in the course unit descriptions available at the department web site www.dscs.sjp.ac.lk.

Aims of the general degree program in Statistics are to

(a) provide the fundamental knowledge in Statistics (Descriptive Statistics, Elements of probability, Distribution theory I, Elements of sampling),
(b) provide essential theoretical knowledge (Statistical inference, Non-parametric Statistics, Sampling techniques, Bayesian inference),
(c) provide essential knowledge in applied statistical techniques (Sampling techniques, Regression analysis, Design of experiments, Categorical data analysis, Time series analysis I),
(d) provide practice in data analysis using common statistical software (Introduction to statistical software, Data analysis I, Data analysis II, Data analysis and preparation of reports),
(e) develop soft skills and transferable skills, with special attention to Statistics (Statistical communication I, Statistical communication II, Data analysis and preparation of reports),
(f) provide opportunity to learn special statistical techniques used in specific fields (Industrial Statistics I, Medical Statistics),
(g) provide exposure other useful areas (Distribution Theory II, Operations research)
(h) produce graduates employable as teachers that are capable of teaching fundamentals of probability and Statistics correctly, statisticians and statistical officers that are capable of designing surveys and experiments, collecting data, analyzing various types of data, interpreting the results, preparing reports etc., in various fields (All the general degree course units).

Aims of the special degree program in Statistics

(a) provide a thorough knowledge in probability theory and theoretical Statistics (Probability theory II, Advanced statistical inference, Time series II,)
(b) provide a thorough knowledge in advanced applied Statistics (Regression analysis II, Design of experiments II, Multivariate Statistics, Statistical modeling,)

(c) provide knowledge and improve skills in advanced statistical computing (Statistical computing)
(d) provide hands on experience in real life statistical problems and statistical consulting, (Statistical consultancy, Project, Industrial training)
(e) provide training to work in industry or research environments
(f) provide opportunity to learn other useful areas of Statistics (Stochastic processes, Actuarial Statistics, Bayesian inference, Time series II, Generalized linear models, Survival analysis, Queues, Industrial Statistics II, Special topics in Statistics)
(g) provide opportunity to learn useful techniques in other subjects (Computer programming, Neural networks),
(h) orient the student towards independent research (Seminar, Project),
(i) provide an opportunity for research, preparation of dissertation, and presentation (Seminar, Project,),
(j) provide an opportunity to interact with variety of researches (Statistical Consultancy),
(k) prepare for any higher education program in Statistics, (All the core course units), and
(l) produce graduates employable as lecturers in Statistics in government and private educational institutes, high caliber statisticians, decision makers, researchers, executives required for government institutes and departments, private institutes and companies etc.

Aims of the M.Sc./ Postgraduate Diploma program in Applied Statistics

(a) provide essential theoretical knowledge in Statistics,
(b) provide knowledge in applications of Statistics and training in data analysis required by graduate employees in various fields,
(c) provide an opportunity to do research,
(d) provide an opportunity for graduate employees to gain higher education qualifications required for their promotions and carrier development,
(e) provide an opportunity for graduates who have not studied Statistics to learn Statistics,

Aims of the general degree program in Computer Science

(a) provide graduates with basic knowledge in both theory and practice in Computer Science, including current emerging technologies and experimental learning,
(b) prepare students to contribute to the computing profession upon graduation, and
(c) provide a basis for continued study, and growth in their fields.

Aims of the special degree program in Computer Science

(a) provide students with a good grasp of core contents of Computer Science which any professional in the subject is expected to know,
(b) foster logical and analytical thought, independent study, self motivation and communication skills both written and verbal,
(c) to make aware of research results and latest trends in the key areas of the subject,
(d) to provide opportunities to gain practical experience of computing, using modern hardware and software, in order to provide motivation for and deeper understanding of material taught in formal lectures,
(e) provide exposure to the industrial environment,
(f) produce graduates with sound knowledge in both theory and practice in Computer Science, including current emerging technologies and experimental learning,
(g) place equal emphasis on theoretical and experimental Computer Science,
(h) prepare students to contribute to the computing profession upon graduation, and

(i) provide a basis for postgraduate study, and enable them to make effective and efficient use of computers to solve human, scientific, engineering, or physical problems, as builders of powerful and easy-to-use tools, researchers, and educators.

3.2 Learning Outcomes

Upon successful completion of any one of our programs, students should be able to practically use the knowledge they gained from the program. The program-specific learning outcomes are given below. The course-unit-specific learning outcomes are given in the individual course unit descriptions.

1. On successful completion of the general degree program in Statistics a student should be able to
   - explain fundamental ideas of probability and Statistics and the theory behind the commonly used statistical techniques,
   - apply suitable statistical techniques correctly for solving real life problems,
   - analyze data using common statistical software and interpret outputs, and
   - prepare statistical reports and make presentations.

2. In addition to the learning outcomes mentioned in 2.2.1, on successful completion of the special degree program in Statistics, a student should be able to
   - explain advanced concepts in theoretical Statistics and the theory behind the advanced statistical techniques,
   - apply the advanced statistical techniques,
   - plan and carry out statistical research,
   - do advanced statistical computing,
   - provide statistical consultations, and
   - adapt to working environments in industry or other organizations.

3. On successful completion of the M.Sc./ Postgraduate Diploma program in Applied Statistics, students should be able to
   - explain the concepts and theory behind well known statistical techniques,
   - apply the suitable statistical techniques correctly to solve statistical problems,
   - analyze data and interpret results,
   - plan and carry out statistical research,
   - do advanced statistical computations, and
   - enhance the carrier or carrier opportunities.

4. Upon successful completion of the general degree program in Computer Science, the students should be able to
   - demonstrate the knowledge and understanding of essential concepts, principles and theories relating to Computer Science.
   - use the knowledge and understanding gained for modeling and designing of computer based systems in an efficient way.
   - identify and analyze specifications relevant to a particular problem.
   - analyze and investigate whether a particular computer-based system meets the requirements and specifications stipulated for its current use and future developments.
   - specify, design, analyze and implement computer-based systems.
   - evaluate systems in terms of standard quality attributes.

- apply the theories and principles of effective database management skills to information such as textual and images.
- employ the theories and principles of human computer interaction for the evaluation and construction of user interfaces and web pages.
- identify and use publicly available software such as open source materials.
- operate software systems and computing equipments effectively.
- participate in teamwork as an active member of a development team.
- manage his or her own learning and development skills including time management and organizational skills.
- recognize the current developments in the field of Computer Science to continue his/her own professional development.

5. Upon successful completion of the special degree program in Computer Science, the students should be able to;
   - demonstrate the knowledge and understanding of essential concepts, principles and theories relating to Computer Science,
   - use the knowledge and understanding gained for modeling and designing of computer based systems in an efficient way,
   - identify and analyze specifications relevant to a particular problem, and plan strategies for finding a solution to it,
   - analyze and investigate whether a particular computer-based system meets the requirements and specifications stipulated for its current use and future developments.
   - employ appropriate theories, practices and tools in the design and implementation of specifications, and
   - identify the possible trade-offs present within given problems.
   - specify, design, analyze and implement computer-based systems,
   - employ appropriate theories and practices in the evaluation of computer-based systems.
   - evaluate systems in terms of standard quality attributes,
   - evaluate possible trade-offs present within given problems,
   - apply the theories and principles of effective database management, data mining and information retrieval skills to various information such as textual, images, sounds and video,
   - employ the theories and principles of human computer interaction for the evaluation and construction of user interfaces, web pages and multimedia systems,
   - identify possible security threats and risks involved in the implementation and operation of computer-based systems,
   - identify and use publicly available software such as open source materials and APIs, and
   - operate software systems and computing equipments effectively.
   - make effective presentations to a wide range of audience regarding computing and technical problems and their solutions,
   - participate in teamwork as an active member of a development team,
   - manage his or her own learning and development skills including time management and organizational skills, and
   - recognize the current developments in the field of Computer Science to continue his/her own professional development.

4. FINDINGS OF THE REVIEW TEAM

4.1. Curriculum Design, Content and Review

Curriculum Design and Content

The Department of Statistics and Computer Science (DSCS) conducts study programs in two subjects; Statistics and Computer Science for both General and Special Degree programs. This is the only such Department in the Faculty of Science (FAS) of the University of Sri Jayewardenepura.

There are 4 subject combinations available with Statistics and/or Computer Science for physical science general degree students at FAS.

- Chemistry/Mathematics/Statistics
- Mathematics/Physics/Statistics
- Computer Science/Mathematics/Statistics
- Computer Science/Mathematics/Physics

In the first two years any student who takes Statistics and/or Computer Science must follow all the core course units worth 20 credits from the relevant subject offered by DCSC. In the third year of the general degree a student should follow course units worth 7-16 credits from the relevant subject. Special Degree students are required to complete 120-126 credits and this should include 60 credits of the relevant subject in the third and fourth years in addition to the entire General degree core units taken in the first two years.

A one year research project is assigned to each special degree student and it is carried out during the fourth year under the supervision of a senior member of the academic staff. They are expected to make several presentations and to prepare comprehensive research dissertations. This is helpful in developing skills in problem identification, data collection and analysis and critical evaluation.

The DSCS places a special emphasis on Industrial training for both Special Degree programs. After completing the program for six months in an industry which is arranged by the DSCS, the students are expected to make presentations, to submit a log book and a final report and to face an oral examination. The review team met with several students who have undergone this program very recently and observed that they have gained a valuable industrial experience. This industrial training program exposes students to a real working culture and provides them with an opportunity to relate concepts learned in the class to industrial setting. Further it has many features to enhance soft skills, attitudes and values of the students.
Statistical Consulting and Seminar course units have been designed to provide special degree students in Statistics with advanced knowledge in the field and to give them a vital exposure to research culture and to enhance their capacity in research.

It was observed that the Statistics and Computer Science course units offered by the DSCS for the General and Special degrees have been designed to provide a good conceptual

knowledge of the fundamental principles in core areas of both subjects. The Mathematical knowledge necessary to comprehend the subject matter in both disciplines is gained from the Mathematics courses provided by the Department of Mathematics in the first two years. The review team is of the opinion that the design and the content of the Statistics and Computer Science curriculum offered by DSCS are adequate to achieve its outcomes. Also the complete coverage of topics at the undergraduate level is comparable to that in other universities.

The review team in opinion that the department should take necessary steps to match the titles of course units in Statistics with the subject content appear in the course.
However the review team noticed that some of the titles of course units in Statistics do not directly reflect the subject content and depth, and this might be a disadvantage for students. Some subject contents are repeated in more than one course unit, and this may be avoided. For example, the exposure to statistical software is given in course units Statistical Communication I and II, Data Analysis I and II etc. Therefore, having the course unit Introduction to Statistical Software may not be necessary. Also the course units Statistical Communication I and II is too early to be done in the first year as most of the general statistical analysis techniques will not be covered in year 1. Also there are several course units of credit value. The depth of coverage of these courses is a major concern.

Curriculum Review
The DCSC has carried out curricular revisions regularly in order to keep the degree program up to date. The feedback from the students, suggestions made by academics at other universities and the experience gained by the academic members by working at other universities are taken into account in the revisions.

A major revision in Statistics curricular was carried out in 2005. Several new course units to enhance the problem solving skills and data analysis skills of the subject have also been introduced in the partial revisions done in 2008 and 2009. The introduction of Actuarial Statistics in 2008 and the revision of Statistics Computing to include Computing with S-plus/R are such two commendable moves.

With the recent revisions, the number of optional units offered by DSCS has been increased remarkably. There are now 19 Statistics and 27 Computer Science optional course units offered by DSCS.

However, although there was some evidence of consultation of internal and external subject experts in Computer Science curriculum revision processes, the team was unable to locate evidence of curriculum revision workshops that have been conducted with the participation of external stakeholders such as IT industry and alumina. DSCS may take this into account during their forthcoming curriculum revisions. The subject review team noted strong focus on Computer Science sections together with Statistics and Applied Mathematics in the present curriculum. It is recommended to follow ACM and IEEE guidelines for computing curricula (please visit, http://www.acm.org/education/curricula-recommendations) at forthcoming revisions through which inclusion of more Information Technology (IT) and Information Systems (IS) sections could also be considered in the present curriculum.

Based on the above observations, the review team is of the opinion that the Curriculum Design, Content and Review aspect of DSCS is GOOD.

4.2. Teaching, Learning and Assessment Methods

Teaching and Learning

The DSCS has a highly qualified teaching staff with post graduate qualifications to teach all course units of the two subjects. However, the Department takes the services of the Department of Mathematics to provide the students with Mathematical knowledge necessary to grasp the concepts and other skills pertaining to Statistics and Computer science.

The FAS annually issue a handbook to the students at registration which contains subject combinations available, different course units and the examination regulations. This hand book is useful for students in selecting appropriate courses. The DSCS maintains its own website and students have full access to course details and past papers.

The review team observed 02 lectures (one in each subject), 02 practical classes (one in each subject) and 01 Statistics tutorial class. Lecturers adopt the conventional method of teaching and use multimedia for the general degree large classes, and the medium of instruction is English and Sinhala. All the lectures are followed by tutorial classes of small groups of around 40. These tutorial classes are conducted by instructors. Students are given opportunities to apply the concepts and theorems of the subjects studied in the classroom through practicals. Special degree students are given an additional opportunity to practice the subjects themselves through a yearlong research project and they are encouraged to present their findings at meetings, seminars and suitable academic forums. The reviewers observed that the instructions given to students by the demonstrators in practical classes were in Sinhala medium. The DSCS may consider providing instructions to students mainly in English medium as this will help to improve the language skills of both undergraduates and the temporary staff.

The DSCS has a very successful industrial training program of six months for special degree students. The exposure of all undergraduates to the industry under guidance is becoming an integral part of the academic activities of universities. This necessity was mentioned by some general degree students in the meetings the review team had with them. The review team therefore recommends the initialization of such a program at least for the Computer Science batch at the moment.

At the meetings the review team had with the students, the students expressed their overall satisfaction about the department.

The review team observed that the academic staff of DSCS undertakes the academic activities earnestly and enthusiastically in spite of the difficulties they face due to the lack of space, equipment and other facilities. While appreciating their invaluable service, the review team strongly recommends that they should be provided with required facilities as quickly as possible.

Assessment Method

The DSCS uses a variety of assessment methods. These methods depend on the level and the nature of the course units. Most course units are taught as regular lectures and have written end of semester examinations, while mid semester class tests are common for most of the course units. The method of assessment of each course unit is informed to the students at the beginning of the course unit.

The individual special degree project is evaluated through presentations, supervisors mark and finally viva-voce examination by a panel of examiners.

All the end semester question papers set by the first examiners are moderated and reviewed by senior staff members of the DSCS. The evaluation of the answer scripts is also done by the same first and second examiners.

It was reported that due to the time constraint for releasing results the moderation and second marking of special degree papers are not done externally.

Based on the above observations, the review team is of the opinion that the Teaching, Learning and Assessment Method aspect of DSCS is GOOD.

4.3 Quality of Students including Student Progress and Achievements

The team observed the evidence of records which indicates that the students obtained career opportunities in leading private and state sector organisations. It is commendable that the awards based on academic performance are in-place to encourage and recognise students' performance. It was noted that the special degree students had a 100% completion rate in the past few years. Evidence suggests that a certain percentage of students achieve high GPAs even though their Z-scores were relatively low at entry to the University. Most students demonstrated good communication skills during the presentations. However, it is recommended that the DCSC implements further measures to enhance the communication skills of the students. The review team observed a tendency of a decline in the Z score of CS and STA students entering to the department over the years, although it may be beyond the control of the DCSC.

Based on the above observations, the review team is of the opinion that the Quality of Students including Student Progress and Achievement aspect of DSCS is GOOD.

4.4. Extent and use of Student Feedback

It was noted that almost all lecturers obtain student feedback for each subject at each level using a standard evaluation form. Mid-semester feedback has also been taken for most of the courses. The information obtained has been well documented. However, the Review Team noted that some of the students are not aware of the student feedback forms.

Although certain corrective actions have been taken as a result of feedback, it is understood that factors mentioned by most students such as the lack of study space, lecture rooms, computer facilities and not using sufficient multimedia for instructions are beyond the control of the DSCS. The Review team strongly feels that the DSCS needs more space to carry out their activities effectively.

Based on the above observations, the review team is of the opinion that the Extent and Use of Student Feedback, Qualitative and Quantitative aspect of DSCS is GOOD.

4.5. Postgraduate Studies

The first post graduate course in Statistics in Sri Lanka was started in 1968 by the Department of Mathematics, SJP. Since then 21 batches of PG Diploma in Statistics have graduated. The PG Diploma Course in Statistics was upgraded to an M. Sc./PG Diploma in Applied Statistics in 1997.

In spite of the lack of senior staff within the department with postgraduate qualifications in Statistics, the continuation of Post graduate degree obtaining the services of academic staff of other universities should be appreciated. The content of these courses covers a wide range of the subject and it is in par with similar PG courses offered by other universities.

However, it would be beneficial if new batches are taken on a regular basis. A main concern of the review team is the low pass rate of the students following the PG programs. The review team was unable to find documents supporting the revision of course content by external bodies.

Though there is a provision to enroll directly for Post graduate research degrees, no students have been enrolled during the last six years. However, it is noted that the senior academic staff of DCSC is involved in research and there are several recent publications to their credit. Also, some staff members have acted as supervisors or co-supervisors of postgraduate research students of other universities. Further, it was observed that the junior staff members have a keen interest in postgraduate studies.

It is also noteworthy to mention that DSCS has already designed Postgraduate Diploma/M.Sc. in Computer Science to be launched in due course. Among obstacles that DSCS is facing in order to start these postgraduate programs, limited infrastructure facilities and space are the main. However the department considers collaborative research work between local and foreign institutes through networks that has been established already. Through such collaborations junior staff may also get opportunities to obtain necessary postgraduate qualifications for their promotions as well.

Based on the above observations, the review team is of the opinion that the Postgraduate Studies aspect of DSCS is SATISFACTORY.

4.6 Peer Observation

The review team observed that there has been an effective regular peer observation process for teaching, and a standard form is used for this purpose. It was reported at a meeting with the academic staff members that observing a lecturer by a colleague at the invitation of a lecturer was introduced about 5 years ago, and the feedback was only communicated verbally. Now the DSCS uses a standard peer evaluation form.

The review team was able to scrutinized peer observation reports of 2008 and 2009, and noticed that most of the members are involved in the process. Also the review team observed that the lecturers monitor the practical classes conducted by demonstrators.

All the question papers of the DSCS are moderated by senior staff members and the second marking of answer scripts are also done by them.

Departmental meetings are held once a month to discuss various matters where staff members share their views. Minutes of the meetings are properly maintained. Evidence of regular meetings was available.

Based on the above observations, the review team is of the opinion that the Peer Observation aspect of DSCS is GOOD.

4.7. Skills Development

The team observed the availability of academic course units such as Statistical Communication, Statistical Consultancy, 4th Year Project, and Seminar which provides ample opportunity to enhance the necessary skills. The internship provided to special students could be offered to the general students who may benefit in seeking employment in the industry. It is commendable that the department has taken the initiative to establish the Stat Society to promote the skill enhance activities to be carried out by the Society. The team noted the evidence of students' active involvement in cultural and CSR projects including 'Sisi Arundathi', assisting IDP camps, blood donation camps, talent shows and religious events. It is commendable that the department has taken the necessary initiatives to teach the current first year students in English medium in the third year.

However, students indicated the need of learning in the English medium from the first year. They further emphasized the need for providing additional assistance in improving the English Language skills prior and during the academic program. The students indicated a limited interest and participation in current ELTU courses and highlighted the need for a customized or revised course offered to the departmental students. The team noted the availability of limited access to up-to-date computing resources in the departmental labs, modern hardware equipment for student projects and access to research journals. Students are making limited use of the services of the Cultural Centre, Career Guidance Unit, Physical Education unit which highlighted the need for an enhanced coordination among the department and other service units.
While commending the successful implementation of an internship program offered for the special CS students, the need for an internship program for the general CS Students is to be highlighted. The team observed the students feedback on the need for enhanced access to recommended text books for borrowing.

Based on the above observations, the review team is of the opinion that the Skill Development aspect of DSCS is GOOD.

4.8 Academic Guidance and Counseling

The review team observed the need for enhancing the formal mechanisms in providing academic guidance and student counseling. The review team did not observe evidence of the

appointment of formal academic advisors by the Department. However, it is commendable that, some level of informal academic guidance is provided by the staff. Furthermore, the team did not observe evidence of a systematic mechanism that identify weak students and provide the necessary guidance and counseling.

Students who follow external courses could be provided with career guidance in selecting appropriate career paths. Hence the programmes such as mentoring could be beneficial to such students.

During the meetings with the students it was noted that the programmes offered by the University's Career Guidance Unit overlaps with the lecture schedules hence the inability of the students to participate in the programs.

Based on the above observations, the review team is of the opinion that the Academic Guidance and Counseling aspect of DSCS is SATISFACTORY.

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

Aspect Reviewed	Judgment
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	Good
Postgraduate Studies	Satisfactory
Peer Observation	Good
Skills Development	Good
Academic Guidance and Counseling	Good

5. CONCLUSIONS

1. Curriculum Design, Content and Review

Good Practices/Strengths:

1. Curriculum revisions are carried out regularly.
2. Industrial training for the Special Degree students for six months is incorporated to the curriculum and this provides students with valuable experience.
3. The independent research project offers students the opportunity to analyze a practical research problem.
4. The DCSC offers a Statistical Consultancy course to address the enhancement of research skills.

5. Presentation skills and the confidence in the subject are developed through the Seminar unit.
6. Availability of Faculty wide Curriculum Development and Quality Assurance Committee
7. Strong Computer Science content in the curriculum including Statistical & Mathematical components.

Weaknesses/Opportunities

1. Practicals related to some course units are done separately.
2. There are several course units of credit value. The depth of coverage of these courses is a major concern.
3. Removal of Measure Theory course from the Special Degree program.
4. In Computer Science curriculum, topics such as Computer/Information Security, Software Quality Assurance, and Software Matrices (CMM) could have also been included increase employability of students.
5. Overlapping/Closely related sections could be merged into course units with generic titles (such as OOSD)

2. Teaching, Learning and Assessment Methods

Good Practices/Strengths:

1. Department maintains its own website and a Learning Management System and students have full access to course details and past papers.
2. Tutorial classes are restricted to small numbers.
3. Use of audio visual aids in lectures.
4. Effective use of a variety of assessment methods in the evaluation process.
5. Very friendly relationship between academic staff and students.
6. Office hours are allocated for students to meet lecturers.

Weaknesses/Opportunities

1. Non availability of multiple copies of recommended text books.
2. Non suitability of some computer labs for effective conduct of practicals.
3. Special degree question papers are not moderated by external examiners.
4. Non availability of a transferring system from Special Degree program to General degree program without sacrificing extra time.
5. Poor infrastructure facilities such as non-availability of departmental lecture theatres, space restrictions in staff rooms and laboratories. This will be a major hindrance to the proper function of the department.

3. Quality of Students, including Student Progress and Achievement

Good Practices/Strengths:

1. Students obtained career opportunities in leading private sector organisations and State sector organisations
2. Recognise/Encourage students through awards based on academic performance
3. Students have participated in sports and some obtained University Colours.
4. Evidence to suggest that career progression of graduated students is systematically monitored by the department.
5. High Completion Rate of Special Students.

6. Evidence suggests that certain percentage of student achieve high GPAs even though their Z-score were relatively low at the entry to the University.
7. Most students demonstrated good communication skills during the presentations.

Weaknesses/Opportunities

1. Information about students' achievements including extra curricular activities has not been maintained by the department in a proper manner.

4. Extent and Use of Student Feedback

Good Practices/Strengths:

1. Regular feedback was taken for most subjects.
2. In some occasions mid-semester feedback was also taken.
3. Certain actions were taken to improve the quality of teaching as a result of feedback.
4. In addition to the formal feedback informal feedback is also taken.

Weaknesses/Opportunities

1. Discussion with students revealed that the tutorials and practicals are given in English, but tutorials and practicals are not conducted in English.
2. There is no evidence that the student feedback questionnaires are endorsed by the quality assurance cell in the university.

5. Postgraduate Studies

Good Practices/Strengths:

1. Continuation of the M SC/PG Diploma in Applied Statistics since 1977.
2. Keen interest of the staff members for postgraduate studies.
3. Supervision of M. Phil. students registered in other universities by some lecturers.
4. Publication of research articles in local and international refereed journals.
5. Some lectures are involved in postgraduate courses conducted by other departments of SJP and other universities.
6. Some students have presented papers at conferences from their M Sc project work.
7. Postgraduate Diploma/M.Sc. programs in Computer Sciences have already been designed to be launched at the receipt of necessary infrastructure.

Weaknesses/Opportunities

1. M.Sc./PG Diploma course is not conducted annually.
2. The mean rate of completing M. Sc. in Applied Statistics is very low. The corresponding rates in 1997, 1999, 2002, and 2006 are 6%, 4%, 3% and 15% respectively with an overall mean of 13%.
3. The percentage failure rate (ignoring dropouts) are also high and the corresponding rates are 78%, 46% and 38% in 1997, 1999 and 2006.
4. No registrations for M. Phil. degrees in the department.
5. The fee being the same for both PG Diploma and M.Sc. courses.
6. The time taken to complete the M.Sc. degree is much longer than the stated 2-year period.

6. Peer observation

Good Practices/Strengths:

1. Availability of a regular peer observation process.

2. Visiting staff is also observed. Tutorial classes done by instructors are observed by lecturers.
3. Staff members have a positive attitude towards peer observation.

Weaknesses/Opportunities

1. No evidence of analyzing the data gathered in peer observation forms

7. Skills Development

Good Practices/Strengths:

1. Statistical Communication, Statistical Consultancy, 4th Year Project, Seminar and Internship provide ample opportunities for skills development and practical application.
2. The team noted the Students' recent initiative of establishing a Stat Society and the planning of activities to be carried out by the Society.
3. Students are actively involved in cultural and CSR projects such as 'Sisi Arundathi', assisting IDP camps, blood donation camps, talent shows, bana etc.
4. Existence of non credit compulsory unit and evidence of ELTU course Curricula Revision.
5. The department has planned to teach the current first year students in English medium in the third year. During the meetings with the students, it was indicated the interest in learning in the English medium from the first year with additional support for improving the English Language skills.

Weaknesses/Opportunities

1. During the meetings, the students indicated a limited interest in current ELTU courses and highlighted the need for a customised or revised course offered to the departmental students.
2. Constrained resources such as labs with older computers and access to hardware equipment and access to journals.
3. Students are making limited use of the services of the Cultural Centre, Career Guidance Unit, Physical Education unit
4. General CS Students do not have the opportunity for Internship and the students highlighted the need for an internship to be competitive in the job market.
5. Students indicated constraints faced due to the limited accessibility to recommended text books.

8. Academic Guidance and Counseling

Good Practices/Strengths:

1. Provision of a comprehensive printed student hand book.
2. Departmental web portal contained comprehensive material including learning outcomes, course objectives and syllabi. Some learning material such as lecture notes were made available in the departmental web portal.
3. Initiatives such as "Learning at University", and Orientation Program are commendable.
4. Academic Staff contact hours have been displayed in the department.
5. Informal academic guidance provided by the academic staff.
6. Students indicated the awareness of psychological counseling offered to the students.
7. Some level of student counseling provided by the four counselors appointed.

Weaknesses/Opportunities

1. No systematic approach to identify weak students who require more attention
2. Students indicated the constraints in using the facilities provided by the University's Career Guidance Unit due to overlapping time tables and heavy workload.

6. RECOMMENDATIONS

1. Reducing the number of 1 credit courses and introducing 3 credit courses at least for special degree program.
2. Incorporating practical components to the main course unit.
3. Giving opportunity to students interested in taking a Measure theory course conducted by the Department of Mathematics.
4. Combining the course units Descriptive Statistics and Elements of Probability and renaming it as Probability theory.
5. Including Multiple Regression in Regression I course.
6. Statistical Comm. I and II are too early in the first year.
7. Renaming Statistical Communication I and II as Explanatory Data Analysis I and II.
8. Including basic designs such as split plot and nested designs in the course content of Design of Experiment I.
9. Consultation of IEEE and ACM guidelines in Computer Science curriculum revisions.
10. Increasing the Computer, IT and space facilities.
11. Giving instructions in English and Sinhala in practical classes to facilitate the improvement of language skills.
12. Maximize utilization of existing Learning Management System for all courses offered by the Department
13. Setting up of an Departmental Alumni association
14. A record keeping process to be implanted to monitor the students' achievements.
15. Offering a research project of two credits for general degree students who are following Mathematics and Statistics.
16. Formulating a common format for the student feedback for all departments in the university in consultation with the quality assurance cell.
17. Getting direct feedback from students to devise a method of overcoming the problem of low pass rates, to preserve the sustainability of the Post Graduate Program.
18. Differentiating between course fee rates for PG and M.Sc.
19. In Computer Science, DSCS may consider starting M. Phil. research degree program with lesser numbers and then to increase numbers through Postgraduate Diploma/M.Sc. programs with the acquisition of necessary infrastructure.
20. Analyzing the data gathered in peer observation forms and taking remedial actions if necessary.
21. Consideration of moving the internship for CS students in the 3rd year.
22. Exploring the possibility of providing the students with more exposure to practical subject areas such as Project Management, Software Quality Assurance etc. In the next curriculum revision process, international guidelines on CS curriculum offered by the professional could be taken into account.
23. Expediting of the implementation process of the Intensive Program in English offered prior to Academic Program.
24. Learning Management System to be utilized more with the use of individual students' accounts and enhanced subject content.
25. It is recommended that sufficient copies of recommended text books are made available to the students.

26. Departmental level Industry scholarships to be established for students who do not benefit from Mahapola /Bursary scheme and who face financial hardships.
27. Student Counselors be provided with training on counselling.

28. Departmental coordinators be appointed for student skills development and to coordinate with Career Guidance Unit/ ELTU/ Physical Education Unit/ Cultural Centre
29. Student participation in extracurricular activities such as soft skills enhancement programmes, community outreach activities to be encouraged.
30. Ensuring regular meetings of student counselors
31. Formal Mentoring programs offered to the students of the department
32. Appointment of academic advisors

7. ANNEXURES

Annex 1: AGENDA OF THE REVIEW VISIT

Day 1 – Wednesday 3rd March 2010

8.00 - 8.30 Meeting with the Vice Chancellor,
08.30 – 09.00 Private meeting of review panel with QAAC representatives
09.00 – 09.30 Discuss the agenda for the visit
09:30 – 10:15 Meeting with the Dean, Chairman of the Faculty QA cell, Head of the Department of Statistics and Computer Science/ Coordinator of Computer Science (working tea)
10.15 – 12.00 Department presentation on the Self Evaluation Report and discussion (LCS)
12.00 – 13.00 Lunch (Math-RR)
13.00 – 13.30 Observing departmental facilities (lecturers' rooms, office, instructors' rooms, LCS, equipments)
13.30 – 14.30 Observing common facilities (Lecture halls, Computer labs (CC), Library),
14.30 – 15.00 Meeting with non-academic staff (DCSS-CGU)
15.00 – 15.30 Observing a STA practical class (CC)/CSC tutorial class (C2)
15.30 – 16.30 Meeting with department academic staff (working tea) (M1)
16.30 – 17:00 Meeting of reviewers

Day 2 – Thursday 04th March, 2010

09.00 – 10.15 Observing Documents (working tea) (Math-RR)
10.15 – 10.45 Observing a CSC lecture (CSC 306, RGNM, b)
10.45-11.30 Experiences from industrial training program (STA, CSC Special, fourth year students)(M1)
11.30 – 12.00 Experiences from statistical consultations (recently passed out STA special batch) (M1)
12:00 – 13:00 Lunch (Math-RR)
13.00 – 13.30 Observing a STA 105 tutorial class (C2/C3)/CSC practical class (LCS)
13:30 – 14:30 Meeting with counselors and advisors (student counselors, academic advisors, Carrier guidance) [Math-RR]
14.30 - 15.00 Observing documents continued (working tea) (Math-RR)
15.00- 15.30 Meeting with undergraduate students (SA)
15:30 – 16.00 Meeting with Statistics Society (SA)
16.00 – 16.30 Meeting with STA/CSC special degree students (SA)
16.30-17.00 Meeting with academic support staff (instructors) (SA)
17.00 – 17.30 Meeting with postgraduate students (SA)

Day 3 – Friday 05th March, 2010

09.00 – 10.00 Presentation of CSC special degree project (one of the published work)/ Presentation of learning software (STA special degree project)
10.00-10.15 Tea (Math RR)
10.15 - 10.45 Observing a STA lecture (STA 205, KMPP, C1))
10.45 – 11.15 Reviewers private discussion (Math-RR)

11.15 – 12.15 Meeting with Head and Staff for reporting (M1)
12.15 – 13.15 Lunch (Math-RR)
13.15 – 17.00 Report writing

Annex 2. DOCUMENTS OBSERVED BY THE SUBJECT REVIEW TEAM

Moderated Papers (Computer Science - Semester I)
Moderated Papers (Computer Science - Semester II)
Moderated Papers (Statistics - Semester I)
Moderated Papers (Statistics - Semester II)
Lecture Notes Visual Basic
CSC 204 2.0 Rapid Application Development Handouts
CSC 353 2.0 Theory of Computation Handouts
CSC 358 2.0 Advanced Database Systems Handouts
CSC 455 2.0 e-Commerce Handouts
Lecture Notes, Handouts, Assignments, Presentations, Videos, Tutorials, Lab Sessions
OOAD Lecture Notes
CSC 205 1.5 System Analysis and Design (Notes)
CSC 453 2.0 Intelligent Systems Handouts
CSC 304 1.5 Introduction to Artificial Intelligence Handouts
CSC 202 1.5 Logic Programming Handouts
CSC 203 1.5 Computer System Architecture Handouts
CSC 101 2.0 Fundamentals of Computer Systems Handouts
Peer Observation Forms (CSC/STA) 2009 [Semester I and 2008 Semester II] Computer Science - Course Outlines
Applications for Computer Science Special Degree Program 2006/2007 Batches
CSC 352 2.0 Modeling and Simulation Handouts
Curriculum Design and Review

STA 104 1.0 Statistical Communication I
Department Minutes Drafts
Department Minutes
Sampling Techniques Survey Reports
Statistical Consultancy Log-Book
Academic Guidance & Counseling
Industrial Training - Computer Science Log Books
CSC 360 1.0 Seminar II Reports
Statistics Course Unit Descriptions
Department Contribution to the Orientation Program in the Faculty
Orientation Program 2008,2009
Program Activities of Learning at University – 2008
Feedback from the Orientation Program (with regard to the activities of the Department) 2007
Orientation Program - 2009Feedback Forms
Orientation Program - 2008 Feedback Forms
Computer Science Past Papers First Year
Computer Science Past Papers Second Year
Computer Science Past Papers - Third Year
Computer Science Past Papers - Special Part I
Computer Science Past Papers - Special Part II
CSC 302 1.5 Neural Networks Tutorial – Submissions
CSC 102 3.0 Tutorial 06
Questionnaires of Department Survey – 2009
STA 101 2.0 2009 Semester 1/End -Feedback Forms
B.Sc. Nursing year - 2009- Feedback Forms
STA 107 1.0 2008/Semester II End - Feedback Forms
STA 106 1.0 2008/Semester II End - Feedback Forms
STA 105 2.0 2008/Semester II End/Mid - Feedback Forms
Statistics Society

STA 104 1.0 2009/Semester 1/End - Feedback Forms
STA 203 1.5 2009/Semester I End - Feedback Forms
STA 201 2.0 2009 Semester 1/End - Feedback Forms
STA 202 1.5 2009 Semester 1/End - Feedback Forms
Feedback Forms Botany Special Students – 2008
STA 102 1.0 2009 Semester 1/End - Feedback Forms
STA 103 1.0 2009 Semester 1/End - Feedback Forms
STA 206 1.0 2008 Semester II/End - Feedback Forms
STA 205 2.0 2008/Semester II/ End - Feedback Forms
CSC 306 2.0 2008/Semester II/End - Feedback Forms
CSC 302 1.5 2009/Semester 1 End - Feedback Forms
STA 301 1.0 2009 /Semester 1/End - Feedback Forms
STA 353 2.0 Semester 1 - End - Feedback Forms
STA 351 1.0 Semester 1 - End - Feedback Forms
STA 301 1.0 2009 /Semester 1/End - Feedback Forms
STA 354 2.0 Semester 1 - End - Feedback Forms
STA 304 2.0 2009 Semester 1 End - Feedback Forms
STA 351 2.0 2009 Semester 1/End - Feedback Forms
STA 302 2.0 2009/Semester 1/ End - Feedback Forms
STA 307 2.0 2008/Semester II/End - Feedback Forms
STA 204 2.0 2008/Semester II/End - Feedback Forms
Statistics Question Papers - Second Year
Statistics Question Papers - First Year
Statistics Question Peers - Third Year
Statistics Question Papers - Second Year

Statistics (Special) Question Papers Third Year
Statistics (Special) Question Papers Forth Year
Applications for Statistics Special Degree Program 2007 Batch
Industrial Training
STA 102 1.0 - Elements of Probability Handouts
STA 107 1.0 - Data Analysis I Handouts
STA 103 1.0 Introduction to Statistical Software Handouts
STA 104 1.0 Handouts
STA 108 1.0 Handouts
STA 106 1.0 Elements of Sampling Handouts
STA 201 2.0 - Statistical Inference Handouts
STA 202 1.5 Non Parametric Statistics Handouts
STA 204 2.0 Regression Analysis 1 Handouts
STA 205 2.0 - Design of Experiments 1 Handouts
STA 206 1.0 Data analysis II Handouts
STA 301 1.0 Handouts
STA 307 2.0 Handouts
STA 309 2.0 - Sampling Theory Handouts
STA 351 2.0 Handouts
STA 353 2.0 Advanced Statistical Inference Handouts
STA 355 2.0 Handouts
STA 453 2.0 - Generalized Linear Models Handouts
STA 461 8.0 Project Proposals
Project Proposals 2003,2005,2006
STA 460 2.0 – Seminar

Computer Science 'Workshops
Statistical Consultancy
Restructuring of English Program
Students Extra Activities in the Faculty
Students ' Achievements
Feedback Forms Learning at University – 2007
Feedback Forms Learning at University – 2008
Feedback Forms - CSC 204 2.0 2008/Semester II End
Feedback Forms - CSC 301 2.0 2009/Semester I End
Feedback Forms - CSC 308 2.0 2009/Semester 1 End
Feedback Forms - CSC 205 1.5 2009/Semester 1 End
Feedback Forms - CSC 201 2.0 2009/Semester 1 End
Feedback Forms - CSC 105 1.5 2008/Semester II End
Feedback Forms - CSC 102 3.0 2009/Semester 1 End
Feedback Forms - CSC 101 2.0 2009/Semester 1 End
Computer Science Dissertations
Statistics Dissertations - 2008/2009
M.sc. Dissertations

Annex 3. THE STAKEHOLDER MET BY THE SUBJECT REVIEW TEAM

a. Vice-Chancellor / University of Sri Jayewardenepura (SJP)
b. Chairman/Internal Quality Assurance Unit of SJP
c. Dean / Faculty of Applied Sciences
d. Chairman / Internal Quality Assurance Unit of Faculty of Applied Sciences
e. Head / Department of Statistics and Computer Science (DSCS)
f. Members of the Academic staff (DSCS)
g. Members of the Non-academic staff (DSCS)
h. Student Counselors
i. Proctor
j. B.Sc. Special Degree Students
k. B.Sc. General Degree 1st year students
l. B.Sc. General Degree 2nd year students
m. B.Sc. General Degree 3rd year students
n. Director / English Language Teaching Unit
o. Officer / Medical Unit
p. Instructor / Physical Education Unit

q. Instructor / Career Guidance Unit