SUBJECT REVIEW REPORT

DEPARTMENT OF CHEMISTRY

FACULTY OF APPLIED SCIENCE

UNIVERSITY OF SRI JAYEWARDENEPURA

19th to 21st October 2009

Review Team :

Prof. S. Mohandas, University of Jaffna

Prof. R. N. Pathirana, University of Ruhuna

Prof. (Ms.) Sujatha Hewage, University of Colombo

CONTENTS

process

A key factor required to promote and safeguard public confidence in Sri Lankan higher education is accountability for quality and standards. As higher education is a public good, universities must conscientiously exercise their responsibility for quality and standards. The subject review is one of the components of the external quality assurance programme carried out in Sri Lankan universities It evaluates the quality of education within a specific discipline. It is focused on evaluating the student learning experience, student achievement and the teaching learning process at the subject level.

Key features of the subject review process include the critical analysis of the self evaluation report 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 conducting discussions with as many stakeholders as possible.

Subject reviews evaluate how the teaching-learning process helps in the achievement of intended learning outcomes.

Peer observation carried out during the review process includes observing teaching both in the theory and laboratory classes, and if possible in the field classes. The documents that are observed include, examples of student work, student handbooks, student handouts, lesson guides, statistics on student achievements and progress, samples of answer scripts, external examiners reports, peer evaluation reports, student evaluation reports, minutes of Departmental committees etc. The stakeholders with whom the discussions are carried out include the Head of the department, members of the academic and non-academic staff, undergraduate students, postgraduate students, alumni, academic administrators, and student counselors.

The subject review is carried out to evaluate the success of the processes employed to achieve the aims and intended learning outcomes stipulated in the self evaluation report.

Aspects of the subject review

In the subject review process, the following eight aspects are evaluated.

- Curriculum design, content and review
- Teaching, learning and assessment methods
- Quality of students including student progress and achievements
- Extent and use of student feedback, qualitative and quantitative
- Postgraduate studies
- Peer observation
- Skills development
- Academic guidance and counselling

The Review Process

The review team consisted of,

- Prof. S Mohanadas, Former Vice Chancellor, University of Jaffna, (Team Chair),
- Prof. R.N. Pathirana, Department of Chemistry,University of Ruhuna
- Prof. (Ms) Sujatha Hewage, Department of Chemistry, University of Colombo

by the Department was provided to the review team on Assurance and Accreditation Council of the University n carried out the review process on 19th , 20th and 21st of October, 2009.

On 19th morning, the review team met the QA Specialist and thereafter met the Vice-Chancellor together with the Dean / Faculty of Applied Sciences, Chairman / Internal QA Unit and Head / Department of Chemistry. The Vice-Chancellor at this meeting briefed the reviewers on the present situation at the University.

The review team then finalized the agenda for the review process with Head of the Department and the Dean of the Faculty. The Agenda for the review visit is given in Annex 1. After finalizing the agenda, the review team met the Head of the Department and other members of the academic staff. The Head of the Department gave a presentation on the contents of the Self Evaluation Report which was followed by a discussion. The review team during the course of the visit had discussions with the members of the academic staff, technical officers & non-academic staff, student counselors, directors of career guidance centre & staff development centre and the present undergraduates following the B.Sc. programmes as well as past students. The list of persons met is given in the Annex. 2.

Several documents were also perused. These included the Faculty handbooks, handouts given to students, minutes of the Departmental meetings, answer scripts, question papers, student feedback forms, peer observation reports etc. The complete list of the documents examined is given in Annex 3.

The review team also examined the facilities available for teaching and learning. These included the lecture theatres, teaching laboratories, equipments, library, etc. The list of facilities observed is given in Annex 4.

On the 21st October, 2009, the review team gave a feedback of the findings to Head of the Department and other members of the academic staff given in Annex 5 except those on study leave and sabbatical leave.

Publications the review report

A report will be prepared after the review visit incorporating the findings of the review team. In the report, the strengths and good practices will be highlighted and the weaknesses will also be stated together with some recommendations. Each aspect will be given a judgment of good, satisfactory or unsatisfactory. The draft report will be sent to the Department and the feedback will be obtained. If there is disagreement with any judgment, it would be resolved by the Quality Assurance and Accreditation Council (QAAC) through discussion. The judgment will be submitted to the Standing Committee on Quality Assurance of the UGC for approval. After its approval, the report will be published in the QAAC website, www.qaacouncil.lk. The Department has to improve the quality of the aspects that receive a judgment of unsatisfactory within 6 months of approving the judgments by the Standing Committee on Quality Assurance of the UGC.

The primary source of documented information for this review was the self-evaluation report prepared by the DOC. The review team was also provided with supporting documents by the Department including the curriculum, detailed syllabi, teaching materials, student work

...hemes, answer scripts, marks, student feedbacks and peer ...scussions with the Vice Chancellor, Dean of the faculty ...ior academic staff members, Director/staff Development Centre, Director / Physical Education, Deputy Proctor, Chief Student Counselor & students counselors, Academic Counselors, Warden, non-academic staff members and students from the first, second, third and final years. The team also visited laboratories, lecture halls, auditorium, library, computer centre and gas plant.

Human Resources of the Department of Chemistry (DOC)

Head of the department submitted a list of names containing academic staff, non-academic staff and visiting staff at present of the Department of Chemistry. There are two Senior Professors, two Professors, two Associate Professors, eight Senior Lecturers, two Probationary Lectures, five Temporary Asst. Lecturers, seven Technical Officers, one Computer Application Assistant, eight Laboratory Attendants and two Labourers.

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

The University of Sri Jayawardenepura has its origins in the historic Maligakanda Vidyodaya Pirivena founded in 1873 by the Ven. Hikkaduwe Sri Sumangala Maha Thera as a centre of learning for Buddhist monks. From the inception till 1959 it functioned as an internationally religionised centre of oriental studies under the guidance of learned venerable monks like Ven. Hikkaduwe Sri Sumangala, Baddegama Sri Piyarathana and Welivitiye Sri Sotatha. In 1959 the Vidyodaya Pirivena was reconstituted as the Vidyodaya University of Ceylon by an act of Parliament. Later under the Universities act of 1978, it was renamed as the University of Sri Jayewardenepura in the new administrative capital of Sri Lanka. University of Sri Jayawardenepura has now become one of the major national Universities of Sri Lanka. Its full time student population is over 8500, enrolled in the following five faculties,

Faculty of Arts
Faculty of applied Sciences
Faculty of graduate studies
Faculty of Management studies and Commerce
Faculty of Medical Sciences

The post graduate Institute of Management (PIM) is affiliated to the University of Sri Jayawardenepura.

The Faculty of Applied Sciences

The Faculty of Applied Sciences was established in 1965 and is one of the oldest among the Faculties of Science in Sri Lanka. At present, it consists of the following eight academic departments with nearly 100 academic staff members; over 1000 undergraduate students and about 100 post graduate students.

Department of Botany,
Department of Chemistry,
Department of Food Science and Technology,
Department of Forestry and Environmental Sciences,
Department of Mathematics,
Department of Physics,
Department of Statistics and Computer Science and
Department of Zoology.

front of pursuing several challenging and pioneering
n in Sri Lankan Universities such as teaching Science in
ects of Science such as fisheries biology, food science, polymer science, forestry and environmental science and statistics and management in the B.Sc curricula.
The Faculty conducts degree programmes leading to the B.Sc (General) degree (03 years duration), B. Sc (special) degree (04 years duration).The courses in the degree programmes are conducted under the semester based course unit system.

Through the Faculty of Graduate Studies, the faculty has provision for students to pursue postgraduate studies and research leading to the degree of Master of Science (MSc), Master of Philosophy (M.Phil). Many undergraduate and postgraduate research projects and training programmes are arranged in collaboration with outside institutions.

The Department of Chemistry

The Department of Chemistry is located in the campus and is one of the founder departments. It has been in existence from the inception of the university in 1965. More than 50% from both Physical and Biological Science streams register for Chemistry courses. Approximately 350 students are enrolled for chemistry for the above programmes. About 30 students are allowed to register for B.Sc. General Degree with polymer Science as a principal subject out of the above number.

Chemistry becomes one of the principal subjects for all subject combinations of the biological stream and for 5 subject combinations of the physical Science stream. The students are recruited for the special degree programme at the end of the second year based on their performance in the first two years. The students who do not follow the special degree programme including those who have registered for Polymer Science stream continue their studies for a general Degree for another year with Chemistry as a subject. The analysis has revealed that there has been an increased demand for Chemistry as a subject over the past 4 years (Table 2.2 of SER). The statistics data (Table 2.2) shows that most students selected for the Special Degree programme in Chemistry were from Colombo, Kalutara and Kurunegala districts. It is also noticed that the gender bias towards female has been high during the recent past in the selection of students for the Special Degree programme in Chemistry.
All the programmes in Chemistry are conducted according to the course unit system similar to other Departments in the Faculty and the academic year consists of two semesters each of 15 weeks duration.
The teaching staff of the Department of Chemistry consists of two Senior Professors, two Professors, two Associate Professors, five Senior Lecturers (Grade I), three Senior Lecturers (Grade II) and two Probationary lecturers. Details are given in Annex 5.

It is noticed from the SER that many staff members are engaged in research activities in their specialized fields and are involved in collaborative research with external institutions(local and foreign) as well as with professional bodies such as Rubber Research Institute, Plastic Research Institute. Moreover, several members of the staff are actively involved in national services such as upgrading the secondary and tertiary in Sri Lanka in addition to their teaching and administrative responsibilities.

Academic support staff comprises of 12-16 temporary Demonstrators and Assistant Lecturers appointed yearly from the newly graduating Chemistry Special batch and their

al classes and marking practical record books of the

s of non-academic staff consisting of Technical Officers (07), Laboratory Attendants (08), Gas Plant Operator (01), Secretarial Stenographer (01) and Laborours (02).

On meeting the members of the non-academic staff on the second day of the review process (20th October 2009), we noticed that that they work in harmony with both academic staff and students.

At this discussion they requested that the technical officers be given training in maintenance of instruments and a technical officer be appointed on a temporary basis to fill the vacancy created due to one technical officer working abroad on assignment. It was also pointed out that they are facing difficulties in transferring of certain equipment and glassware frequently from on lab to another due to their shortage and accordingly they suggested that the department should purchase certain instruments such as colorimeters and glassware to circumvent this problem. They also indicated that the number of presently available ice making machines and distilled water plants is not adequate to cater for the requirement and as such they requested that their numbers to be increased by two each **.**

Moreover, they were of the opinion that a certain action should be taken to minimize the breakages of glassware due to their mishandling by the students. It was revealed that, although such breakages are recorded in a book, no action is taken to charge them for such breakages. It was suggested by them to devise a mechanism to make the students aware of the prices of the items that they consume in the practical classes. During this meeting, it was also indicated that the wearing of aprons or overcoats by students be made compulsory during the practical classes.
Observation of departmental facilities was done on the first day (19th October 2009) of the review process.

The Department possesses seven teaching laboratories at present (two physical chemistry, two organic chemistry, one inorganic chemistry, one polymer science and one research) and an instrumental centre to conduct undergraduate laboratory course units. Each laboratory is manned with one technical officer and one or two laboratory attendants.
Practical classes of B.Sc. (General) Degree first year, second year, third year and B.Sc. (General) Polymer Science are conducted in five of these (GL_1, 1L3, GL_2, 1L1 and Polymer Science Laboratory) laboratories whereas Chemistry (Special) Degree organic and inorganic practical classes are conducted in the Advanced Organic Laboratory ($1L_4$) and Special Degree physical chemistry practical classes are conducted in GL_1 which have the student capacities 18 and 32 respectively.

All the special degree students who carry out final year research project are confined to the Advanced Organic ($1L_4$) and Polymer Science laboratories. In addition, the postgraduate students too are permitted to use these two laboratories for their research activities.
The review team noticed that the Department possesses an instrument room which has a collection of modern instruments that are at the disposal of undergraduate and postgraduate students. It is equipped with UV/Visible spectrophotometers, FTIR spectrometer, NIR spectrometer, Fluorimeter, High Performance Liquid Chromatograph (HPLC), Gas Chromatograph (GC), Densitometer and Viscometer. The instruments such as impact tester and tensile meter that are needed for special polymer analysis are housed in a room (2LB)

aboratory. It was also noticed that there is no adequate them.

Department currently possesses a three-storied building, equipped with one main lecture theatre (C1), three lecture rooms (C3, C4, and C5) located in the third floor. One more lecture hall located next to the Deanôs office is also shared by Department of Chemistry with other Departments. The lecture rooms and theatres are equipped with black and white boards. There are 2 moveable multimedia projectors. One of the lecture rooms (C3) is equipped with in-house multimedia facilities and the other two multimedia projectors in the Department are available on request.

There are 3 separate research laboratories located in the Department where several senior academic staff members carry out their research. These laboratories are equipped with sophisticated and specific instruments and glassware suited for the research activities. Only the responsible staff member and Chemistry Special Degree students whose research projects are supervised by that staff member have the access and permission to use these laboratories.

It was also noticed that all the lecturers have been provided with a personal computer each for their teaching and research activities. The Department has its own computer unit equipped with eight personal computers, with 1 computer reserved for the academic staff. Six of the computers have Internet facilities. This unit is managed by the Chemical Society. Moreover, all students of the Science Faculty have the access to the computers in the Faculty Computer Unit. The reviewers observed that the computer and internet facilities provided to the academic staff and students are very satisfactory.

The Department has its own mini-library which possesses a collection of about 500 books/scientific magazines received by way of donors and it is maintained by Chemical Society of the Department. This library is extensively used by the Special Degree students for their literature survey for the final year research projects.

The observation of the facilities (General) in the main library and the computer centre of the University were carried out on the second day (20th October 2009) of the review process. The main library which is in the close proximity of the Department has a satisfactory collection of textbooks in Chemistry covering a wide range of titles in the chemical sciences and related subjects. It was also noticed that the journal/periodical section of the library is well furnished with standard periodic journals in Chemistry. The main library can be accessed on-line through the university web site.

3. AIMS AND LEARNING OUTCOMES

At present the Department of Chemistry conducts the following undergraduate programmes.

B.Sc. (General) Degree with Chemistry	3 years
B.Sc. (General) Degree with Chemistry and Polymer Science & Technology	3 years
B.Sc. (Special) Degree in Chemistry	4 years

In addition to the above, the Department is involved in conducting following postgraduate programmes through the Faculty of Graduate Studies.

M.Sc. in Polymer Science & Technology

3.1. Aims

The Department conducts the above programmes to provide a high-quality and internationally recognized educational programme, equipping students with the core content of Chemistry and appropriate skills for successfully continuing studies and for careers related to the discipline or other multidisciplinary areas involving the subject or adapt to career in research in Sri Lanka or aboard.

- provide the students a broad understanding of the subject and the curricula reflects the growing diversity of studentsô intellectual background and their desire for more flexible learning pattern in certain specialized areas with emphasis on the acquisition of knowledge and expertise related to industrial processes.
- allow the students to follow a wide range of courses specifically designed to impart a broad and a balanced foundation of subject knowledge and the major themes of modern Chemistry. A range of learning opportunities within the semester system enables students to gain theoretical and practical knowledge on the subject along with training in scientific research, self studying and application of such training in real world situations.
- emphasize the importance of acquiring transferable skills such as written and oral
- communication, presentation and information technology (IT) skills required for a
- lifelong learning process.
- provide friendly, responsive and supportive departmental environment conducive
- to the enthusiastic learning, high standards and good completion rate.
- offer career guidance for students following undergraduate degrees to apply their knowledge and training in a wide variety of areas such as research, industry, university teaching, and management to allow them to seek employment within their chosen fields or multidisciplinary areas involving the subject.

3.2. Learning Outcomes

As stated in the Self Evaluation Report (SER), on successful completion of the B.Sc. General Degree programme, the students should

- have a basic knowledge in principles and conceptual understanding of the fundamental principles of bonding and structure of molecules and ions, thermodynamics, kinetics, phase equilibrium, surface chemistry, elementary quantum mechanics, electrochemistry, spectroscopy, organic chemistry (including stereochemistry, nomenclature, reactions and mechanisms), bio-chemistry, radiochemistry, coordination chemistry, analytical and separation methods.
- have acquired knowledge in applied chemistry disciplines such as polymer science and
- technology, chemical engineering, forensic science, chemistry of medicinal and
- aromatic plants, textile chemistry, food chemistry and technology, nanochemistry,
- computational chemistry and environmental chemistry.
- have acquired practical skills related to the different disciplines of Chemistry, and ability to apply them in problem solving.
- be familiarized with basic laboratory techniques, chemical principles associated, proper use of glassware, basic equipment and instrumentation.
- have learned technical and intellectual skills necessary for the acquisition and analysis of

rain in soft skills for addressing real world problems.
method in investigation and analysis and make use of
cal developments related to Chemistry in drawing conclusions and justification of results.

- be skilled in problem solving, critical thinking and analytical reasoning.
- have developed a range of personal, practical and transferable skills.

In addition, on successful completion of B.Sc. General Degree with Polymer Science and Technology as a principal subject, students should:

- have acquired a broad knowledge on theories, principles and terminology related to Polymer Chemistry.
- be familiar with the synthesis, characterization, properties and processing of widely used polymer materials specially with an in-depth knowledge on industrially important polymers.
- have developed hands on experiences on polymer property testing methods and other characterization techniques and be competent in working in an advanced polymer laboratory.
- have acquired transferable skills such as communication and presentation.
- have had direct real world exposure to industrial applications of polymers.

Upon successful completion of the B.Sc. (Special) Degree in Chemistry, students should:

- have acquired a broad and in depth knowledge and a conceptual understanding of the fundamental principles of Chemistry, concepts, theories and practical skills in organic, inorganic, physical, polymer science, analytical chemistry and food chemistry, including a detailed knowledge of one area of research that provides a broad framework followed by progressively increasing depth of study.
- have acquired knowledge in other applied chemistry areas such as medicinal chemistry, fabric technology, industrial utilization of plant products, and environmental chemistry.
- have developed problem solving skills necessary to tackle new challenges throughout their careers through learning how the knowledge and understanding may be applied to research through self- directed learning.
- have developed a wide range of subject specific skills, personal and general or transferable skills such as critical ability, independent thinking, data handling and interpretation, team work, written and oral communication, information management and computer literacy required for lifelong learning process.
- have laid a strong foundation to technical and intellectual skills necessary for the acquisition and analysis of data through laboratory work.
- have developed their ability for critical and self-directed learning.
- have gained core Chemistry skills with in-depth specialist knowledge and attain working level of competency either in a special branch of the subject or in the management level.
- have gained sufficient skills to integrate their background knowledge in the Chemistry or other disciplines in Chemistry, to process industries.
- have developed the ability to work independently on research project, literature survey and writing reports.
- have familiarized with the use of a range of modern instruments, methods and glass ware used for laboratory exercises, communication, information search, calculation and specialized chemical applications, and be able to use them efficiently and creatively.
- have laid a strong foundation for post graduate studies by learning how the
- knowledge and understanding may be applied to research.

Chemistry is the principal subject in the 13 subject combinations offered by the Faculty (Annex 6) for both biological and physical science streams leading to a three-year B.Sc. General Degree or a four-year B.Sc. Special Degree. The Department conducts the three-year B.Sc. Polymer Science and Technology as a separate subject. The Department also conducts theory and practical courses in Chemistry for the students following B.Sc Special Degree in Food Science and Technology, B.Pharm and B.Sc. in Medical Laboratory programmes conducted by the University. Academic year consists of two semesters, each of 15 weeks duration. The chemistry course units offered are credit based. The credit value varies from 1.0 to 8.0 and is always a multiple of 0.5. Credit value indicates the size and value of the course unit. During first and second year the students must follow 08credit theory courses and compulsory 02 credit practical courses (Annex 7). The third year courses consist of 10 credits covering theoretical and practical aspects of main areas in chemistry and several optional topics (Annexure 8). Under the B.Sc. General Degree Programme candidates should register for a minimum of 27.0 credits in Chemistry during the three years and the credit value should not exceed 36.0 in order to claim Chemistry as a principal subject.

Based on the examination results of the first two years limited number of students are selected to follow a B.Sc. Special Degree Programme in Chemistry, number of students recruited varying from 15-24. To obtain a B.Sc. Special Degree in Chemistry candidates should register for course units with a minimum credit value of 120.0 and a maximum of 126.0. Apart from the core Chemistry courses offered in the special degree programme a significant number of optional courses from different multidisciplinary areas are also available (credit value 56, Annexure 9). The chemistry special degree students are sent to industrial training for one month at the end of the third year. During the 4^{th} year each student following the chemistry special degree programme undertakes a research project of credit value 8.0. During the first semester the students give a presentation based on the literature survey. At the end of the research project the student submits a report, make a presentation and face a viva.

The review team notes that the curriculum is designed adequately to cater for both three-year B.Sc. General Degree and four-year B.Sc. Special Degree programmes. Curriculum in the first year is designed to impart basic foundation required to acquire advanced knowledge in chemistry. The second and third year courses have been designed to impart a broader knowledge in the subject of chemistry. The review committee appreciates the efforts taken by the Department to have many applied courses in both B.Sc. General 3^{rd} year and Special Degree programmes providing better prospects for employment opportunities. The review team notes that the chemistry special degree students are sent to industrial training for one month at the end of the third year. During discussion students expressed that the industrial training should be extended to a longer period of time, at least for three months. This should be considered for implementation considering the availability of time within the academic year. Each chemistry special degree student is assigned to a supervisor at the beginning of the fourth year. The review team observed that the research areas covered are wide and include theoretical and applied chemistry topics. The research projects provide opportunities for the Chemistry special degree students for independent thinking and help to develop analytical skills, cognitive and transferable skills. Undergraduate Practical courses are conducted satisfactorily with a senior academic in charge with an adequate number of support staff.

and out given are comprehensive. Support staff is g practical well and in an organized manner. However for weighing in the first year laboratory where students have to queue up and lack of adequate glassware and essential instruments in the physical chemistry laboratory making them work in groups have been noted by the review team.

The Department recruits 25 ï 30 students per academic year to follow the three year B.Sc. Polymer Science and Technology programme. In addition to Chemistry courses, they follow 10 credit courses in the first two years and 8 credit courses in the third year of polymer science and technology (Annex 10). Seminars & project of credit value of 3.0 is also compulsory. The review team noted that the curriculum is wide and comprehensive covering major areas in polymer chemistry and technology. During the discussion the students (05) who were selected for the three year polymer science and Technology course and now following the special degree programme in chemistry expressed their desire to follow a special degree programme in polymer science and technology rather than chemistry. The review team feels that this aspect should be considered positively by the department.

Curricula of both Chemistry and Polymer Chemistry and Technology have been reviewed and updated in keeping with the current trends. The review team appreciates the initiative that is being taken by the department to introduce a B.Sc. Degree in Material Science following the new developments in Chemistry.

The review team recommends that the essential basic instruments such as balances as well as glassware for laboratory work be provided without delay for satisfactory conduct of practical courses. We also recommend the department to explore the possibilities of commencing a B.Sc. special degree programme in polymer science and technology and of the extension of the time duration of the industrial training programme.

It is the view of the Review Team that the present state of curriculum design, content and review adopted by the Department can be judged as GOOD.

4.2 Teaching, Learning and Assessment Methods

The review team observed the lectures delivered at different levels during their visit from the 19th to the 21st October 2009 and all lectures in the degree programmes are conducted by the senior academics in the Department.

It was noticed that in certain lectures, chalk & board, overhead projector and/or multimedia facilities were efficiently used. However, certain lecturers confined themselves only to chalk and board without using even the simple teaching aids such as the overhead projector. This led them to rewrite certain structures on the board unnecessarily wasting time. This was evident from the analysis of the evaluation of lectures by students where a significant percentage of students had stated that teaching aids are not used by one of the lecturers involved in the above lectures. As such the opinion of the review team is that the young staff members be given training under staff development.

Demonstrations in the practical classes are done by the Demonstrators who are appointed from the most recently graduated Chemistry special batch and they work under the supervision of the academic staff member who is in-charge of the practical class. These practical sessions are conducted for major branches of Chemistry; Inorganic, Organic and

n of 10 weeks. The students are provided with handouts are well maintained and it carries a significant weight of practical classes by the active participation of the above staff is admired by the Review Team despite the shortage of certain equipment and glassware to accommodate high number of students enrolled for Chemistry where practical classes are compulsory.

All lecture theatres and laboratories are in good condition required to create a proper learning environment for students and no criticisms were made by students regarding the learning environment of the department during our meeting with students. The first and second year students are happy with the orientation programme that was conducted by the Faculty.
During our meeting with Special and General Degree students, most of them showed their willingness to follow either four year special Degree or the four year polymer Science programme.

The Review Team noticed that the students in the Faculty are not offered a course in Computer Literacy and students also requested that a course of this nature be introduced.
As such, the Review Team recommends that a compulsory course on computer literacy be introduced by the Faculty.

It was brought to the notice of the Review Team by the students that they find it difficult to see what is written on the black board and also lectures are inaudible especially in largely attended lectures. As such they expressed their willingness to follow lectures being delivered through the combination of black board and chalk with multimedia as much as possible.
Moreover, students requested that optional courses such as Forensic Chemistry, Basic Chemical Engineering be introduced to the curriculum.
Answering a question posed by the Review Team regarding the availability of Chemistry text books in the main library, students showed their satisfaction regarding the numbers of Inorganic and Physical text books available and they also need the number of reference books for Organic chemistry be increased.

The students expressed their satisfaction about the way the tutorials are conducted by the Department. It is learnt that the tutorials are usually given in the form of exercises and are made available in advance and students are advised to attempt them before the discussion which is conducted by the relevant senior teacher.
The Review Team observed that the moderation of question papers and the second marking of answer scripts of both General and Special degree programmes are carried out by a panel constituted by the senior academics in the department. We are of the opinion that the moderation of question papers and second marking of the question papers of the special degree programme should be carried out by examiners from a different university and accordingly the Department was advised to practice the above.
The review team had the opportunity to examine a sample of question papers. In general questions have been formulated to achieve intended learning outcomes. The questions are set by the lecturers in charge. It was noticed that the number of questions set for a certain course unit examination in the Special degree programme, varied from one year to another. The review Team is of the opinion that it is not a good practice and as such it is advised to maintain a fixed number of questions for course units of the same credit value.

It is the view of the review team that the present state of teaching, learning and assessment methods adapted by the department can be judged as GOOD.

ogress and Achievements

of Applied Science is around 350 per academic year of which about 60% follow Chemistry as a subject. The documents supplied by the department revealed that the performance of the students is monitored at all levels by tutorials, continuous assessments, practical examinations and the formal end of semester examinations. The marks of formal end of semester examinations and final practical mark of students are available with the Head of the Department of Chemistry. The attendance of the students at practical classes is monitored well and only students with an 80% attendance are allowed to sit for the practical examinations.

Generally the student performance at the B.Sc General Degree programme is satisfactory with about 80% pass rate during 2002 to 2003 and the pass rate of Special Degree Chemistry students is 100% during the same period. The Z-score of students following chemistry special degree programme during 2002 to 2004 varies from 1.25 to 1.3. However no meaningful conclusions can be made as Z-score values of all the students following chemistry as a subject is not available. It was noted by the review team that the performance of the Special Degree Chemistry is better than the General Degree students with Chemistry as a subject. The Department records show that the special degree graduates passed out during last 2-3 years are all employed with majority in the private sector and some are following postgraduate programmes.

It is the view of the Review Team that the quality of students, student progress and achievements can be judged as GOOD.

4.4 Extent and Use of Student Feedback

The Department obtains qualitative student feedback about the academic programme and the requirement of infrastructural facilities at various forums such as Faculty Board meetings, practical sessions and lecture & tutorial classes. Students expressed happiness about their interaction with teachers and higher authorities.

The Department has perceived the importance of quantitative student feedback. The teaching process is evaluated by student feedback using a questionnaire since 2008. The questionnaire includes feedback on several aspects of teaching & learning such as student awareness of learning outcomes, organization & clarity of the lecture, motivation & interaction of the lecturer, speed & audibility of the lecture, etc. Student feedback data obtained by the lecturer have been analyzed to identify the strengths and weaknesses of each staff of the department. The outcome of the quantitative student feedback has been brought to the notice of all academic staff at departmental meetings. The Review Team noted that student feedback data has been taken into consideration during the revision of the curriculum and to increase the tutorial classes, practical and industrial visits

The Review Team recommends that the practice of obtaining students feedback may be extended to all visiting staff as well as for practical classes. Also data may be collected for a lecturer to compare his/her scores over the years on a particular course to evaluate the progress.

It is the view of the Review Team that the Extent and Use of Student Feedback, Qualitative and Quantitative adopted by the department can be judged as GOOD.

ucts two taught M.Sc. programmes in polymer science and technology and in newly introduced industrial utilization of plant materials. Duration of the courses is 1-2 years. During the period 2000/2005 the pass rate of students of the postgraduate course of polymer science and technology varies from 72%(2000) to 56%(2005).The review team is satisfied with the breadth of research topics carried out by these students. In addition to taught postgraduate courses several students are following full time M.Phil (03) and Ph.D (01) programmes. Postgraduate research programmes are funded by research grants.

Research facilities available for the M.Sc. polymer science and technology course are found to be good since the essential equipment has been obtained from an ADB grant. The research facilities and arrangement for supervision for all other postgraduate programmes are also good except that the equipment such as HPLC need replacing. The review team recommends that the department takes measures to keep fume hoods and exhaust fans in working order especially in the organic chemistry laboratories. We support the postgraduate studentsô request of keeping the research laboratories open after 4pm.

It is the view of the Review Team that the postgraduate studies of the Department can be judged as GOOD.

4.6. Peer Observation

The Dept. has perceived the importance of peer evaluation and the review team was pleased to find that the practice of peer evaluation of teaching by colleagues in their own department has begun recently. The peer evaluation data are collected on communication, clarity, delivery, sequence and student interest. As per the materials provided to the review team, many permanent staff members have been subjected to peer observation while teaching by other members of the Department. The team also noted that the Senior Academic staff members are also being peer-evaluated. In addition, the temporary staff members are being monitored by senior academics. The peer observation is found to be a workable tool in the DOC. It can be recommended that the peer observation data may be collected for few years to analyze the data collected and be correlated with the student feedback responses for further improving teaching, learning and assessment of lecturers concerned.
The DOC also effect curriculum development and changes as a result of collective agreement among the staff members, provide guidance to the junior members by the senior academic members through collaboration in applying for research grants and conducting research within the Department and moderation of examination papers and marking of answer scripts by a second examiner by an internal panel of senior academic staff members

As it was pointed out in 4.2 the Departmentôs peer practices could be improved if the moderation of question papers and the second marking of the answer scripts of the Special degree programmme are carried out by external examiners subsequent to the currently practiced internal moderation and second marking process.

Having considered carefully the extent and use of peer observation, the review team is of the opinion that this component can be stated as SATISFACTORY.

department takes an enormous effort to develop various skills of the students.

Research and industrial trainings are aimed at developing studentsô innovativeness, time management and planning. Industrial training component expose them to develop skills required to manage the life in the industry environment.

Several oral presentation exercises, about two per year are aimed at the students to develop communication skills, computer skills, preparing visuals and defending the ideas and outcome. Group presentations help to develop team work culture and leadership skills.
Various other exercises such as oral examinations, written examinations, poster presentations and practical examinations are designed to develop all necessary skills required to achieve high standard of performance in any profession. Skills development are further enhanced by the students participation at the cultural show of the orientation programme and through the participation in running an efficient studentsô chemical society where students organize vidujaya science, polymer science and mineral science exhibitions, seminars for A/L students and publications. These activities enhance studentsô motivation skill, organization skill, editorial skill, team work and display of talent & leadership qualities.

It is the view of the Review Team that the quality of students, student progress and achievements can be judged as GOOD.

4.8. Academic guidance and Counseling

When new students are recruited, they are provided with the faculty handbook containing curriculum and a university prospectus. An orientation programme is being conducted during the first two weeks of their entry. The hand book and the website provides information about University, Faculty, Departments, subjects offered, subject combinations, academic programmes and details of course titles. On the first day of the orientation programme, the Vice-Chancellor, Dean of the Faculty, Career Guidance Officer and University Proctor and Senior Student Counselor address the students. At this programme an introduction is given to the students about the University, Faculties, Departments and various student learning support system available at the University.

During the orientation programme student visit various departments in the faculty and they come to know about the staff, the courses offered by each of the department, subject combinations available and the method of selecting subjects and the selection criteria to offer the special degree programmes. At the entrance of the Department a notice board consist of photographs of all academic staff with the name and title is displayed. This is a good practice that students will be able to come to know about the staff to approach for various matters. The orientation programme is conducted for two weeks and during the orientation programme an intensive course in English is being taught. In addition English is taught through out the student career at the rate of two classes a week and a pass in English is made compulsory.

Four Academic Mentors are appointed by the DOC and each Mentor is assigned with 25 students to clear any doubts arising out of academic matters. Whenever students encounter personal problems it has been found that the students can meet the faculty student counselors

here are four student counselors attached the FASc under Deputy Proctor in turn work under a University Proctor. is nobody to function as a professional counselor.

There is a Director for Career Guidance Unit to facilitate students by giving trainings/seminars on job related matters and improve attitudes to carry out a successful career. All the staff assist students in applying for their postgraduate studies and seeking employment opportunities.

It is the view of the Review Team that the Academic Guidance and Counselling can be judged as GOOD.

Based on the observations made during the study 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	Good
Postgraduate Studies	Good
Peer Observation	Satisfactory
Skills Development	Good
Academic Guidance and Counseling	Good

5. CONCLUSIONS

The strengths / good practices and the weaknesses of each of the eight aspects considered in the subject review process are summarized as follows.

1. Curriculum Design, Content and Review

Strengths:

1. The curriculum is designed adequately to cater for both three-year B.Sc. General Degree and four-year B.Sc. Special Degree programmes
2. Curricula of both Chemistry and Polymer Chemistry and Technology have been reviewed and updated in keeping with the current trends.
3. The curricula of both chemistry and polymer science & technology are comprehensive and have been designed to cover the important areas of the subject.
4. Significant number of applied optional courses are available for students to choose from depending on their interest.

n polymer science and technology is not available
e industrial training component of the PST programme is not sufficient.
3. A compulsory course on computer literacy is not included in the curriculum
.

Judgment: ***Good***

2. Teaching, Learning and Assessment Methods

Strengths:

1 Use of variety of opportunities to provide appropriate teaching and learning experiences.
2 Promotion of self learning skills of students following the Special degree programme
3 Provision of industrial training for students to expose them to local industries. to acquire experiences.
4 Well maintained laboratories.
5 Moderation of question papers and second marking of the answer scripts are done.

Weaknesses:

1. Less opportunities to promote self learning abilities of the students following the General degree programme.
2. Basic instruments such as adequate number of balances and consumables such as glassware available are not sufficient to conduct practical courses with the increase intake of students
3. In moderation of question papers and second marking of the answer scripts of the Special degree programme, examiners from a different university are not invited

Judgment: ***Good***

3. Quality of Students, Students Progress and Achievement

Strengths:

1. Quality of B.Sc. Chemistry Special Degree students graduated during last three years is good with 100% pass rate and all the students are employed or are enrolled as postgraduate students.

Weaknesses:

1. Z-scores of B.Sc. General Degree students are not available and year to year progress has not been followed. Employment records are not available to comment on achievements.

Judgment: ***Good***

4. Extent and Use of Student Feedback

Strengths:

1. Obtaining qualitative student feedback is in practice.
2. Obtaining quantitative student feedback procedure has begun two years ago.
3. Availability of analyzed data and scores on the quantitative student feedback responses for the academic staff.

edback practice not extended to practical sessions as well

Judgment: ***Good***

5. Postgraduate Studies

Strengths:

1. A very popular M.Sc. in Polymer Science and Technology course is conducted.
2. A new M.Sc. in Industrial utilization of medicinal and aromatic plants has been commenced.
3. Several M.Phil. and a Ph.D programme are continuing satisfactorily.

Weaknesses:

1. Few equipments are not available or to be repaired and updated to carry out research work more effectively.

Judgment: ***Good***

6. Peer Observation

Strengths:

1. Commencement of formal peer observation for academic staff membersô teaching.
2. Guidance provided to the newly recruited academic staff by the senior academic members on various issues in teaching and other duties
3. Guidance provided to the junior members by the senior academic members through collaboration in applying for research grants and conducting research with in the Department

Weaknesses:

1. Obtaining peer observation has not yet extended to visiting academics
2. Moderation of question papers and the second marking of answer scripts of Special degree programme are not carried out by teachers from a different university.

Judgment: ***Satisfactory***

7. Skills Development

Strengths:

1. Every student, general as well special degree take part in several skill development exercises; industrial training, practical, research, oral presentation, seminar presentation, popularization of chemistry for A/L students, exhibition, chemical society, etc.

Weaknesses:

1. A compulsory course on computer literacy is not included in the curriculum

Judgment: ***Good***

ling

1. Availability of student handbook/prospectus and a website.
2. Availability of an orientation programme.
3. Availability of Academic Tutors and Mentors.
4. Availability of University Proctor and Deputy Proctors
5. Availability of Student Counsellors for counselling.
6. Organising workshops to develop the skills for a successful future career

Weaknesses:

1. Non-availability of Professional Counsellor

Judgment: ***Good***

6. RECOMMENDATIONS

Based on the findings of the review, the review team wishes that the Department may consider the following recommendation in order to improve the quality of the study programmes further.

1. Explore the possibilities of commencing a B.Sc. Special degree programme in polymer science and technology.
2. Extend the time duration for the industrial training programme of PST.
3. A compulsory course on computer literacy shall be introduced to the curriculum by the Faculty.
4. Opportunities shall be provided to General degree students to promote their self learning skills.
5. Facilities shall be improved to deliver lectures through the combination of black board and chalk with multimedia as much as possible.
6. Young staff members shall be given training in teaching methodologies under professional development.
7. A uniform system shall be adopted to maintain a fixed number of questions for course units of the same credit value.
8. Laboratories shall be provided with basic instruments such as balances and consumables such as glassware to cater to the increase in intake of students to chemistry courses.
9. Moderation of question papers and second marking of the answer scripts of the Special degree programme shall be carried out by examiners from a different university
10. It is recommended that as far as possible to keep studentsô z-scores and year to year performances in a suitable manner to follow the progress and the achievements of the students following courses in the chemistry department.
11. Obtaining quantitative student feedback procedure may be extended to practical sessions as well to all visiting academics.
12. Findings of the student feedback practice may be carried out regularly to see the change over the years for each staff.
13. Explore the possibilities of obtaining grants to acquire instruments required to conduct M.Phil and Ph.D programmes more effectively.
14. Practice of obtaining peer observation has just commenced

be correlated with the student feedback responses for
f the lecturer concerned
be extended to visiting academics

17. Close guidance be given with more practical sessions to weak students. Academic supervisors even can get the help of better performing students (peer support).
18. A compulsory course on computer literacy shall be introduced to the curriculum by the Faculty
19. Service of a Professional Counsellor may be sought

Acknowledgements

The Review Team appreciates the excellent working arrangement made by the DOC during the review visit. The HOD and all others in the dept. provided the necessary support to perform our duty well. The documents were displayed and any other document needed by the team member, it was provided by the staff. The review team is grateful to all the categories of the staff in the DOC and others for the support given during our visit.

VIEW VISIT

Day 1 – Monday 19th October 2009

08.00 ï 09.00	Private Meeting of Review Panel with QAA Council Representatives
09.00 ï 09.30	Discuss Agenda for the Visit
09.30 ï 10.00	Meeting with the Vice Chancellor ï Dr N L A Karunaratne (by Appointment)
10.00 ï 10.30	Tea
10.30 ï 11.00	Meeting with the Dean ï Prof A M Abeysekera
11.00 ï 11.45	Department Presentation on the Self Evaluation Report by Head of Dept.
11.45 ï 12.30	Discussion
12.30 ï 13.30	Lunch
13.30 ï 14.00	Observing teaching 2nd year Practical class Inorganic BAP (duration 13.00 ï 16.00)
14.00 ï 15.00	Observing Departmental Facilities Ground Floor (Visits to Instruments Room, IT room, teaching Laboratories GL2,GL3 Organic Research Laboratory First floor ï Teaching Laboratories 1L1,1L2,1L3, Special degree Project Laboratory (water analysis), Advanced Organic Laboratory 1L4 2nd floor - Mini Library (Chem Soc.) Lecture Halls (C1, C3, C4, C5) Staff Research Laboratories, Polymer Sc Laboratory, Instruments center, C2 Lecture Hall , Glassware stores
15.00 ï 16.00	Meeting with Department Academic Staff
16.00 ï 16.30	Observing teaching 3rd year general degree lecture SDMC @ C1 (duration 16.00 ï 16.50)
16.30 ï 17:00	Brief Meeting of Reviewers

Day 2 – Tuesday 20th October 2009

09.00 ï 09.30	Observing Teaching ï 3rd year Special lecture CDJ @C3 (duration 09.00 ï 11.00)
09.30 ï 10.30	Observing Documents (Working Tea)
10.30 ï 11.30	Observing Other (General) Facilities (Library, Computer Centre et.)
11.30 ï 12.30	Meeting with Technical Officers, Laboratory Attendants, Office Staff
12:30 ï 13:30	Lunch
13.30 ï 14.00	Observing Teaching Practical Class Polymer Science 3rd year LMKT Polymer Laboratory (duration 13.00 ï 16.00)
14.00 ï 14.30	Meeting with Postgraduate Research Students
14.30 ï 15.00	Meeting with PG students ï Polymer Science MSc students ï SL / LK
15.00 ï 15.30	Observing Teaching ï 1st year Lecture SL @ Sc. Auditorium (duration 15.00 ï 16.50)
15.30 ï 15.45	Observing Chemistry special Studentsô Presentations (4th year Project seminar)
15.45 - 16.00	*Meeting with all General Degree Students (1st, 2nd, 3rd year 15 per batch)*
16.00 - 16.30	Meeting of Reviewers

09

demic / Studentsô Counselors (LK, CM)
ial degree students

10.15 ï 10.45	Observing Teaching - 3rd year Practical Class (Physical PMJ)
10.45 ï 11.15	Observing teaching - 2nd year Lecture CM @ C1)
11.15 ï 11.45	Reviewers Private Discussion (working tea, late!?)
11.45 ï 12.45	Meeting with Head and Staff for Reporting
12.45 ï 13.30	Lunch
13.30 ï 17.00	Report Writing

Annex 2. LIST OF PERSON MET BY THE REVIEW TEAM

Vice Chancellor
Dean of Faculty of Applied Sciences
Head of the Department of Chemistry
Director, Staff Development Centre
Librarian
Head, ELTU
Deputy Proctor
Warden
Student Counselors and Academic Counselors
Academic staff of the department
Non-academic staff of the department
Students of 1st, 2nd, 3rd and final year
Passed out & employed students
Postgraduate Students
Demonstrators

Annex 3. DOCUMENTS PERUSED BY THE REVIEW TEAM

Cadre
Career Guidance (Workshops / Training Programs
Correspondence (with other Universities and Institutes)
Curriculum Revisision
Department Meetings
Equipment and Consumables
Industrial Training
Moderated Papers
Panel Member and Meetings
Peer Observation
Permanent Academic Staff
Postgraduate Studies & Research
Question Papers 1st year
Question Papers 2nd Year
Question Papers 3rd Year
Question Papers 4th Year
Student GPA
Student Matters
Subject Review
Teacher Evaluation

Visiting Appointments

Annex 4. FACILITIES OBSERVED BY THE REVIEW TEAM

New three-story building complex of the department of chemistry comprising ï A large lecture hall, three lecture rooms, seven teaching laboratories, two research laboratories and staff rooms
Central computer laboratory with computers & internet facilities
Department computer laboratory
Chemical society Internet Café
Equipment rooms with specific instruments and glassware
Central library
Department mini-library
Gas plant

Annex 5. ACADEMIC STAFF OF THE DEPARTMENT OF CHEMISTRY.

Name	Designation	Educational Qualifications
Prof. A.M. Abeysekera	Senior Professor and Dean/Faculty of Applied Sciences	B.Sc, Ph.D
Prof. S. I. Samarasinghe	Associate Professor and Head of the Department	B.Sc, Ph.D
Prof. W.S. Fernando	Senior Professor	B.Sc, Ph.D
Prof. S.P. Deraniyagala	Professor	B.Sc, Ph.D
Prof. P.M. Jayaweera	Professor	B.Sc, Ph.D.
Prof. W.D.W. Jayathilake	Associate Professor	B.Sc, M.Sc
Dr. K.C.P. Mahathanthila	Senior Lecturer Grade I	B.Sc, Ph.D
Dr. C. D. Jayaweera	Senior Lecturer Grade I	B.Sc, Ph.D
Dr. S.S.L.W. Liyanage	Senior Lecturer Grade I	B.Sc, Ph.D
Dr. L. Karunanayake	Senior Lecturer Grade I	B.Sc, Ph.D
Dr. L. M. K. Tillekeratne	Senior Lecturer Grade I	B.Sc, Ph.D
Dr. B. A. Perera	Senior Lecturer Grade II	B.Sc, Ph.D
Dr. M. N. S. Kottegoda	Senior Lecturer Grade II	B.Sc, Ph.D
Dr. S.D.M. Chinthaka	Senior Lecturer Grade II	B.Sc, Ph.D
Mrs. N.T. Perera	Probationary Lecturer	B.Sc. (on study leave; reading for Ph.D.)
Mrs. P.L. Dissanayake	Probationary Lecturer	B.Sc. (on study leave; reading for Ph.D.)

IONS.

Number	Subject Combination	Stream Biological/ Physical Science
S 01	Chemistry, Botany, Zoology	B
S 02	Chemistry, Mathematics, Physics	P
S 03	Chemistry, Mathematics, Statistics	P
S 05	Chemistry, Mathematics, Management Science	P
S 07	Chemistry, Forestry and Environmental Science, Zoology	B
S 14	Chemistry, Physics, Zoology	B
S 16	Chemistry, Forestry and Environmental Science, Management Science	B/P
S 18	Chemistry, Physics, Polymer Science and Technology	B/P
S 19	Chemistry, Forestry and Environmental Science, Plant Biotechnology	B
S 20	Chemistry, Zoology, Aquatic Science	B
S 21	Chemistry, Forestry and Environmental Science, Aquatic Science	B

* All available subject combinations for biological science stream include Chemistry as principle subject.

Annex 7. B. SC. (GENERAL) DEGREE COURSE UNITS - CHEMISTRY

Each student should offer course units having a minimum cumulative credit value of 27.0

FIRST YEAR

Semester 1

CHE 101 1.5	*Bonding and Structure of Molecules/ions*	*c*
CHE 102 2.0	Principles of Organic Chemistry	c
CHE 105 1.5	Main Group and Transition elements	c
CHE 107 2.0	Chemistry Practicals (Inorganic, Organic, Physical) (to be continued in Semester II)	a

Semester II

CHE 103 1.0	Chemical Thermodynamics	c
CHE 104 1.0	Principles of Analytical Chemistry	c
CHE 106 1.0	Structure & Properties of Matter	c
CHE 107 2.0	Chemistry Practicals (Inorganic, Organic, Physical) (continued from Semester I)	a

SECOND YEAR

Semester I

CHE 201 1.0	Analytical Methods	c
CHE 202 1.0	Chemistry of Coordination Compounds	c
CHE 204 1.0	Electrochemistry	c
CHE 205 1.0	Introduction to Heterocyclic compounds and Biomolecules	c
CHE 209 2.0	Chemistry Practicals (Inorganic, Organic, Physical) (to be continued in Semester II)	a

	oscopy	c
	tics	c
CHE 207 1.0	Phase Equilibria & Surface Chemistry	c
CHE 208 1.0	Quantum Chemistry	c
CHE 209 2.0	Chemistry Practicals (Inorganic, Organic, Physical) (continued from Semester I)	a

Annex 8. B. SC. (GENERAL) DEGREE COURSE UNITS - CHEMISTRY

THIRD YEAR

Semester I

CHE 305 1.0	Molecular Spectroscopy and Photochemistry	o
CHE 308 1.0	Mineral based industries in Sri Lanka	o
CHE 309 1.0	Environmental Chemistry*	o*
CHE 312 1.0	Basic Chemical Engineering	s
CHE 314 1.0	Polymer Chemistry and Technology #	o
CHE 315 2.0	Chemistry Practicals (Inorganic, Organic, Physical) (to be continued in Semester II)	a
CHE 318 1.0	Applied Electrochemistry	o
CHE 319 1.0	Homogeneous Catalysis	o
CHE 320 1.0	Food Chemistry	o
CHE 334 1.0	Nano- Chemistry	o

Semester II

CHE 302 1.0	Chemistry and Industrial Utilization of Plant Products	o
CHE 315 2.0	Chemistry Practicals (Inorganic, Organic, Physical) (continued from Semester I)	a
CHE 321 1.0	Food Spoilage and preservation	o
CHE 329 1.0	Instrumental analysis	o
CHE 330 1.0	Chemistry of Biomolecules	o**
CHE 331 1.0	Fabric Technology	o
CHE 332 1.0	Food Analysis	o
CHE 333 1.0	Quality Control and Assurance (based on PST 306 1.0)	o

Annex 9. B.Sc. (Special) Degree Course Units - CHEMISTRY

Part I

Semester I

CHE 358 1.0	Advanced Organic Spectroscopy	c
CHE 359 1.0	Symmetry and Group Theory	c
CHE 360 1.0	Advanced Electrochemistry	c
CHE 362 1.0	Advanced Quantum Chemistry	c
CHE 363 1.0	Statistical Thermodynamics	c
CHE 366 1.0	Organotransition Metal Chemistry	c
CHE 367 1.0	Advanced Coordination Chemistry	c
CHE 368 1.0	Bio-inorganic Chemistry	c
CHE 369 1.0	Advanced Photochemistry	c
CHE 370 2.0	Chemistry of Biological Compounds	c
CHE 372 1.0	Heterocyclic Chemistry	c
CHE 374 2.0	Inorganic Chemistry Practicals	a

	istry Practicals (Semester I and II)	a
	istry Practicals	a
CHE 351 2.0	Advanced Analytical Chemistry	c
CHE 352 1.0	Spectroscopic Methods in Inorganic Chemistry	c
CHE 353 1.0	Structural Chemistry	c
CHE 354 1.0	Inorganic Reaction Mechanisms	c
CHE 357 2.0	Natural Products Chemistry	c
CHE 361 1.0	Advanced Kinetics	c
CHE 365 1.0	Diffraction Methods in Chemistry	c
CHE 371 1.0	Biochemistry	c
CHE 373 2.0	Advanced Physical Organic Chemistry	c
CHE 374 2.0	Inorganic Chemistry Practicals	a
CHE 375 2.0	Organic Chemistry Practicals (Semester I and II)	a
CHE 376 2.0	Physical Chemistry Practicals	a
Part II		
Semester I		
CHE 451 1.0	Inorganic Materials	c
CHE 454 1.0	Medicinal Chemistry	c
CHE 456 1.0	Polymer Chemistry ##	c
CHE 457 1.0	Advanced Molecular Spectroscopy	c
CHE 459 1.0	Advanced Thermodynamics	c
CHE 460 1.0	Industrial Management	c
CHE 461 1.0	Basic Chemical Engineering	c
CHE 466 1.0	Industrial Utilization of Plant products	o
CHE 468 1.0	Forensic Chemistry	o
CHE 471 1.0	Textile Chemistry	o
CHE 474 1.0	Physical Chemistry of Polymers ###	c
CHE 476 1.0	Solid State Chemistry	o
CHE 479 1.0	Lasers in Chemistry	o
CHE 484 1.0	Polymer coating and paints industry	o
CHE 486 1.0	Nano Chemistry (with CHE 334 1.0)	o
CHE 490 8.0	Research Project (continued in Semester II)	c
Semester II		
CHE 458 1.0	Advanced Surface Chemistry	c
CHE 462 2.0	Food Chemistry	c
CHE 463 2.0	Food Technology	o
CHE 464 1.0	Polymer Technology ####	o
CHE 465 1.0	Bio-physical Chemistry	c
CHE 467 1.0	Mineral Based Industries in Sri Lanka	o
CHE 470 1.0	Environmental Chemistry	c
CHE 475 2.0	Synthetic Organic Chemistry	c
CHE 477 1.0	Electro analytical Chemistry	o
CHE 480 1.0	Industrial Pharmacy	o
CHE 481 1.0	Surface Techniques and Dynamic Surfaces	o
CHE 482 1.0	Food Analysis	o
CHE 483 1.0	Polymer Blends and Composites (based on PST 301 1.0)	o
CHE 485 1.0	Quality Control & Assurance (with PST 306 1.0) (based on PST 303 1.0)	o
CHE 490 8.0	Research Project (continued from Semester I)	c

o	-	optional for those doing Chemistry
s	-	optional for all students in the faculty
o*	-	optional for those doing Chemistry, but not offering Forestry and Environmental Science.
o**	-	optional for those doing Chemistry, but not offering Botany /Plant Bio Technology
#	-	optional for students following Chemistry, but not offering Polymer Science and Technology
##	-	Students who have offered Polymer Science & Technology as a subject in the first two years are not allowed to follow this course. Instead, they will follow CHE 483 1.0 - Polymer Blends and Composites (based on PST 301 10) in the first semester as a compulsory course. However, the students who have not offered PST as a subject could also register for this course as an optional if they wish.
###	-	Students who have offered Polymer Science & Technology as a subject in the first two years are not allowed to follow this course. Instead, they will follow CHE 484 1.0 ï Polymer Coatings and Paints Industry (based on PST 303 1.0) in the first semester as a compulsory course. However, the students who have not offered PST as a subject could also register for this course as an optional if they wish.
####	-	Students who have offered Polymer Science & Technology as a subject in the first two years are not allowed to follow this course. Instead, they will follow CHE 485 1.0 ï Quality Control & Assurance (based on PST 306 1.0) as an optional course. However, the students who have not offered PST as a subject could also register as an optional if they wish.

Annexure 10 B. Sc. (General) Degree Course Units

POLYMER SCIENCE & TECHNOLOGY

Each student should offer course units having a minimum cumulative credit value of 27.0

FIRST YEAR

Semester I

PST 101 2.0	Introduction to Polymer Science and Organic Chemistry of Polymers	c
PST 103 2.0	Management Process I (based on MAN 101 2.0)	c
PST 106 1.0	Wood and Wood Related Chemistry	c

Semester II

PST 102 1.0	Inorganic Polymers	c
PST 104 2.0	Rubber Chemistry (Synthetic & Natural)	c
PST 105 2.0	Basic Chemical Engineering and Polymer Industry	c

	Polymers	c
PST 202 1.0	Solid State Properties of Polymers	c
PST 203 2.0	Biometrics I (based on STA 220 2.0)	c
PST 204 1.0	Degradation and Stability of Polymers and Polymer Additives	c

Semester II

PST 205 1.0	Plastic Technology	c
PST 206 1.0	Analytical Methods and Testing of Polymers	c
PST 207 1.0	Solution Properties and Thermodynamics of Polymers	c
PST 208 1.0	Rubber Technology	c
PST 209 1.0	Business Law (based on MAN 228 1.0)	c

Third Year

Semester I

PST 301 1.0	Polymer Blends and Composites	o
PST 302 1.0	Polymer Rheology, Viscosity and Rubber Elasticity	o
PST 303 1.0	Polymer Coatings and Paints Industry	o
PST 304 1.0	Rubber based Industries in Sri Lanka	o
PST 305 1.0	Polymer Laboratory Practicals	a
PST 310 1.0	Environment & Polymer Industry	o

Semester II

PST 306 1.0	Quality Control and Assurance	o
PST 307 1.0	Polymer Engineering & Mould designing	o
PST 308 1.0	Selection of Materials for Polymer Industries	o
PST 309 3.0	Industrial Project / Seminars	a

Course Type

a	-	compulsory
c	-	core
o	-	optional for all those doing Polymer Science & Technology