

SUBJECT REVIEW REPORT

DEPARTMENT OF PHYSICS



**FACULTY OF NATURAL SCIENCES
THE OPEN UNIVERSITY OF SRI LANKA**

20th to 22nd December 2006

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1. SUBJECT REVIEW PROCESS

Subject review process formulated by the University Grants Commission evaluates quality of education within a specific subject or discipline. It is focused on the quality of the student learning experience and on student achievement. It has been designed to evaluate the quality of both undergraduate and postgraduate programmes offered by academic Departments of the Sri Lankan Universities.

Aspects of Provision under Review

This report describes the outcome of a review carried out to evaluate the quality of the academic programmes and related issues in the Department of Physics of the Faculty of Natural Sciences of the Open University of Sri Lanka. In this exercise the following aspects were examined and evaluated.

1. Curriculum Design, Content and Review
2. Teaching, Learning and Assessment Methods
3. Quality of Students, Student Progress and Achievements
4. The Extent and Use of Student Feedback
5. Postgraduate Studies
6. Peer Observations
7. Skills Development
8. Academic Guidance and Counselling

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

The Open University of Sri Lanka (OUSL) was established under section 18 and section 23 (1) of the Universities Act No. 16 of 1978. It incorporated within its system, the External Services Agency (ESA) and the Sri Lanka Institute of Distance Education (SLIDE) and became fully operative in 1980, under the OUSL ordinance No. 3 of 1980. At the inception, the academic programmes of the OUSL were conducted by two boards of study, the Board of Study for Management, Science and Technology and the Board of Study for Humanities and Social Sciences.

The OUSL is the first university in the country to offer programmes of study leading to certificates, diplomas, degrees and post graduate diplomas and degrees through distance education. A multimedia study system adapted to suit local conditions was developed where face to face teaching was minimal. Student centered learning was facilitated by specially designed course materials which included print as well as audio and video materials. The learning process was supported, where necessary, by work in the laboratories and the field, workshops, day schools (discussion classes) and also seminars.

A major change in the university resulted from the OUSL ordinance No. 1 of 1987. This new ordinance provided for three (03) faculties with several divisions under them which replaced the two boards of study. They are

- (1) Faculty of Humanities & Social Sciences (HSS) with divisions in Education, Management & Social Sciences, Legal Studies.

- (2) Faculty of Engineering Technology (Eng. Tech.) with divisions in Civil Engineering, Mechanical Engineering, Electrical, Electronic Engineering & Computer Science & Engineering and
- (3) Faculty of Natural Sciences (NSc) with divisions in Mathematics, Physical & Chemical Sciences and Life Sciences.

The OUSL Ordinance No. 1. of 1990 paved way for the establishment of five (05) academic divisions in each faculty including Division of Physics in the Faculty of Natural Sciences. However, through a subsequent amendment to the ordinance in 1996 the academic divisions were later converted to academic departments.

At present OUSL has four (4) Faculties and number of academic departments in the Faculty of Natural Sciences has been increased to six (6) departments.

Vision Statement

“to be a leader in Open and Distance Learning renowned for excellence, in human resource development and empowerment of people to achieve their potential.”

Mission Statement

“to enhance opportunities for life-long learning of adults through Open and Distance Learning and support excellence in research and scholarship.”

OUSL started awarding B.Sc. Degrees since 1990 and it is the first university to award B.Sc. Degree through distance education. In addition to the traditional Degree programmes the Faculty recently commenced a B.Sc Degree programme in Nursing since and a Certificate Course in Laboratory Technology.

Unlike in covenantal universities, the students of the Open University have to bear a part of the cost of their education. However, the openness of the university with regard to its academic activities makes it an attractive choice for the employed and therefore approximately 80 percent of the student population today are those who are employed. It also has the largest student population with over 25,000 students on roll.

The organizational structure of the Open University is similar to that of conventional universities. Apart from the academic departments, there are other units that are under the guidance of the Registrar of the University.

In attempting to meet the demands for globalization of education, equality in educational opportunities and provision of lifelong education, OUSL offers 42 programmes with over 900 courses. The programmes are conducted by the four faculties viz. Education, Engineering Technology, Humanities and Social Sciences and Natural Sciences through nineteen Departments of Study.

Infrastructure Facilities and Student Support Study System

The Open University is a distance education institution with a student centred learning approach. Therefore the system of study is designed to support a distance learner through multiple media which includes specially designed printed lesson material for a self learner, audio visual aids, discussion and day classes, seminars, workshops, tutor clinics, laboratory and field work, factory/industry visits, e-mail and internet. The printed material offers the student the equivalent of lectures and tutorials. Students are provided with lesson material at the point of registration

Teaching also includes a system of continuous assessment through a planned schedule of home assignments, tests, project work etc. The assessments have a dual purpose viz. a tool as well as a means of helping the students to assess their own progress. Assignments are marked and returned to the student with the marks, tutors comments and observations. The continuous assessment component also forms a part of the overall mark of the final examination.

Academic counselling is an important activity of the OUSL. It helps the students in selection of courses in relation to the time they could spend and the academic programme/courses they like to pursue.

Programmes

The Open University has progressively increased the number of programmes from 4 offered at its inception to over 40, offered by the 4 Faculties. These programmes range from conventional, non-conventional, job oriented, welfare oriented programmes to continuing education. The Open University of Sri Lanka is one of the pioneers among Distance Learning Universities to award in Bachelor of Science and Bachelor of Engineering Technology degrees.

The programmes are at Foundation, Certificate, Diploma, Degree and Post graduate level which provide an opportunity for entry at different levels. It provides a readily accessible, progressive ladder of opportunity through its lateral entry/exit system. The foundation level has been introduced as an alternative to GCE (Advanced level) to assist students to acquire a qualification to enter the degree or diploma programmes.

Outreach

The Headquarters Complex (Central Campus) of the OUSL is located on a 36 acre site at Nawala. Academic and Administrative Secretariats have been established at the Central Campus. OUSL students are spread all over the country and are served through the Regional Educational Service network of 28 centres covering the length and breadth of the island. The network consists of 4 regional centres at Colombo, Kandy, Matara & Jaffna and 17 Study Centres and 7 smaller units called Teaching Centres which have been established to cater to very specific programmes. The network of centres is dispersed throughout the country and has brought education literally close to the students' homes.

The Regional Educational Services (RES) is headed by a Director. The Centres are administered under an Assistant Director or a Regional Officer. Academic staff and Counsellors are also stationed at the Regional Centres to provide academic support. Students may use a centre of their choice for registration and for academic activities.

All Centres provide facilities for counselling, distribution of course material, collection of information, conducting of examinations and viewing & listening facilities for videos and audios. Libraries and Computer Laboratories have been established in the Regional Centres and in some Study Centres. Regional Centres have more activities while the Study Centres have fewer activities.

The Department of Physics

The mission and the vision of the Department are same as the mission and the vision of the university.

The Department of Physics contributes courses to a number of study programmes. These Programmes include the Foundation Programme in Science (for those who do not possess

G.C.E. (A/L) qualifications of 3 passes), the B.Sc. Degree programmes, and the Advanced Certificate in Laboratory Technology Programme. The Department also provides research supervision for M. Phil students in Physics.

Admission requirements for each programme of study of the OUSL vary depending on the level of study. Admission for the level 03 B.Sc. Degree programme courses in Physics requires a minimum of 3 passes at the G.C.E. (A/L) examination (in approved science subjects). However those who do not have the above qualifications can still join the Degree programme after the successful completion of the Foundation courses offered by the university. No formal educational qualifications are required to register for the courses at the Foundation level. Further there is possibility of joining a programme laterally at an appropriate level.

The Department of Physics has 12 academic staff members, 2 academic support staff members, 7 temporary demonstrators, 2 technical officers, 2 lab attendants, 1 computer application assistant and 1 labourer.

The academic staff consists of 1 senior professor, 2 senior lecturers, 6 lecturers and 7 demonstrators. Preparation of teaching materials, conduction of day schools and practical classes are some of the major duties of the senior academic staff. The technical officers assisted by the two laboratory attendants assist in conducting laboratory practical sessions. The Department also has one labourer.

The Department of Physics is located in the Colombo Regional Centre building with 05 partitioned rooms (for the professor and for the senior lecturers) and 04 rooms shared by Lecturers, academic support staff and demonstrators.

To conduct the practical components of the Physics courses of all programmes stated above, the Department of Physics has only one laboratory (maximum of 50 students can be accommodated). The research project work and undergraduate research projects are also conducted in a partitioned room in the same laboratory. No equipment for research, however, is available other than those obtained through research grants, which are used for specific projects. The Department of Physics has no laboratories in other regional centres.

Eight personal computers and a note book computer are available in the department for academic, office and confidential activities such as examination work. Department has 01 photocopy machine, 01 Line Printer and 02 Laser printers. 01 Overhead projector is also available. All senior academic members are provided with a computer.

Day schools are conducted either in the Auditorium or in one of the several lecture rooms available for the whole university. White boards are available only in the auditorium. Other lecture rooms have black boards. Screens, Multimedia Projectors and the Overhead projectors for the auditorium and other halls are supplied from Regional Educational Services (RES) on request. There are 04 examination halls, shared among all faculties.

Students have access to library facilities in three locations. They can use the main library with lending and reference facilities and the Colombo Regional centre library. Students (at level 3 and above) who wish to make use of the limited lending facilities (14 days reference) are required to register by paying a reasonable library deposit. In addition to this library, students can use regional libraries at Kandy and Matara.

Audiovisual facilities (AV) are available at the Audio Visual Resource Centre (AVRC), which is attached to the main library. These facilities are also available at the regional centres. Students can use these resources at any regional centre. Students have to make

prior arrangements with the librarian/Regional officer to use the AV facilities at these centres.

The Colombo Regional centre has a local area network. Limited internet facilities are available at other Regional Centres. The students can use the computer facilities in the computer laboratories at the regional centres. However, students have to make prior arrangements with the centre to use this facility.

Hostel facilities for students are available in Colombo, Kandy and Matara centres. These facilities are limited and provided only for the students who travel from long distances to do their academic activities such as attending practical classes, day schools and exams. A large number of students who attend the practical classes use this facility.

3. AIMS AND LEARNING OUTCOMES

3.1. Aims

The specific aims of the Department of Physics at the OUSL are given below.

- 3.1.1. Provide a range of learning opportunities to a wide clientele of students to acquire knowledge, understanding and skills in Physics and related areas of study through distance education methodology.
- 3.1.2. To provide opportunities to students to study at their own time and place to suit their interest or job requirements through a wide range of courses within a structured and flexible academic programmes.
- 3.1.3. Promote self-study and independent learning using instructional course material in multiple media (printed course material supplemented with some face-to-face contact sessions and audio-visual aids) suitable for distance learners.
- 3.1.4. Provide Foundation courses in Physics to give opportunities for adults without any formal educational qualifications to obtain tertiary educational qualifications in Physics and enter the academic mainstream.
- 3.1.5. Provide undergraduate and postgraduate courses and programmes of study with an integrated multidisciplinary approach to enable adults (especially the employed students) to obtain academic qualifications.
- 3.1.6. To provide programmes and courses emphasising laboratory, field and research skills relevant to Physics subject and related fields.
- 3.1.7. Provide counselling, guidance, facilities and a departmental environment conducive for progressive learning and especially provide the motivation and support necessary for independent learning
- 3.1.8. Encourage both discipline based and distance education research among staff.
- 3.1.9. Provide training opportunities for career development, distance education teaching methodologies and in assessment strategies for staff through encouraging staff to attend staff development programmes.

3.2. Learning Outcomes

On successful completion of programmes/courses, the students should have:

- 3.2.1. Gained broad knowledge and understanding in areas of Physics from microscopic level to the macroscopic level.
- 3.2.2. Developed specific knowledge and understanding in the core areas of Physics as well as more applied aspects of Physics, on successful completion of the specific courses listed in Annex 2 and 3.
- 3.2.3. Acquired practical skills, field based methods and techniques to complement and support subject-based theoretical knowledge.
- 3.2.4. Acquired the ability to conduct scientific investigations and undertake supervised research studies.
- 3.2.5. Acquired a range of critical, analytical, transferable and personal skills including the collecting, recording and critically evaluating scientific data, critical evaluation of published literature, statistical analysis of data, efficient use of library facilities and a range of other sources to locate and retrieve information, computer literacy, effective written and oral communication skills, self-discipline through meeting deadlines and time management and the ability to work within groups.
- 3.2.6. Changed from a dependent to an independent learner (through studying at distance mode) with the flexibility and confidence to move into new and multidisciplinary areas of study, research or employment.
- 3.2.7. Developed a respect and an appreciation for the limited resources in nature so as to be able to live conserving them.
- 3.2.8. Developed an interest in life-long learning.

Study Programmes and Course Details of the department are given in Annex 3.

4. FINDINGS OF THE REVIEW TEAM

4.1. Curriculum Design, Content and Review

Department of Physics has prepared lesson material for its B.Sc. Degree, Advanced Certificate in Laboratory Technology and Foundation of Science programmes.

All programmes/courses have been to be approved by the curriculum development committee and then the Senate and the Council.

The programmes and courses are now developed by course teams including subject specialists, editors, etc., from the Open University as well as other universities. *However, most of the course materials used by the Department have been developed some time back and the Reviewers find that their style of presentation, the content and its depth need improvements.*

Contents of course units are developed as printed course material that are generally conform to the OUSL house style. For this purpose the OUSL has an advanced Audio Visual Resource Centre (AVRC). *Reviewers have noticed that certain materials have*

been developed by the Department of Physics earlier, but the Review Team strongly feels that this centre is currently underused.

The work load of each course unit conforms to OUSL credit rating which indicates a work load of 75 hours per 1/6th credit. The workload incorporated in these 75 hours includes the time to read and understand course material, time for assessments, time for practicals, etc. A student can register for a maximum of 2 credits (900 hours of study time) within an academic year.

Most of the core courses in Physics are offered at levels 3 and 4 while courses in applied fields are offered in levels 5 and 6. *When going through the course materials, Reviewers however found that in certain cases the depth of the material presented are too advanced for the prescribed level. One such topic is the Fourier analysis. Reviewers also noted that majority of students following the Medical Physics has done so without proper basic knowledge in relevant basic Physics courses.*

The optional course units, at levels 5 and 6 in the B.Sc. degree provide flexibility in the choice of course units.

Students in the B.Sc. degree programme are exposed to interdisciplinary courses (offered by other faculties) such as management studies, laws of Sri Lanka, environmental studies and computer studies, which are compulsory for all students at level 3.

Unless exempted, all students have to offer and pass English in most programmes.

In addition, students can offer continuing education courses (up to ½ credit) such as mathematics and IT courses, outside the basic programme.

To allow students to take courses to suit their interest or job requirement, most courses are offered under the stand alone programmes which allow students to take individual courses without registering for the programme. The curriculum is designed in such a way that these courses can be taken on its own.

Programmes/courses are supposed to be restructured, reviewed and updated regularly after deciding at the Department meetings/Faculty Board meetings. *Reviewers feel that this process has been delayed in the case of the Department of Physics.*

Contents of Course Units

In designing and planning the contents of course units (Annex 7.2), the depth and breadth are identified by the staff of the Department of Physics and in some instances in consultation with senior academics of conventional universities to maintain academic standards comparable with those courses offered at undergraduate levels of other academic institutions.

The course contents are given to the students in the form of several units of printed course material. The layout of the text is designed based on the OUSL house style and made interactive with self-assessment activities. Audio visual aids and recommended reference texts allow the students to obtain an in-depth knowledge of the subject. These promote self-study and at the end of the course students will achieve confidence to think and work independently.

The Review Team has been informed that during development of the printed course material, contents are evaluated by students and academics through a process of developmental testing. The Reviewers observed that this has been done only in a very

informal manner. Reviewers emphasise the importance of a formal evaluation by students at the development level as well as after offering the course.

Course materials are edited for their scientific contents and language before publication to maintain academic standards.

In addition to the theory, practical sessions form an essential component of the course units, they are designed so that students will understand the course contents and acquire practical skills, which will be useful later in research and in their work places.

The exercises in practical sessions take many forms. They are laboratory based observations and/or experiments and field studies. They are all designed so that students are trained to collect and record, analyse and interpret information and to write practical/project reports. Practical exercises are included in practical guidebooks and are issued to students at the registration.

The course unit titled Research Project in Physics in the B.Sc. Degree Programme enable students to acquire the ability to conduct a supervised scientific investigation. This includes writing a mini-project proposal, conduct of experimental work, analysis of data and submission of findings in the form of a project report according to the guide lines provided to the student. *Since the research project is an important unit in improving many skills such as report writing, presentation, etc., Reviewers feel that all the students should be encouraged to do this unit. Reviewers observed that not many students undertake the unit 'research project'.*

Curriculum Review

Reviewers have been informed that course structure/contents of Physics course units are revised from time to time to restructure and update courses with new knowledge. However, Reviewers noted that some course materials were not revised or even not edited during re-printing and were still in the original printed form. When revising such course materials, Reviewers feel that the depths of the subjects at different levels need to be re-determined carefully so that students can grasp them easily.

B.Sc. Degree Programme

The B.Sc. Degree programme was restructured in 1994. As a result, some of these course units were designed to have practical sessions, unlike in the previous case where all practicals were carried out as one separate practical unit. This change was most welcome by the students and staff since it helped the students to understand the course material and helped the staff in their teaching.

In addition, course units were introduced at level 5 in specialized fields related to Physics. The objective was to provide the students the opportunity to study applied fields related to Physics. The course units at level 5 were made optional allowing more flexibility for students to choose course units within a level of study. At present there are twelve optional course units at level 5 of which two courses (Research Project in Physics and Literature Survey in Physics) are offered to a limited number of students. According to the Department the contents of the level 5 course material have been developed in such a manner that they are self-contained and hence do not need prerequisites. *However, the Review Team noted that many students offer some of these units without following the fundamental Physics course units.*

Presently, in the B.Sc. Programme the students have to follow 3 disciplines at level 3. However, they have the option of following any two chosen disciplines at level four. This

allows them the free choice of not registering for the level 4 core courses in Physics. Flexibility and the increase in the number of optional courses offered by different departments have led students choosing course combinations which may be detrimental to the build up of a good knowledge-base for Physics at undergraduate level. Currently, revision of course contents of courses at level three and above is underway and will introduce new knowledge in the course contents. *Reviewers welcome this effort and hope that the revision will make the essential introductory core courses such as Mechanics, Quantum Mechanics, Solid state Physics, etc. compulsory for all the students following Physics in the future.*

With the introduction of the restructured B.Sc. degree programme the course contents of Physics units were also revised and updated to include new scientific knowledge. *Reviewers are pleased to observe that the attempts are being taken to introduce course material more user friendly and interactive manner as far as possible for the distant learner.*

The Department of Physics also plans to introduce new Physics course units for certificate and diploma level by 2009. The course units that the department is planning to develop are in specialized areas such as electronics and geology.

Advanced Certificate Program in Laboratory Technology

This is an inter-faculty program initiated by the Natural Science faculty in 1998. The contents of the course unit on Laboratory techniques in Physics PSC 2324 were adapted from materials provided by Commonwealth of Learning. Subsequently, a Regional workshop was held in Sri Lanka in 2000 to extend the program of study to a Diploma level and at this workshop the curriculum and course contents of PSC 2324 was revised extensively to suit the needs of the Diploma in Laboratory Technology. Academics of the Department of Physics are currently involved in revising the course material.

Faculty of Natural Sciences in general has now recognized the need for revision of the curriculum regularly. *However most of the courses offered by the Department of Physics have not been revised since 1996. In general the presentation of the printed course materials are not user friendly. Level of difficulty of some of the courses, especially level 3 are too high. As mentioned above majority of students has followed the Medical Physics course unit event without proper basic knowledge in Atomic or Nuclear Physics. It is therefore very unlikely that objectives the course have achieved. This may one of the reasons as to why number students enrolled for this course is very small.*

Further, the Review Team observed that some course materials were not revised or even not edited during re-printing stage and were still in the original form.

As such, Reviewers rate the Curriculum Design, Content and Review aspect of the Department as UNSATISFACTORY.

4.2. Teaching, Learning and Assessment Methods

Teaching and learning strategies are designed diversely to achieve the *aims* of the Department in general and learning outcomes stated.

Learners pursue their education through distance education methodology. The academic programmes have been specially designed to enable persons aged 18 and above to follow programmes of study leading to Certificates, Diplomas, Degrees and Post Graduate Degrees/Diplomas.

An academic year is based on two semesters. All academic activities of an academic year are arranged according to the Faculty schedules, which avoid overlaps and enables the students to select optional units appropriate to their overall programme. The schedules of activities for the first semester are given at the time of registration, whereas those for the second semester are posted to the learners at the end of the first semester. All courses have information sheets that contain the information such as the materials they have to collect for each course, general comments about the courses, information on day schools, practical classes and assignments, eligibility criteria and evaluation methods and final examination etc. Any changes in the schedules are informed immediately to the students by post. In addition notices are displayed on the notice boards of the Department and Regional Centres.

Information about any major changes; for instance, an introduction of a new course or a change of an existing course is included in the student guidebook and announced two years before the date of the change.

The staff communicates with the learners through various media which include personal communication, letters, notices, telephone, etc. The traditional postal method works well with the learners.

As mentioned earlier, the system of study is a multimedia system with strong emphasis on distance education techniques, using printed course materials and audio-visual aids. Printed course materials are the central element in the teaching system and they provide the students with the primary material for self-study. They are designed in such a way so as to give subject knowledge and understanding and also encourage a dialogue between the learner and the teacher on a specific subject.

For effective learning of the course material, practical sessions are incorporated for almost all the Physics courses for which the attendance is compulsory. The primary aim of the practical session is to allow students to learn experimental methods and develop skills. Practical sessions of certain courses are designed in such a way that they reinforce and extend specific subject knowledge and allow students to practice what they have learned in theory.

The main difference between the conventional university system and the Open University is that course materials have replaced the lecturers. As the students are learning at a distance mode using the printed course materials, tutor support is given to them in many ways. Though the Department does not conduct conventional lectures to learners, there are limited number of optional face-to-face sessions, which may take different forms *via* day schools, tutor clinics, small group teaching, and individual learner support. The latter two are informal sessions practiced by the Department of Physics. For the convenience of the employed learners, the Department schedules the day schools mainly on weekends.

The Department gets student feedback as well as peer feedback on the course materials very informal manner. *As mentioned earlier Reviewers wish to emphasise the importance of a formal evaluation by students particularly after self learning the course. This feedback on the course material will help in improving the course material and to provide effective and user friendly learner support.*

Assessment Strategy

Assessments include both formative and summative assessments. Several formal activities in student assessment and evaluation is followed by the Department.

Home assignments and practical assessments serve as the continuous assessment component of a course. Students have to obtain at least 35% in continuous assessments to be able to sit the final examination. A certain percentage of continuous assessment marks contributes (30%) to the final mark of a course. The final examination of a course is held at the end of a semester. The final examination mark accounts for the other 70%.

The continuous assessment tests are set by the senior coordinator (Professor, Senior Lecturer, Lecturer or probationary lecturer) of a particular course. It may or may not be moderated by peers. However in future it has been decided to moderate all the papers of continuous assessment tests. Final exam papers are moderated by external moderators (Professor/Senior Lecturer of relevant field, in other Universities).

The students can also sit for the examinations at other regional centres. At the beginning of each semester students are informed about scheduling of the day schools and practical classes at the regional centres.

Teaching and Learning Activities

The study sessions of the printed course material are prepared for self-learning, and they motivate the students to build up a steady progress in learning.

All staff members have been trained for course development and most of the course materials are developed with the input from experts. When developing a course material, a course team, which includes a Course chair, Authors, Educational technologist, Content editor, Language editor, Desktop publisher, Graphic artists and Translators are appointed. The word processing and DTP work are carried out at the department. The printing is done at the OUSL press and the books are made available to the learners at the time of registration.

The academic content of a particular course is divided into units or blocks to make it easier for the distance learner.

The learners are initially orientated to the course content in the first block/unit of the series by giving an overview of the entire course structure. This includes a description of different components of the course material, such as number of units and sessions that belong to the course, supporting audio and video visual components if any, number of lab and face to face sessions and a description of how the student will be evaluated. This enables the student to get a quick impression of the course. Following this section the detailed break down of all subsequent units is given as an advance organizer for the students. Finally each session gives its' own introductory paragraph summarising the key concepts that will be covered in the session.

An average student is expected to read and understand a study session within a period of two hours. A session consists of 2500 words approximately, and a 1/6 credit theory course contains about 20-25 sessions or 15-20 theory sessions along with several practical sessions. The number of sessions may vary in different courses.

The study sessions are reader friendly and use simple and clear language along with clear illustrations/diagrams. They promote active learning; orientate and organise the learner to the subject content.

The study sessions also provide a series of self-assessment questions and activities interspersed through the text. These guide the learners towards an understanding of the material, promote active learning and help the learner to develop analytical skills and creative thinking.

In certain courses, audio-visual aids have also been produced as supplementary material and they are incorporated as an activity during the practical session. Some of these audio-visual aids are available at the library and the regional centres. Students can also independently view these and learn from them.

Learners in the distance education system are responsible for their own learning. However, most of them require interaction with the teacher and this is mainly provided through day schools.

Normally three day schools (altogether 9 hours) are scheduled for a 1/6 credit course and four day schools (altogether 12 hours) for a 1/3 credit course.

Medium of instruction at the day schools and practical classes is Sinhala, Tamil and English for level 1, 2 and 3 and English only for level 4 and above. Internal staff conducts most of the face-to-face sessions at the regional centres. However, for certain courses, qualified visiting academics from other universities have been appointed to conduct the day schools. The strategies of the day schools are communicated to the visiting academics by the senior co-ordinator of a particular course so as to maintain uniformity in providing learner support.

Through the day schools, students are able to clarify and consolidate course contents, develop study/learning skills; provide group support and share experience; build confidence between the teacher and the students and among the students. *However this type of interaction was not observed by the Review Team during the observation of a day school session.*

The materials to be discussed at the day school are indicated in the information sheet issued at the registration. This helps the students to study those particular sections before they come for day schools. They are also given instructions to send their problems to be discussed at the day school to the co-ordinator, a week before the date. However the students rarely contact the co-ordinator, as majority of the students do not read the materials. *This may be the reason for poor interaction of students at the day school sessions and Reviewers are pleased to note that the Department has identified this problem. As a remedy the Department of Physics uses a variety of teaching methods to motivate the learners to study the course material and encourage them to spend time for study.* These methods include; giving the over view of the book at the day schools, discussion, group activities, presentations, workshops, discussion of past assignments and, past examination questions etc. Model questions are also discussed at the day schools.

Since the participation at the day schools is not compulsory, attendance of the learners may vary greatly (40 -70%). However, this increases when an assessment is scheduled following a day school.

In addition to the day schools, tutor clinics are conducted for all the courses at the three regional centres prior to the examinations. During tutor clinics the staff discusses the assessment criteria and model questions with the learners. Staff members who are conducting day schools at the Colombo Regional Centre are also available at the scheduled tutor clinics conducted at the Regional Centres. This has given the opportunity for the learners residing out of Colombo to discuss their problems with the teachers in the Colombo Regional Centre.

The Department facilitates small group learning and also give individual learner support at the department. It is essential as learners have diverse background knowledge. Some find it very difficult to organise themselves for distance learning as they are very much

used to face to face teaching. The staff guide and motivate them for self-learning, and also provide help in the English language.

Practical sessions are conducted for all the courses in Physics at level 3, 4 & 5 and attendance is mandatory. Practical sessions are scheduled during weekdays. The laboratory practical sessions are conducted at the Colombo Regional Centre. The opportunities to interact with the teaching staff (Tutor support) are provided at the practical sessions too.

The Department designs the experiments and practical tasks, and prepare practical guidebooks. At the beginning of the practical class, person in charge reviews the theoretical knowledge of learners and provide assistance during the practical time. Practical classes also help develop subject related knowledge and transferable skills.

There are differences in the approach of the practical classes between different courses, reflecting their different objectives. They may be in the form of laboratory sessions, field oriented studies, research projects, literature surveys, or oral presentations and always depend on the best suitable method to give the relevant skills to the student of that particular course. The demonstrators provide the support to the students. Normally one demonstrator is in-charge of 2-3 experiments.

Since a large number of students (200-300) register at level 3, 4-6 practical groups are normally scheduled. The students have to sign in for one of the group within a given period (at registration period for first semester practical and one month before the practical commences for second semester practical)

The practical component of level 3 covers General & Thermal Physics and Basic Electromagnetism. Hands on experience are given through the experimental work to learn both theoretical principles and the design of experiments. All practical work is guided by self-teaching worksheets and assessment exercises. These practical are designed to develop skills in data collection, recording, analysis and interpretation. Part of the practical component in Essentials of Geology (PHU 3257) is covered by field practical and there is a field trip involved, where the students learn the applied aspects of geology.

The students who register for Research Project in Physics (PHU 3254) are assigned supervisors by the Department. Sometimes, their research is jointly supervised with an external resource person. The Research Project enables students to conduct supervised research in an area of their preference and encourages initiative, self-reliance and originality. It also develops in them specialist laboratory and transferable skills. They also develop presentation skills. Literature Survey in Physics (PHU 3153) at Level 5 is organized for the students to develop scientific writing skills. However, only few students register for these courses.

Practical of the Advanced Certificate Course in Laboratory Techniques are totally based on laboratory exercises.

Assessments

Assessments are conducted for feedback, evaluation and grading of the learners. In addition the assessment serves many purposes; Selection, maintaining standards, motivating learners, giving feedback to the learners.

The staff has participated in workshops and seminars to design assessment tasks effectively. The assessment papers are confidentially typed by the academic staff in charge and printed at the examination division. Usually peer feedback is obtained for the formative assessment tasks.

Home assignments - At all levels, the learners are given “take home” assignments and the staff marks them. The questions are set covering all the materials of a course.

Practical reports are also evaluated by the staff members and 60% of the marks of the practical reports are considered for the continuous assessment marks.

The senior coordinator in charge of the course becomes the chief examiner and they design the final exam papers, which are moderated by relevant external staff members in other universities. All chief examiners, setters, markers and moderators have to be approved by the Faculty Board and Senate.

Marking of the final examination papers is done by the chief examiner of the course and the course co-ordinator (Educational Assistant). However, the chief examiner gets help from other staff members if the student number is large. Usually one lecturer marks a particular question in all the answer papers to maintain uniformity in marking. Additions are checked by the internal checking examiners.

Computation of the overall final examination mark is done as follows, 30% of the CAM and 70% from the final exam mark. This has to be above 40 to obtain a pass.

OUSL has a very good system of providing worthwhile learning experience to its students. It is essential to have properly designed and regularly revised lesson material for students to get best out of this system. It is somewhat questionable whether some of the lesson material offered by the Physics Department has reached this level.

Nevertheless teaching and learning process inherent to the Open University system encourages student centred self learning skills helping them in their personal development in future life long continuous learning. Availability of a wide variety of evaluation method to assess students is very effective in grading the self learners.

Based on the above observations reviewers conclude that Teaching, Learning and Assessment Methods in the Department is SATISFACTORY.

4.3. The Quality of Students including Student Progress and Achievements

Introduction (Student Profile): The Open University is open in its admission policy, and requires only that the learners are 18 years of age or older. Past academic performance of students at other educational institutions does not hinder admission but may help them to seek exemptions. The enrolment in some programmes of study may require a specific level of prior academic achievement. The Department of Physics provides courses/programmes of study to students at various levels of study. Depending on their qualifications, a student can register for Certificate, Diploma, and Degree level or Post-graduate level courses.

Admission Requirements: Varies with the programme.

Exemptions: The Department recognizes previous qualifications/work experience and offer appropriate credit exemptions as prescribed by the Senate. Trained teacher certificate, National Diploma/ Diploma in Teaching (Science), Science Teacher’s Diploma, passing General Science Qualifying Examination or Part 1 of the B.Sc. Degree are some of the qualifications for which exemptions are being given.

Orientation Programme: The faculty conducts a pre registration orientation programme for the students and provides information about the faculty. During this programme distance learning methods, department administration, credit system and other activities

are dealt with. The information about programmes and courses are also given to the students.

Counselling: Each student is assigned a personal counsellor at the orientation. All the academic staff members in the Department of Physics contribute as counsellors of the faculty. During the counselling sessions students obtain guidance to select the courses, depending on the time and personal engagements. The personal counsellor is also responsible to guide the student through out the student's stay at the university.

Performance and Monitoring: More than 80% of the students registered for any Physics course each year become eligible to sit the final examinations. However, only half of them sit for the final exam in the year of registration. This is clearly seen in courses offered at level 3 and level 4. As a result the student number eligible to sit the final exam increases each year.

Flexibility of the Programme: A high flexibility is present in the programmes offered by the Open University and it is also applicable for all the courses and programmes offered by the department. This enables them to pursue their studies in accordance with needs and requirements of their own interests.

Student Achievements: Students registered for programmes related to Physics have achieved success over the past five years according to the completion rate.

(i) Advanced Certificate Programme in Laboratory Technology

A considerably high number of students sit for the final examinations and complete the course. More than 75% of students select Laboratory Techniques in Physics course as an optional course and a considerable number of them get merit passes in the whole program. In the last two years, the number of distinctions and merits obtained by the students were considerably high.

(ii) Foundation Courses

The number of students who registered has increased from 2000 to 2004. The number of students who pass the foundation level (1) & (2) courses decreased from 2003 to 2004. The exact reason for this decrease is not clear. The results also show higher performance at both levels in year 2002 and 2003. Students who complete this program are eligible to register for B. Sc. Degree program.

(iii). Bachelor of Science Degree Programme

According to a study carried out by the faculty of Science, for a cohort of students who registered for B.Sc. degree program takes average time period of 4-6 years (89%) to complete the degree. This time period taken is reasonable for both employed and unemployed students, as they have to complete seven credits including English.

The total number of Students offering Physics at level 3 gradually increased from 2000 to 2004.

The average number of students who registered for level- three Physics course during the last five years was 1287 and average percentage of passes at this level was 48%. Remaining 52% were either dropouts or failures. There was a steady increase in the student number who registered and sat the Physics course at level 3, of the B.Sc. degree program during the last five years.

At Level 4 average performances (passes) for the five year period was 57.5%, while at level five average percentage passes were 72%. Performance at level three was less

compared to level four and five. Students at level 3 are new to the Open and Distance learning (ODL) methods and they take time to adjust to ODL system. Therefore average student performance drops at this level. However, number of students who registered for level three courses increased during the last five years.

The Level 5 Physics courses cover vast area of specialization as mentioned in section 1.3. Level 5 students have a better understanding of the ODL system and are also keen to finish the program. Therefore drop out rate is lower when compared to level three and four and show better performance than in the first two years.

Even though a less number of students offer Physics as a subject in all three years any student graduated from Faculty of natural science at least offer a single course from the Department of Physics at level five for their B.Sc. Degree. In that sense their knowledge in chemistry and biology blends with Physics make them professionally suitable to undertake any career in government or private sector.

(iv). Stand Alone and Continuing Education

Students who do not wish to register for a regular program of study are given the opportunity to register for stand-alone courses and obtain additional information and knowledge in specific courses. Physics foundation courses (PSF 1302, PSF 2302), laboratory techniques in Physics and almost all other causes in level 03, 04 and 05 are offered by the Department of Physics as stand alone courses and as Continuing Education courses. But very few students follow these courses as stand alone courses.

Job opportunities and Employment Records: Most of students are already employed specially as teachers. However, the department provides opportunity for a small number of graduates that pass out to work in the department as demonstrators. Graduates are also accepted well by research organizations and other institutions. Very often they compete with conventional university graduates and achieve success in obtaining employment in institutions such as International Schools, Government schools, Sri Lanka Standard Institution, etc. The OUSL programmes have been accepted for promotion in places of employment.

The reviewers are of the opinion that the Quality of Students, Student Progress and Achievements are GOOD.

4.4. The Extent and Use of Student Feed Back

The Department considers student feed back as one of the important means by which the quality of teaching and learning is enhanced.

Qualitative Feedback

Qualitative feed back from the students are obtained in the following ways.

- During the discussion classes (eg. Day schools) which are based on course materials designed for the various courses. These discussions are conducted throughout the course duration. The feed back helps in reviewing/restructure course materials.
- At the end of each course, revision sessions/tutor clinics are conducted for small groups/individual students. These discussions provide an end of course feed back regarding both course content and instructional design.

- During the above activities, the students identify their difficulties with respect to both content and design of the course materials. These small groups provide an additional opportunity for the teachers to discuss the learning experiences of the students.
- Informal student feedback is obtained during laboratory, counselling sessions and field classes.

The percentage of students who are eligible to sit for the final examinations based on the continuous assessment marks and also the percentage of students that pass at the final examinations of each course are also used as indicators of effectiveness of the teaching learning process.

The qualitative feedback obtained from the students is considered by the course teams and at the Department meetings. The senior coordinators of the courses are responsible for implementing the recommendations arising from these meetings and make sure they are incorporated during the re-structuring of course materials.

The Reviewers observed that the Department gets student feedback as well as peer feedback on the course materials very informal manner. This is noted as a major deficiency by the Reviewers.

As mentioned in the previous section it is important to obtain written evaluation by students particularly after using the course materials. Obtaining students' feedback formally and effectively through analysis and quantifying of their written questioners will help in improving the course materials and to provide effective and user friendly learner support.

As such reviewers grade this aspect as SATISFACTORY.

4.5. Postgraduate Studies

Research Degrees

The Department offers opportunities for students to register for the Master of Philosophy (M.Phil) degree or the degree of Doctor of Philosophy (Ph.D). Depending on the qualifications of the students they may initially be offered provisional registration. Postgraduate students with 4 year special degrees are offered direct registration. Students with general degrees (3 year degree) in Physical Science are initially given provisional registration. Those students are required to present their progress with regard to the proposed research within six months of registration and are evaluated prior to confirming their registration.

The areas/fields of study in which students are registered for these research degrees depend on the availability of the supervision and facilities in the particular field.

Research Methods Training

Training in research methods for the postgraduate students is offered at the departmental level where students are trained in both laboratory techniques as well as field techniques by their supervisors.

Supervision and Research Facilities

Research students are assigned a supervisor/co-supervisors at registration. Currently the department has five staff members in the department with doctorates who are

available to act as supervisors. The research projects and collaboration research carried out by the department members are listed in Annexure 7.4.

Research facilities in the department are dependent upon academic staff being successful in obtaining research grants, which include equipment and other materials. However the facilities for research in the department need improvement.

During the period 2000- 2004, two M.Phil degrees have been awarded in Physics. Two new students registered for M.Phil degrees in Physics during the last two years. Their work is in progress.

Reviewers grade this aspect as SATISFACTORY.

4.6. Peer Observation

As mentioned before, teaching at the Open University is mainly by printed course material. As the course material have to some extent replaced the conventional lecturer, at the Open University peer observations mainly focus on the peer observation of staff on how effective they prepare their course material. During the development of course material, draft materials are given to other academics in the department and/or outside to read through. Also course material are always edited and checked by another academic (or subject specialist) for easy reading. The final examination papers are always moderated by senior academics (in Physics) in other universities

In addition, as a practice, probationary lecturers, demonstrators or educational assistants in the Department work under a senior staff member in most academic activities.

Considering the above, the reviewers are of the opinion that this aspect is SATISFACTORY.

4.7. Skills Development

Skill development of students is an important aspect of curriculum design and the learning, teaching and assessment methods that are used.

Independent/Self learning skills are developed in all students from level one onwards. This is achieved by the use of special instructional designs in the preparation of the course materials by including self assessment exercises, by providing students with advance organizers, by clearly stated aims and objectives, etc.

Students learn and practice investigational skills including the planning of experiments, making accurate observations, correct interpretation of data and making the correct inferences during laboratory and field classes. Students are required to work in teams to develop the skill of teamwork in most courses.

Through the continuous assessment tests/practical assessments, students are also trained in the development of examination skills. Students are also trained in specific skills such as report writing and oral presentations in certain courses.

In view of the above activities, Skills Development aspect has been graded GOOD.

4.8. Academic Guidance and Counselling

Help and guidance to students is readily available at all times from the staff. They are provided with programme/course details and other information in the prospectus and the

information sheets. Orientation sessions and personal counselling by the academic staff prior to registration also play a major role in this regard. Each student is assigned a member of staff who serves as the personal tutor/counsellor. Academic guidance is given through teaching sessions/Day schools/Laboratory sessions.

Day schools are based on the printed course materials and other learning aids. Laboratory classes are also provided with practical guides indicating the necessary instructions needed to carry out practical exercises. Any changes to the planned programmes are communicated to the students through the help of notice boards at the regional/study centres, News Bulletins, advertisements in papers and electronic media and individually posted letters.

Students are given continuous assessment tests/practical assessments, which also serve as learning instruments. These along with tutor clinics provide guidance in developing examination skills of the students. Based on these tests they also receive guidance on how to improve the quality of their work through written and verbal feedback in form of model answers and discussion classes.

As stated earlier, students are provided with personal tutors at the time of registration. They help students and provide additional support/advice when required.

The counselling sessions held prior to registration guide the students on what courses they should register for during each academic year.

Students who need special guidance on personal problems are encouraged to meet senior student counsellors who may direct them to other professionals depending on the need.

As such the Academic Guidance and Counselling of the Department is GOOD.

5. CONCLUSIONS

Curriculum Design, Content and Review:

Strengths/Good Practices: Collective approach in course designing. Recently this approach is further improved by introducing the course team concept. Availability of opportunities for training facilities for course development.

Weaknesses: Most of the courses have not been revised since 1996. In general the presentation of the printed course materials are not user friendly. Level of difficulty of some of the courses, especially level 3 are too high. Majority of students following the Medical Physics has followed this unit event without proper basic knowledge in relevant basic Physics courses.

Teaching, Learning and Assessment Methods:

Strengths/Good Practices: Teaching and learning process encourages student centred self learning skills helping them in their personal development in future life long continuous learning. Availability of a wide variety of evaluation method to assess students.

Weaknesses: Not using students' feedback effectively through analysis and quantifying. Not updating course material regularly and making them user friendly.

Quality of Students, Including Student Progress and Achievements:

Strengths/Good Practices: Students have a positive attitude towards self learning.

Weaknesses: The Department has not marketed the Degree Programme properly to attract mature students as well as school leavers.

Extent and use of Student Feedback, Qualitative and Quantitative:

Strengths/Good Practices: Interest in obtaining students' feedback.

Weaknesses: The department gets student feedback on course materials very informal manner. As such feedback has not been subject to proper processing and analysis. This is a major weakness.

Postgraduate Studies:

Strengths/Good Practices: Genuine interest in promoting postgraduate studies and research.

Weaknesses: Deficiency in expanding this activity.

Peer Observation:

Strengths/Good Practices: Peer observation is being practised.

Weaknesses: Results not used consistently to improve course materials.

Skills Development:

Strengths/Good Practices: Positive attitude towards improving the quality of students.

Weaknesses: No Physics related practical/theory work at the regional centres

Academic Guidance and Counselling:

Strengths/Good Practices: Counsellors appear to have been trained and have positive attitudes

Weaknesses: Attention to student needs is deficient as reflected by the physical environment and other facilities.

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

Aspect Reviewed	Judgment Given
Curriculum Design, Content and Review	Unsatisfactory
Teaching, Learning and Assessment Methods	Satisfactory
Quality of Students including Student Progress and Achievements	Good
Extent and Use of Student feedback, Qualitative and Quantitative	Satisfactory
Postgraduate Studies	Satisfactory
Peer Observation	Satisfactory
Skills Development	Good
Academic Guidance and Counselling	Good

The overall judgment is suspended

6. RECOMMENDATIONS

Based on observations during this visit Reviewers wish to make the following recommendations.

1. The Review Team was pleased that the academic and technical staff members of the Department are enthusiastic in developing the Department. The technical staff also showed their concern about the progress of the students and their readiness to help the students. Department of Physics has recognized the need for curriculum revision regularly and has made some effort to improve its curriculum. *However, as mentioned previously Reviewers observed that some course materials were not revised or even not edited during re-printing and were still in the original form.*

In order to improve the overall academic standards of the Department, the Review Team recommends using student's feedback effectively and upgrading the course materials and also the overall presentation of printed course materials in a user friendly manner.

2. Majority of students has followed the Medical Physics course unit event without proper basic knowledge in Atomic or Nuclear Physics. This was evident from the comparison of numbers of student enrolled in these course units. The Review Team recommends making some basic courses as prerequisites for the Medical Physics course.
3. Reviewers noted that students do not have Physics related activities in the Regional Centres. Therefore it is also suggested to introduce new methods of teaching and innovative practices such as e-based communication and also employing some visiting staff at the regional centres.
4. The Review Team observed that the laboratory space is not sufficient at all. In laboratory work it is important to provide opportunities for students to work independently, test new techniques, and practice the theories learnt. Reviewers, therefore, strongly recommend the expansion of laboratory space and also setting up of a Mini Worksop necessary for equipment repair and also for the development of new equipment/apparatus for undergraduate as well as for the postgraduate work.
5. The Review Team would like to stress the need to expand research activities by the senior staff as it will improve their career development.

7. ANNEXES

Annex 1. AGENDA OF THE SUBJECT REVIEW

Day 1: 20th December, 2006

08.15 am – 08.30 am	Welcome Meeting with Head of the Department	(Blk 13)
08.30 am – 08.45 am	Discuss the Agenda of the Review	(Blk 13)
08.45 am – 09.15 am	Meeting with Dean of Faculty of Natural Sciences	(Dean's Off)
09.15 am – 09.45 am	Tea	
09.45 am – 11.45 am (Room 13.1)	Departmental Presentation of the Self Evaluation Report	
11.45 am – 12.30 pm (Room 13.1)	Discussion with the Teaching Staff of the Department	
12.30 pm – 01.30 pm	Lunch	
01.30 pm – 02.30 pm	Curriculum Design, Content and Review and Teaching Learning and Assessment Methods Combined Core Aspect Meeting	(Faculty Board Room)
02.30 pm – 03.00 pm	Observing Departmental Facilities	
03.00 pm – 03.15 pm	Tea	
03.15 pm – 04.15 pm	Press, Book Distribution Centre, ET and Library Visits	
04.15 pm – 05.15 pm	Meeting with Undergraduate Students	(Blk 13)

Day 2 : 21st December, 2006

08.15 am – 08.45 am	Reviewers Meeting	(Blk 13)
08.45 am – 10.30 am	Observe Documents & Working Tea	(Blk 13)
10.30 am – 11.30 am	Observing Undergraduate Practical Class	(Blk 20)
11.30 am – 12.30 pm	Meeting with Technical Staff and Non-academic Staff	(Blk 20)
12.30 pm – 01.30 pm	Lunch	
01.30 pm – 02.00 pm	Meeting with Postgraduate Research Students	(Blk 13)
02.00 pm – 03.00 pm	Academic Guidance and Counselling Core Aspect Meeting	(Faculty Board Room)
03.00 pm – 03.15 pm	Tea	
03.15 pm – 05.15 pm	Report Writing	(Blk 13)

Day 3: 22nd December, 2006

08.15 am – 08.45 am	Reviewers Meeting	
08.15 am – 10.00 am	Reviewers Private Discussion	(Blk 13)
10.00 am – 10.15 am	Tea	
10.00 am – 12.30 pm	Report Writing	
12.30 pm – 01.30 pm	Lunch	
01.30 pm – 02.30 pm	Observing Day School	
02.30 - 03.30 pm - Room)	Meeting with Head & Staff for Reporting	(Faculty Board Room)
03.30 pm – 05.00	Report Writing & Working Tea	(Blk 13)

**Annex 2. NUMBERS OF STUDENTS REGISTERED AND ELIGIBLE TO SIT
THE FINAL EXAM OF DIFFERENT COURSES OFFERED BY THE
DEPARTMENT OF PHYSICS DURING THE LAST FIVE YEARS**

Course Title &		Level	2000		2001		2002		2003		2004	
Course Code			Reg.	Eli.								
	Foundation											
PSF 1302-Physics I		01	20	12	13	07	29	20	29	13	28	14
PSF 2302-Physics II		02	18	09	11	05	22	13	28	12	18	11
	ACLT											
PSC 2324-Laboratory Techniques in Physics			30	25	28	23	22	19	24	21	-	-
	B. Sc. Degree											
PHU 1141-General and Thermal Physics		03	99	74	132	99	138	110	148	127	148	80
PHU 1142-Basic Electromagnetism		03	62	46	115	95	117	86	155	100	173	87
PSU 1143-Electronics for Biology Students		03	06	03	18	16	24	17	35	29	-	-
PSU 1244-Physics for Biology Students		03	06	06	07	05	08	03	07	06	11	09
PHU 2141-Waves, Vibrations and Geometrical Optics		04	12	07	22	18	23	16	40	29	41	29
PHU 2142-Advanced Electromagnetism		04	08	07	12	11	21	19	24	22	45	30
PHU 2143-Circuit Theory and Electronics		04	15	14	14	13	22	20	20	19	40	35
PHU 2144-Practical Physics		04	07	06	10	09	19	18	23	19	36	32
PHU 2145-Thermodynamics & Radiation		04	17	13	17	16	17	14	33	27	32	26
PHU 3141-Physical Optics		05	00	00	14	11	10	07	00	00	17	14
PHU 3142-Physical basis of Quantum Theory, Theory of Relativity and Solid state Physics		05	09	06	04	03	00	00	13	13	-	-
PHU 3143-Atomic and Nuclear Physics		05	04	04	06	05	00	00	06	05	17	15
PHU 3144-Practical Physics		05	00	00	06	06	04	03	02	02	09	06
PHU 3145-Atmospheric Physics		05	33	33	75	73	112	106	106	99	92	84
PHU 3148-Mathematical Physics		05	44	43	22	19	14	09	22	19	43	34
PHU 3150-Data Acquisition and Signal Processing		05	19	18	13	12	14	11	17	15	25	24
PHU 3152-BioPhysics		05	48	45	51	45	45	38	57	47	-	-
PHU 3153-Literature Survey Project in Physics		05	00	00	02	02	00	00	00	00	01	01
PHU 3254-Research Project in Physics		05	05	04	02	02	01	01	00	00	04	03
PHU 3257-Essentials of Geology		05	32	28	65	55	83	72	86	76	168	148
PHU 3158-Medical Physics		05	68	59	87	81	91	82	169	162	134	121

Annex 3. PROGRAMME AND COURSE DETAILS

The following courses/programmes that are conducted by the Department of Physics

Programme	Level of Study	Course code and course title	Credit rating*	Duration of the programme	Registered student numbers in 2005/06
Foundation			3	2 years	
	1	PSF 1302-Physics I	½		35
	2	PSF 2302-Physics II	½		32
Advanced Certificate in Laboratory Technology			2	Minimum 1 year	
	3	PSC 2324-Laboratory Techniques in Physics	½		15
	3	PSC 2323 Laboratory Organization Management and Safety	1/2		15
B.Sc. Degree			6	Minimum 3 years	
	3	PHU 1141-General and Thermal Physics	1/6		227
	3	PHU 1142-Basic Electromagnetism	1/6		228
	3	PSU 1143-Electronics for Biology Students	1/6		33
	3	CHU 1140 Introduction to Biochemistry and Biophysics	1/6		
	3	PSU 1244-Physics for Biology Students	1/6		15
	4	PHU 2141-Waves, Vibrations and Geometrical Optics	1/6		34
	4	PHU 2142-Advanced Electromagnetism	1/6		44
	4	PHU 2143-Circuit Theory and Electronics	1/6		39
	4	PHU 2144-Practical Physics	1/6		29
	4	PHU 2145-Thermodynamics & Radiation	1/6		38
	5	PHU 3141-Physical Optics	1/6		-
	5	PHU 3142-Physical basis of Quantum Theory, Theory of Relativity and Solid state Physics	1/6		20
	5	PHU 3143-Atomic and Nuclear Physics	1/6		16
	5	PHU 3144-Practical Physics	1/6		-
	5	PHU 3145-Atmospheric Physics	1/6		122
	5	PHU 3146 Atmospheric Dynamics	1/6		-
	5	PHU 3148-Mathematical Physics	1/6		51
	5	PHU 3150-Data Acquisition and Signal Processing	1/6		34
	5	PHU 3152-Biophysics	1/6		54
5	PHU 3153-Literature Survey Project in Physics	1/6		-	

	5	PHU 3254-Research Project in Physics	1/3		03
	5	PHU 3257-Essentials of Geology	1/3		144
	5	PHU 3158-Medical Physics	1/6		155
	5	PHU 3159-Fundamentals of Geophysics	1/6		48

** For a 1/6 credit course, the time expected to be spent on self-study is about 75 hours.*

The workload of an OUSL student who registered for a total of 2 credits courses is approximately equivalent to the workload undertaken by a full time student in a conventional university in one academic year.

Annex 4. RESEARCH PROJECTS OF DEPARTMENT MEMBERS

The following research projects and collaboration research have been carried out by the department members.

- (1) **Topic:** Study of Semiconductor Nanostructures for Optoelectronic Devices
Collaborators/Investigators: Dr. L.S.G. Liyanage, Dr. V.P.S. Perera and Prof. K. Tennakoon (IFS)
Research Students: One student applied for a M.Phil in 2006
Grant: NSF Research Grant (RG/2004/P/03)

- (2) **Topic:** A theoretical study of mechanisms of ionisation, charge transfer and excitation in classical hydrogen atom – bare nucleus collisions in two dimensions.
Collaborators/Investigators: Dr. L.S.G. Liyanage and Dr. G. Bandarage
Research Students: Mr. H.S.S. Peiris (registered for MPhil at OUSL)
Grant: NSF Research Grant RG/2004/C/04

- (3) **Topic:** Study of cooling rates of Sri Lankan Precambrian from Diffusion zoning in Garnets
Collaborators/Investigators: Dr. G.W.A.R. Fernando and Prof. Dr. Sumit Chakraborty (Germany)
Funding: German-Academic Exchange Service, Bonn, Germany and University of Bochum, Germany

- (4) **Topic:** Study of forest die Back in Hakgala Strict Nature Forest Reserve
Collaborators/Investigators: Dr. G.W.A.R. Fernando, Mr. Nalaka Ranasinghe (GSMB), Mr. Sarath Ekanayake, IUCN
Research Students: Ms. Renuka Wimalasena, MSc Student (PGIS)
Funding: Faculty Research Grant, OUSL, GSMB and PGIS

- (5) **Topic:** Heat Treating of Some Non-Gem Quality ‘Geuda’ in Sri Lanka
Collaborators/Investigators: Dr. G.W.A.R. Fernando, Prof. Dr. Wolfgang Hofmeister (Germany), Dr. Tobias Häger (Germany)
Research Students: H. H. D. A. L. Siriwardena (MPhil Student registered at PGIS)
Funding: University of Mainz, Germany, Self Funding from MPhil Student

- (6) **Topic:** The study of Mineralization in and around Matale District aiming at Discovery of new Occurrences and Value Addition Possibilities
Collaborators/Investigators: Dr. G.W.A.R. Fernando and Dr. A. Pitawala, University of Peradeniya

Research Student: Ms. T.H.N.G. Amaraweera (MPhil Student registered at PGIS)

Funding: Through NSF Research Grant RG/2005/EB/01

(7) **Topic:** Arsenic Mobility in Water Sources of Sri Lanka

Collaborators/Investigators: Prof. Dr. Michael Kersten (Germany), Prof. Rohan Weerasooriya, IFS, Hantana, Kandy, Dr. G.W.A.R. Fernando

Research Student: Ms. C.N.B. Wijeratne (PhD Student at University of Mainz, Germany)

Funding: German- Academic Exchange Service

(8) **Topic:** Study of Acid Sulfate Soils in Colombo Suburbs

Collaborators/Investigators: Dr. G.W.A.R. Fernando and Mrs. Sardani Samaranayake (NBRO)

Research Student: Ms. D.I.C. Gurusinghe (M.Sc Student, PGIS)

Funding: NBRO and PGIS

(9) **Topic:** Soil, Rock and Plant Survey of Ussangoda Serpentinite body

Collaborators/Investigators: Dr. M.C.M. Iqbal (IFS), Dr. Cyril Wijesundara (Peradeniya Botanical Gardens) and Dr. G.W.A.R. Fernando

Research Student: Asiri Weerasinghe (Mphil student, PGIS and OUSL graduate)

Funding: IFS and NSF (pending)

(10) **Topic:** Advance Petrological Study of Serpentinite bodies located at the Highland/Vijayan boundary of Sri Lanka

Collaborators/Investigators: Dr. Thilak Hewawasam, (Sabaragamuwa University) and Dr. G.W.A.R. Fernando

Funding: Faculty Research Grant, Faculty of Applied Science, Sabaragamuwa, University

(11) **Topic:** Mitigation of Landslide Harzards in the Upper Kotamale Hydropower Reservoir, Talawakele

Collaborators/Investigators: Dr. Jagath Gunathilake (University of Peradeniya) and Dr. G.W.A.R. Fernando

Funding: Ceylon Electricity Board, JICA