

# **SUBJECT REVIEW REPORT**

**DEPARTMENT OF  
FOOD SCIENCE AND TECHNOLOGY**



***FACULTY OF AGRICULTURE  
UNIVERSITY OF PERADENIYA***

08<sup>th</sup> to 10<sup>th</sup> March 2006

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## **1. PURPOSE AND AIMS OF THE SUBJECT REVIEW**

The subject review evaluates the quality of student learning experience in terms of its management and quality assurance at programme level. This report examines the quality of academic programmes offered by the Department of Food Science & Technology (DFST) in the Faculty of Agriculture of the University of Peradeniya. The review was carried out using the process recommended by the CVCD and the UGC, laid down in the Quality Assurance Handbook for Sri Lankan Universities, published in July 2002.

The review team consisted of Prof S Widanapathirana, Senior Professor of Microbiology, Faculty of Science, University of Kelaniya (Team Chair), Prof NR de Silva, Professor of Parasitology, Faculty of Medicine, University of Kelaniya, and Dr KKDS Ranaweera, Senior Lecturer in Food Science and Technology, Faculty Applied Sciences, University of Sri Jayawardanapura. The review visit took place on 8 – 10 March 2006.

The specific aspects examined were as follows:

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

The primary source of documentary information for this subject review came from the self evaluation report submitted by the DFST. The review team was also provided with a variety of documents which included the Faculty of Agriculture handbook for 2004 / 2005, the detailed curricula for B.Sc. Agriculture (BSc Agric) students majoring in Food Science & Technology, and Bachelor of Food Science & Technology (BFST) degree students, teaching materials (transparencies, CDs, videos etc) samples of student work (student reports and practical reports), end of course assessments (question papers, marking schemes, answer scripts), feedback from undergraduate and postgraduate students, peer observation and academic guidance and counselling.

The review team had very useful discussions with the Dean of the Faculty, the Head, DFST and other academic staff members, undergraduate and postgraduate students, and supporting staff in the department and student counsellors. Members of the team also visited lecture theatres, laboratories, the Agriculture Library, computer rooms and staff rooms. The review team was able to observe 2 lectures and 2 practical classes.

On the last day, the review team had a final meeting with the entire academic staff of the department to discuss and verify the observations and judgments made by the team.

## **2. THE UNIVERSITY AND DEPARTMENT UNDER REVIEW**

### ***2.1 University of Peradeniya, Faculty of Agriculture***

The University of Peradeniya is one of the largest and oldest universities in Sri Lanka, with 7 faculties of study, and a current undergraduate student population of about 9500. The B.Sc. Agriculture degree programme at Peradeniya started in 1947, five years after the university was established. In 1973, an independent Faculty of Agriculture was established, with six departments of study. Since then, the Faculty has created two more departments of study, including the Department of Food Science and Technology and the Department of Soil Science.

### ***2.2 The Department of Food Science & Technology (including staff and facilities)***

The DFST was established in 1986 with a view to strengthening Food Science education, a function which was previously carried out by the Department of Agriculture Chemistry. At present, the academic / teaching cadre consists of one Senior Professor, one Professor, five Senior Lecturers (including one temporary Senior Lecturer), and 2 probationary lecturers (both currently on study leave overseas). Three academic staff positions are vacant at present; two of these being recently granted by the UGC, with commencement of the new BFST programme. Supporting staff consists of one Temporary Assistant Lecturer, 6 Temporary Demonstrators, one Senior Staff Technical Officer, 3 Technical Officers, 2 laboratory attendants, a clerk, a driver and a labourer.

The DFST has an auditorium that can accommodate 50 students and another lecture room for 25 students next to the Food Chemistry Laboratory. There is one large laboratory able to accommodate 40 students, and 4 other smaller laboratories that can accommodate 5 - 10 students at a time. It also has 2 computer rooms (one each for students and staff) and 2 instrument rooms. Audio-visual equipment for teaching includes overhead projectors in all lecture halls and laboratories, and one multi-media projector. The laboratories are well-equipped, owing to 2 large grants received in 1998 (JAICA) and 2002 (ADB), but space is inadequate, and they are scattered in many different places in several buildings. It is expected that infrastructure facilities will improve with completion of the Department's new 4-storey building which is currently under construction.

Library facilities are provided through the main Agriculture Faculty library, which has an extensive collection of books (including about 700 titles in Food Science & Technology). Currently, the Agriculture Library subscribes to about 30 periodicals at present, of which about 5 are related to Food Science & Technology.

### ***2.3 The degree programmes***

#### ***2.3.1 B.Sc. degree programmes***

Students on the BSc Agric degree programme have been able to major in Food Science and Technology for many years. In 2004, however, the Faculty introduced an additional degree programme titled Bachelor of Food Science and Technology (BFST), to meet an increasing demand from the food industry. About 200 students are currently accepted each year for the BSc Agric degree programme, and about 20

of these students major in Food Science and Technology. Another 20 students are selected separately by the UGC, for direct admission to the BFST programme. Courses conducted by the DFST account for 8% of core courses on the BSc Agric degree programme; 80% of courses for BSc Agric students majoring in FST; and 67% of courses for the BFST programme.

### *2.3.2 Postgraduate degree programmes*

The DFST also conducts four postgraduate programmes (MSc in Food Science & Technology, MSc in Food & Nutrition, MPhil and PhD) through the Board of Study in Food Science & Technology at the Postgraduate Institute of Agriculture. The current review evaluates the DFST's contribution to both undergraduate degree programmes.

## **3. AIMS AND LEARNING OUTCOMES OF THE PROGRAMME**

As described in Chapter 2 of the Self-Evaluation Report, the DFST has laid down 2 separate sets of aims for the two degree programmes. They are as follows:

### *B.Sc. Agric degree – majoring in Food Science & Technology*

The aim of this programme is to provide basic Food Science & Technology knowledge and skills to agriculture graduates so that they could combine the concepts on production of agricultural raw materials suitable for quality processing.

At the end of the degree programme, students should

- a) Possess the abilities and attitudes to successfully fulfill current and emerging tasks in the public, non-government and private agriculture sectors
- b) Be able to establish and manage socially, economically and environmentally appropriate agricultural enterprises
- c) Be able to design, conduct and analyze research relevant to the agriculture sector
- d) Be able to critically evaluate situations, think creatively, work in a team and provide dynamic leadership

### *BFST degree programme*

The aim of this programme is to produce graduates capable of handling the technical supervisory, marketing and managerial functions of the food industry and take up research leading to new product development.

At the end of the degree programme, students are expected to be able to

- a) Apply scientific agro-processing concepts in the food industry
- b) Explain the nutritional role of identified foods
- c) Demonstrate professionalism through attitudes and activities
- d) Apply high technical and research skills and abilities to food processing
- e) Demonstrate personal, managerial and leadership characteristics in performing their duties

## **4. ASPECTS UNDER REVIEW**

### **Summary of overall judgment**

The review team is pleased with the performance of the Department of Food Science and Technology in all 8 aspects of education under review. Based on the positive features in all 8 aspects, the overall judgement on the subject Food Science & Technology is rated as 'confidence'.

#### ***4.1 Curriculum design, content and review***

The curricula of both degree programmes under review are constructed on a semester-based course unit system. All BSc Agric students follow a core programme for 5 semesters. On successful completion of this course, there is provision for students who desire to major in Food Science and Technology, to follow a curriculum offered by the DFST for the next 3 semesters. Students are selected to the Dept by the Dean's Office, based on prior merit. On the other hand, students entering into the BFST programme are selected by the UGC on an all-island Z-score performance at the GCE Advanced Level examination. They enter the DFST directly as first year students and follow a curriculum that is mostly conducted by the DFST.

The reviewers noted that both groups of students follow well-structured series of basic and advanced interdisciplinary and multidisciplinary course units of high academic quality throughout their student career. The students of the BSc Agric degree programme following FST modules are provided with requisite subject knowledge, transferable skills and managerial skills, in addition to the basic skills acquired during the various core modules.

The BFST students receive a specialized training through their curriculum. The course modules provide an excellent coverage of basic sciences, food science and all aspects of subject and practical knowledge required for the food industry. The BFST programme curriculum contains some optional course units in Semesters 5 – 7, which provide a certain degree of flexibility and choice for students.

The BFST degree curriculum has been designed on concepts and guidelines recommended by the Institute of Food Technology of the USA, and also based on course contents for university degree programmes in Food Science and Technology, recommended by the Committee of University Professors of Food Science and Technology of the UK. The review team noted that in terms of content, depth and quality of student learning outcomes, this curriculum is on par with similar degree programmes in UK universities. It also offers opportunities for higher education, internationally.

The curriculum for BSc Agric students majoring in FST includes several industrial visits. Their research projects are frequently planned and carried out in the industrial setting. More exposure to the industrial environment is built into the BFST degree programme, through their Task Project in the 1<sup>st</sup> semester, subsequent industrial visits, and the research project. The reviewers are of the opinion that both curricula facilitate progression to employment of graduates.

### *Curriculum review*

BSc Agric programme has recently been reviewed by the Faculty, and a new curriculum has been formulated, and will be put into effect from the next intake of students.

The BFST degree programme, which was launched only 2 years ago, will be reviewed in 2008, when the first intake of students has completed the degree programme. The Dept intends to revise and update the curriculum taking into consideration the views of the food industry, employees, and alumni as well as feedback from past and present students.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'good'.*

### **4.2 Teaching, learning and assessment methods**

The above aspects of the DFST were evaluated using (a) the Self-Evaluation Report (b) peer observation of lectures and laboratory practical classes, (c) meetings with academic and supporting staff and students. The review team also examined the Agriculture Faculty handbook, time tables, project reports, question papers, marking schemes, and answer scripts.

The review team noted that courses are delivered through a combination of lectures, practicals, discussions, assignments, group work, video and PowerPoint presentations, and field / industrial visits. The review team was happy to observe that the BFST students in particular, are provided at the beginning of each lecture or practical course, detailed information on expected learning outcomes (in terms of knowledge, skills and attitudes) outline of course content, resources available in the DFST, assessment strategy and a list of reference material. The document provides very clear information regarding expected learning outcomes, skills to be achieved, and assessment strategy to students, staff and any outsider. The current teaching - learning and assessment methods appear to facilitate achievement of the stated aims of the department.

It should be mentioned that during the meeting between the review team and the students, the latter expressed general satisfaction with the courses conducted by the DFST. However, they also expressed concern regarding the lack of a practical component in some areas (e.g. Microbiology) and a heavy workload in Semester 6 due to the large number of course units they have to offer. They also said that there was some undue delay in releasing examination results, but added that this delay was probably at Faculty level, rather than at Departmental level.

The review team noted that students' evaluation of teachers, peer observation of teaching activities, etc, are used regularly to improve the teaching learning process. The team was happy to note that the DFST has adopted an innovative technique described in the international literature, for students following the practical course on Product Development to evaluate each other. This technique results in a quantitative measure of ability of students to function in a collaborative manner. It has been used to change the attitudes of students towards their colleagues in an effective manner.

It also found that all question papers are routinely moderated in the department (often by the Senior Professor) and scrutinized by a Scrutiny Board consisting of all academic members of the DFST. However, there was no evidence of involvement of any external examiners in the assessment of students, except in evaluation of the research projects. The review team was informed that this was a decision of the Faculty Board of the Faculty of Agriculture. The review team felt very strongly that external examination in the assessment system is a vital component of quality assurance and recommends that such practices should be adopted.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'satisfactory'.*

#### **4.3 Quality of students including student progress and achievements**

Students are admitted, on their choice, to the DFST from the GCE Advanced Level Examination Agriculture Stream granted admission to the Faculty of Agriculture. The DFST strongly maintains that the Peradeniya University Agriculture Faculty has been able to attract students with the highest z-scores from among those who opt to follow agriculture degrees in Sri Lankan universities. Students admitted directly by the UGC to the BFST degree programme have an even higher z-score. Students admitted to the BSc Agric degree programme must have offered Chemistry, Biology and Physics or Agriculture at the A level examination, while admission to the BFST programme requires Chemistry, Biology and Physics. Thus students admitted to both degree programmes are well-prepared to complete the programme successfully.

The Faculty of Agriculture and the DFST employ various strategies to enhance the quality of education and enable students to achieve the expected learning outcomes. The Self-Evaluation Report states that rates of completion are high, and numbers of dropouts are very low or insignificant. However, no statistics have been presented in support of this statement. High completion rates suggest that students achieve the stated aims and desired learning outcomes, and thus maintain satisfactory academic standards. In any event, the research reports, practical record books and marked answer scripts provided the review team with sufficient evidence that intended learning outcomes are being achieved.

Since students who have entered the new BFST degree programme have not yet completed their period of study, statistics on their final achievement are unavailable. However, comparison of these students with the BSc Agric students appears to indicate that the performance and achievement levels of the BFST students are relatively higher. The number of students who obtain honours in the final degree are generally high among the FST major students. However, the review team noted from the data presented in the Self-Evaluation Report, for the last 5 batches of students, no-one who has majored in FST has secured First Class honours. This issue was also raised by the students in their discussion with the review team, when they noted that in comparison with other universities, students in the Agriculture Faculty at Peradeniya are very rarely awarded First Class honours.

The review team is of the opinion that the quality of students and their progress and achievement are in keeping with the stated aims and objectives of the DFST.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'good'.*

#### **4.4 Extent and use of student feedback**

From the documentation provided to the review team and the discussions held with students, it is evident that the DFST encourages direct and indirect feedback from students, using a variety of approaches. Direct feedback includes question time during lectures, feedback on experiences in carrying out assignments in the field and industry, student performance on given assignments, and practicals. An innovative technique practiced by the DFST in order to obtain feedback is the use of 'micro-theme' questions during lectures. Indirect feedback on student performance is also obtained through discussions with the temporary demonstrators, who assist in practical classes. In discussions with the academic staff, they were able to provide many examples of how teaching practices had been changed as a result of feedback from students

All students in the Agriculture Faculty have been asked to formally evaluate their teachers' lectures and practical classes using a standard questionnaire, as a routine practice since 2003. The teachers distribute the questionnaire to the students, and the completed forms are taken by a student representative to the Dean's office, where the responses are entered on a computer (including general comments). The analysis is returned to the teacher concerned. Several such analyses were made available to the review team.

The DFST has also devised a method to obtain feedback from graduates about the course content, practicals, teachers' availability and time allocated for the courses followed by students of the BSc Agric degree programme who majored in FST.

However, the review team noted that the DFST does not have a dedicated student / staff liaison committee. It recommends that such a committee is set up, with representation from all batches of students following courses taught by the DFST, in order to facilitate bilateral communication between students and staff.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'good'.*

#### **4.5 Postgraduate studies**

Postgraduate studies in the DFST are carried out through the Board of Study in Food Science & Technology of the PGIA. The BOS offers MSc degrees by course work and MPhil / PhD degrees in two disciplines: Food Science & Technology and Food & Nutrition. At present the MSc courses have about 20 students each. There are 3 MPhil students and one PhD student. All postgraduate courses are offered on a fee-paying basis, and students are required to bear the course fee.

The review team is satisfied that the DFST possesses sufficient infrastructure facilities and equipment to conduct postgraduate research projects, and provides adequate supervision for postgraduate students. However, only one student has registered for a PhD over the last 4 years. The team also noted that in general, the completion rate of the postgraduate degrees was low.

The DFST obtains feedback from postgraduate students about the courses followed by them, and the performances of their teachers with the help of a pre-prepared Course and Teacher Evaluation Form. It was also evident that the DFST often collaborates with the food industry in planning, conducting, and supervising research projects.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'good'.*

#### **4.6 Peer observation**

The DFST has evolved several mechanisms to monitor the quality of teaching provided to their students and has a mechanism to use the feed back to enhance the quality of teaching.

The review team was pleased to find evidence of peer evaluation of teaching by colleagues in their own department, also by undergraduate and postgraduate students. As per the materials provided to the review team, all the permanent staff members have been subjected to observation while teaching, by other members of the Dept. The review team found it noteworthy that the Senior Professor himself has also been subject to observation by his colleagues. Several very valuable and constructive comments have been made in this process, including getting the students to be more interactive, giving little breaks at regular intervals etc. There was also evidence that the DFST used feed back and comments made by those in the food industry and their graduate students, to improve the quality of education through curriculum revision, and in character building of students. The review team was impressed by the cooperation given by academic staff and students in the implementation of an effective peer observation mechanism.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'good'.*

#### **4.7 Skills development**

There is ample evidence that the 2 undergraduate academic programmes conducted by the DFST are structured in such a way as to provide opportunities for students to develop a variety of skills in addition to subject-specific knowledge. The laboratory experiments planned in some modules give the students hands-on experience in setting up experiments, making observations, and in arriving at justifiable conclusions. There is a mechanism for continuous evaluation and assessment of students' laboratory reports as well as project reports, and for guiding them to improve their writing skills.

Both groups of students, i.e. BSc Agric students majoring in FST as well as the BFST students are provided with excellent opportunities for development of presentation skills through various activities such as proposal formulation seminars, the Task Project, the research project, and various other subject-specific seminars. There was evidence that students have the opportunity to use modern audio-visual equipment for their presentations. The DFST believes that working in the Task Project, laboratory practical classes, participating in field visits and exhibitions, enables students to acquire team work skills and leadership skills, as well as the

ability to think critically. The DFST has regular correspondence with the agri-food industry and related institutions (e.g. Milco (Pvt), Kist, CRI, ITI, Harischandra etc). The review team was convinced that the DFST encourages such activities among students.

The review team understands that all students are provided with a document that gives details of the academic content, assessment methods and type of skills expected in each course module. The assessment strategies used by the DFST evaluates the variety of skills mentioned above. These are all very positive aspects of skills development strategies adopted by the DFST.

*The reviewers rate this aspect of the Dept of Food Science and Technology as 'good'.*

#### **4.8 Academic guidance and counseling**

Students are provided with necessary information with regard to academic programmes offered by the DFST in the Faculty prospectus and the website. On selection to the majoring module, the students are also provided with more information with regard to courses offered. At the beginning of each course, the lecturer provides students with information on the aims, desired learning outcomes, nature of assessments, and references for the course he / she conducts. Similarly, students are also provided with information necessary for using laboratory facilities including laboratory safety and rules and regulations. The team noted that students were generally satisfied with the assistance and support extended by DFST staff to students over problems related to academic matters.

All students admitted to the Faculty of Agriculture are assigned to a voluntary advisor from academic staff members. Student Advisors meet with their students immediately after admission, and are available to their assigned students in the event of any personal problems. Students with significant personal problems are referred to a Student Counsellor either in the Faculty or in the Career Guidance Unit, which also has a trained counselor. The Faculty has five designated Student Counsellors with varying levels of training in counselling. General career guidance is provided by the University Career Guidance unit. Students were aware of the existence of such a unit, although most did not have a clear idea of the services offered by it.

The review team was happy to note that there is a mechanism by which needy students are provided with financial support through the Needy Students Fund managed by the Dean, with guidance from Student Counsellors.

The review team is satisfied that there are mechanisms in place to address the students problems and requests through academic guidance and counseling, and would like to rate this aspect as **'good'**.

## 5. Conclusion

<b>Review Aspect</b>	<b>Review Judgement</b>
Curriculum design, content and review	Good
Teaching, learning and assessment methods	Satisfactory
Quality of students, including student progress and achievement	Good
Extent of student feedback	Good
Postgraduate students	Good
Peer observation process	Good
Skills development	Good
Academic guidance and counseling	Good

Overall Judgment - Suspended