SUBJECT REVIEW REPORT

DEPARTMENT OF MECHANICAL ENGINEERING

FACULTY OF ENGINEERING
UNIVERSITY OF MORATUWA

27th to 29th December 2005

Review Team :
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CONTENTS

1. SUBJECT REVIEW PROCESS

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

Subject review process at the Department of Mechanical Engineering (DME) of the University of Moratuwa was conducted following the guidelines provided in the Quality Assurance Handbook for Sri Lankan Universities, published by the CVCD and University Grants Commission in July 2002. The quality of education was reviewed according to the aims and learning outcomes given in the self-evaluation report of the Department.

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

- Curriculum design, content and review;
- Teaching, learning and assessment methods;
- Quality of students including student progress and achievements;
- Extent and use of student feedback (both qualitative and quantitative);
- Postgraduate studies;
- Peer observations;
- Skills development;
- Academic guidance and counseling.

The review team visited the department for three days, namely 27th, 28th and 29th December 2005. The agenda of the three-day visit is given in Annex 1. The information related to the above eight aspects were collected by:

- Having discussions with the Dean, Head of the Department, members of the academic and non-academic staff (see Annex 2 for persons attending) and a student group comprising 38 undergraduate & 08 postgraduate students.
- Peer observation of the teaching process (see Annex 3)
- Observing the facilities at the Department (see Annex 4) and
- Examining the documents provided by the Department (see Annex 5).

Each of the eight aspects was judged as good/satisfactory/unsatisfactory, noting the strengths, good practices and weaknesses in each. Considering the judgment of the eight aspects, an overall judgment is reported at the end of this report selecting one of the three options; confidence/limited confidence/no confidence; in the academic program.

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

History of the University of Moratuwa dates back to 1972. The technical college that had existed in this location has later been converted to a degree-awarding institute. Department of Mechanical Engineering (DME) was established in 1969 under the Ceylon College of Technology, but has its origins in the Ceylon Technical College, dating back to 1893. The

DME is one of the oldest and largest academic departments in the Faculty of Engineering, University of Moratuwa (UoM), which offers the Honours Degree of Bachelor of Science of Engineering (BSc Eng (Hons)), number of postgraduate research and taught-course Degree programmes and National Diploma of Technology (NDT) through Institute of Technology of UoM (ITUM). Over the years the DME has effectively contributed to the overall academic programmes of the Faculty at undergraduate and diploma level through its significant input to the common core subjects. The planning and execution of activities of the DME are performed under 5 academic sub groups namely:

- Design and Manufacture
- Industrial Engineering and Management
- Machine Dynamics and Control Systems
- Thermo-Fluids and Energy studies
- Marine and Nautical studies

Current (2006 First Semester) annual intake of the Faculty of Engineering is about 745 students and they follow a common course during the level 1 study. From level 2, students specialize in Mechanical Engineering (ME) and the current intake to the department is 70. This will be increased to 90 students once the buildings come up (by 2007), with the IRQUE project grants. Further the department offers research degrees PhD and MPhil (Fulltime/ Part time) MSc (Full time) and M.Eng/ PG Diploma in Energy Technology and Manufacturing Systems Engineering aimed at practicing engineers.

At present (2005 December) there are 24 Academic Cadre positions, 01 Systems Engineer, 10 positions for Technical Officers, 6 Technical Assistants (01 Boiler operator, 01 Motor Mechanic, 01 Machinist, 02 Electronic Repairmen, 01 Computer Systems Assistant), 11 positions for Laboratory Attendants and one Clerk and one Office Attendant. The department has10 laboratories, a Design and Draughting Center, CAD/CAM/CAE machining centre and a computer centre. The students have access to the computing facilities in the university main library. The DME has recently acquired latest simulation software, instrumentation and computer interfaced test-rigs.

In addition to the books in the University main library, two small collections (for research and project students) are available in the department.

3. AIMS AND LEARNING OUTCOMES

3.1. Aims

The aim of the department is to provide theoretical and practical knowledge of Mechanical Engineering and related topics for its useful applications in the industry, commerce and society. The degree program produces high quality graduates for careers in industry, as practicing engineers and scientists having due awareness of the social, economic and environmental aspects of mechanical engineering/ mechatronics.

In this context the aim of the DME is to provide;

- An undergraduate program, which provides the student with a broad understanding of the Mechanical Engineering (ME) complemented by an application oriented practical program and industrial training, enabling the students to develop skills to face the challenges and cater to needs of the society.

- Postgraduate degree courses to provide advanced knowledge and understanding on ME and mechatronics in order to prepare the students for further research studies and careers in industry.
- A range of learning opportunities within the semester system, enabling students to gain theoretical and practical knowledge on ME.
- Opportunities for students to develop competence in oral and written communication, information technology and communication technology skills that will enable them to meet the needs of the prospective employers and to contribute effectively in their chosen careers.
- A friendly and a responsive environment in the department by improving the staff student and student- student interaction.
- Opportunities for students to gain knowledge on non-technical subjects.
- A good learning environment and encouragement for the students by providing awards and bursaries, enabling students to concentrate on realizing the core objectives.
- Opportunities to develop and maintain links with the industry internally as well as externally for mutual benefit.

3.2. Learning Outcomes

Expected Learning outcomes in the degree programme in DME

On successful completion of the Degree programme in Mechanical Engineering (ME), students should be able:

- To understand principles of ME and apply the knowledge in related industrial applications.
- To develop skills in problem analyzing, design and implementation related to ME.
- To foster the development of knowledge in ME through research and innovation.
- To develop leadership, organizational and teamwork skills.
- The undergraduate students will also satisfy the academic requirements for Associate Membership of the Institution of Engineers, Sri Lanka (IESL) and membership of Institution of Mechanical Engineers in United Kingdom (I.Mech.E UK).

4. FINDINGS OF THE REVIEW TEAM

4.1. Curriculum Design, Content and Review

Good Practices in Curriculum Design, Content and Review

- Regular Curricular Revisions, more recently in 2000 and 2004. [Sources: Self Evaluation Report, Presentation by the DME, Discussions with academic staff]
- Stakeholder (Industry, Graduates, Students) involvement in Curriculum Revision [Sources: SER, Meeting with Staff]
- Addressing the modern trends (e.g. Mechatronics, Robotics and Biomedical Engineering) [Sources: SER and Discussions]
- Industry leader position in teaching and research in many areas of Mechanical Engineering [SER, Presentation and Discussions]
- Ability to select courses from a wide variety of subjects to suit individual student interests and aptitude.
- Incorporation of regular industrial visits to give students an exposure to the real world of work.

The curriculum of the DME, which was developed initially in late sixties, has been revised several times to meet the relevant issues of the Sri Lankan industry. In year 2000, UOM Engineering Faculty moved from the three-term system (old curriculum) to the credit based semester system. In this semester system students have to earn a minimum total of 150 credits out of which 135 are GPA credits and 15 are non-GPA credits, during the four-year period. These 135 credits have to be earned from Basic Engineering subjects, Core Mechanical Engineering subjects and specific role oriented subjects. The course reflects modern concepts of engineering education and training, incorporating both communication and management skills together with a significant design element. Design is integrated throughout the curriculum, beginning with the first-year engineering course and continuing through the higher levels, with a comprehensive design project in the final year. The design project aims to enhance creative and innovative skills of the students whilst giving them an opportunity to apply their knowledge into practice.

The undergraduate curriculum of the DME has a mandatory six-month industrial training period (6 non-GPA credits) beginning from semester 2 of Level 3 (Source SER, page 20). This gives the students practical experience in industry, complements the academic components of the undergraduate curricula and prepares them for a more mature approach to their final year of study. As understood by discussion with the Faculty and students, the students gain useful skills and work experience valued by prospective employers, during this period of industrial training.

The curriculum is enriched through subjects with a presentation component to improve communication skills at each level. In addition, skills required in the areas of management and IT, are also imparted through a number of related subjects enabling the graduates to fit into industry with minimal further training. Further, the department has introduced a number of electronics based course modules to produce graduates with a strong electro-mechanical background who are highly employable in the present day industry.

The students are also given a comprehensive knowledge in the field of mathematics so that they have a good mathematical background, useful in the study of engineering and its applications, in their future careers.

The present ME degree program is accredited by the IMechE (UK) and the Institution of Engineers, Sri Lanka. The current IMechE accreditation is valid for the 2003, 2004, 2005, 2006 and 2007 intakes of students.

As indicated by the DME, the latest progress in the curriculum development was the restructuring of the departmental curricula. This was done in year 2004 in order to get the study program accredited by the UK Institute of Mechanical Engineers (IMechE) to get international recognition and to attract and create jobs for the graduates. A feedback was also taken from the staff, DICB (Department Industry Consultative Board) and the first batch of students who completed the semester system. The revised curriculum has been proposed to the Engineering Faculty of UOM and the level two students are already following the revised new syllabus (December 2005). It was noted by the study team) that the department is planning to expand the curriculum further with more electronics based subject modules and with the introduction of Aeronautical Engineering subjects in future.

The Review Team was satisfied with the depth and breadth of the syllabi covered in the undergraduate programme. It was of the opinion that the curriculum is of a sufficiently high standard and the provisions in place for regular revisions of the curriculum are satisfactory.

4.2. Teaching, Learning and Assessment Methods

4.2.1 Teaching & Learning

Teaching activity in most subjects is based on lectures, experimental classes, tutorials, project assignments, and Industrial training. Methodology of lecturing adopted by the lecturer was seen to be aided by one or a combination of; green/white board, overhead projector, multimedia and printed lecture notes. The observed lectures seemed to be well prepared, delivered well and met the stated learning outcome. The students were learning by listening, seeing, taking down notes and by discussion. The length of a lecture is 2 hours and this duration should be reviewed in future, to fit in to a guideline by the UGC.

Experiments are designed to develop data recording, calculation, analysis and interpretation skills. Practical classes were observed being carried out in groups of students varying from 2-12 per group. Group size depends on the time and resources (lab and human) availability. The QA review team felt that students may not get the expected benefit of the lab session due to resource limitations, particularly when large groups of students are accommodated during lab sessions for level 1. The reviewers observed the practical classes being conducted and guided by an instructor rather than an experienced academic. Providing instruction sheets prior to the scheduled time and the presence of a senior lecturer in practical classes would have been beneficial. The reviewers were concerned about the non-availability of standard lab safety practices.

Good Practices about Teaching and Learning

- Teaching and learning are carried out through a combination of methods such as lectures, tutorial assignments, practical classes, industrial visits, industrial training [Sources: SER, Discussions with students and staff]
- Level 3 innovative design – where the students are guided to applied design and innovative thinking
- Level 4 comprehensive design project – application of learnt theories to do a practical design [Sources: SER, Discussions with staff]
- Uniform assessment method for the Faculty. For most course units 30% for CA and 70% for ESE. [Sources: Performance Criterion, SER, Discussions]
- Dean's List – providing encouragement for students obtaining GPA greater than 3.8 [Sources: SER, Discussions].
- One-week period allowed between the Department Meeting and Board of Examiners, allowing students to appeal for re-correction. [Source: SER, Discussions with students and staff]
- Sometimes the examiners are allowed to change the range of marks for grades, on their judgment. (No rigid range) [Sources: SER, Discussions with staff]

Weaknesses observed in Teaching and Learning Methods

- Senior Lecturers/Lecturers are not present at practical classes; most of the time instructors conduct experiments [Sources: Observations; Discussions]. The instructors

may not have had hands on experience on the practical they teach, being only observers as students. The Technical staff reported (on rare occasions) having to teach the Instructor first, so that the Instructor can teach the students.

- Lab safety for students has to be improved [Sources: Observations in lab classes]

- Scheduling of practical classes more towards the end of semester, burdening the students with heavy workload closer to the period of end-semester examinations. It was noted by Academic staff that after allowing for add-drop 2 weeks period to allow the final class lists to be prepared, the lab scheduling is pushed to the third week onwards.

- Insufficient laboratory space to carry out practical classes for large groups of students.

- Limited access to computer facilities and the Internet.

It was revealed from the discussion with staff and students that industrial visits are arranged for the students to observe application of the theories that are taught in the University and for them to understand better and engrave those theories in their minds.

Students undergo a six months industrial training period at the end of Level 3 Semester 1. (i.e. during the Level 3, Semester 2). This enables students to experience in-plant work in an area of their preference within the ME programme.

As per the details available for the review team, the final year students carry out a Comprehensive Design Project enabling them to apply the mechanical engineering and other design theories learnt. This allows development of specialization required for successful execution of engineering projects.

The review team also witnessed the availability of Internet and Intranet containing useful information for students. This facility is expected to enhance student's self-learning abilities.

4.2.2 Assessment Methods

In the DME program different assessment methods are used to determine the achievement level of the stated learning outcomes. The performances of each student in most of the modules are evaluated by continuous assessment and by an end of semester examination. In most modules the continuous assessment component carries 30% and the end of semester examination 70% of the total marks. The continuous assessment of a student is done based on their laboratory practical class reports, assignment reports, case study presentations, factory visit reports, quizzes and mid-term tests. All candidates should obtain at least 40% of the continuous assessment marks at all levels to qualify to sit the end of semester examination. The end of the semester examination assesses student's knowledge transferred during lectures and information gathered from reading material. Examinations are designed to test the student's ability to perform under time limitation without referring to their lecture notes or any other material. Examination questions take different forms such as, short notes, essays, numerical problems, results interpretation and multiple-choice questions. A minimum requirement of 20% should be obtained from the end of the semester examination in order to obtain a pass for a module. This is a University requirement applicable for all modules. The results are given to students in writing.

Good Practices in Assessment Methods

- Progress monitored at the Dept. level; students are allowed to appeal for re-corrections. . [Sources: SER, Discussions with students and staff]
- Dean's List – continuous encouragement for improvement for students obtaining a GPA above 3.80 [Sources: SER, Discussions with Dean and HoD]
- High achievements at the end with most of the students completing the course with Honours, within five years [Sources: SER; page 26, Discussions with Staff]

Assessment of all the courses has been done uniformly throughout the Faculty and it is clearly stated in the Performance Criterion given to all students.

It is made clear that internal moderators, to ensure questions are clear, relevant and the coverage is appropriate, moderate examination papers. The answer scripts are marked anonymously according to the marking scheme prepared by the examiner and the answer scripts/marks are moderated by the same moderator for the module. The review team appreciates the fact that marks are displayed on the notice board and the students are given a chance to apply for re-correction within one week.

On the basis of its observations, the review team considers that overall teaching, learning, and assessment aspects are good.

4.3 Quality of Students, Including Student Progress and Achievements

Students who apply for the DME have to be first selected to the Faculty of Engineering, University of Moratuwa, by obtaining the required Z score for the physical science stream for the respective year. Out of the three Engineering Faculties in Sri Lanka, University of Moratuwa is the preferred choice of students in the merit list. About 50 of the first year students are leaving the course preferring other foreign scholarships (e.g. Australian undergraduate scholarships) available based on performance in the G.C.E. Advanced Level Examination. Students who are enrolled in the Faculty of Engineering follow a general engineering course of study conducted by the Faculty of Engineering and supported by all the departments.

On the basis of the results of the semester two examinations in Level 1, the students are given the option to select their preferred program of study. The marks of the English language test are not considered in streaming. A total of 70 students are selected to DME out of a total engineering student population of 745.

Usually the Output/Input ratio will be > 0.95. This is in common with other study programs of the university. As a well recognized institute, there is a great preference for entry and with entry; the intention is to complete the program within the minimum period possible. As seen in page 26 of SER, the length of undergraduate study is between 4.5 – 5 years. Those who enter, normally leave the course after completing more or less on time. This shows that the students are adequately prepared to complete the program satisfactorily.

Student performance is monitored at the end of each semester by calculating a SGPA to enable students to assess their own progress, to establish whether they are experiencing problems, and to ensure that they are suitably equipped to proceed to the next year of study.

The students who have performed poorly but yet passed are given an academic warning and restricted in their choice for optional subjects.

A high level of success is achieved by students on DME program. In the year 2005 October (E/01 batch), 3 out of 67 students (4.5%) obtained First Class pass. 34 students (50.7%) obtained Second uppers and 24 students (35.8%) of the students of the same batch obtained a second-class lower division pass. The number of incompletes is only 6 (9%) in E/01 batch. (Source: Results sheets provided by the DME)

In the first batch under semester system (E/00 batch), no students out of 59 obtained First Class pass. 13 students (22%) obtained Second uppers and 36 students (61%) of the students of the same batch obtained a second-class lower division pass. There were 5 general passes (8.5%) The number of incompletes was only 5 (8.5%) in E/00 batch. (Source: Results sheets provided by the DME).

Students who obtain a GPA greater than 3.8 are included in the "Deans List". This serves as an incentive for students to strive for greater achievement.

Considering all the above the review team judged this aspect as good.

4.4 The Extent and Use of Student Feedback

Qualitative student feedback is obtained by Informal discussions between students and level coordinators, Informal discussions between students and academic advisors, Final year student feedback forums, Student/ staff liaison committees, Quality circles etc.

The students get the opportunity to discuss any academic or personal matters with their academic advisors, who are appointed by the Head of DME. Each academic advisor is responsible for a group of students throughout their studies at DME.

Qualitative student feed back is obtained through discussions at the student/staff liaison committees at the faculty level and the departmental levels. The departmental student/staff liaison committee is chaired by the Head/DME and the level coordinators and the batch representatives are met regularly to discuss the issues related to the subjects offered by the mechanical engineering department as well as other departments such and Computer Science and Engineering, Management of Technology and Mathematics.

4.5 Post Graduate Studies

The Department of Mechanical Engineering offers five different postgraduate degree programmes. PhD by research, M.Phil. by research M.Sc. by research, M. Engineering degree by course work and post graduate diploma (PG.Dip.). These programmes could be followed either on full time basis or on part time basis as indicated in the SER (M.Sc. is Full Time only). At the moment there is quite a number of postgraduate candidates registered under different degree categories. It is a well-structured programme of studies governed by a higher degree committee responsible to the Faculty of Engineering, presently chaired by Prof. N. Rathnayake with its 14-member committee.

The progress of each research student is regularly reviewed by the progress review committee, comprising project supervisor, research coordinator and the field expert

nominated by the Head of the department. Candidates who qualify remain in the programme while the others are considered dropouts. Almost all the postgraduates are funded by a project. But some postgraduate students informed us that the funds are very often inadequate. Funding agencies are both local and foreign in nature.

The review committee is of the opinion that most of the postgraduate students are very dedicated and committed and apply themselves strongly amidst all odds. The facilities available to them are not adequate but still they could manage and are happy with the working environment. They complain only about their access to Internet and the need for improvement in access and space.

Generally graduates are very happy with their supervisors as they feel that they get the fullest and utmost support from supervisors. Therefore with a little bit of improvements in terms of facilities the postgraduate degree programme will have a bright future at the DME.
The review committee therefore feels that this aspect should be graded as good.

4.6 Peer Observation

The Department of Mechanical Engineering of the Faculty of Engineering of Moratuwa University has its own mechanism for peer evaluation. They are doing that on an informal basis for quite sometimes, but with the emphasis on the subject. The DME has prepared a set of forms with the necessary details for evaluation. The staff informed that these forms were discussed at staff meeting and it was decided to make it formal. But the Head of the department feels that since there was no consensus at the faculty level on these issues, they themselves are rather reluctant to implement it. Having discussed this particular issue at length, the review committee made it clear that it is a norm elsewhere in other institutions and encouraged DME to follow suit. The reviewers feel that they have convinced the staff to implement the peer evaluation as expected at its earliest.

The reviewers also felt that the members of the staff are very friendly and open and therefore the reviewers are of the opinion that the DME will implement the suggestions.
Hence we shall grade this aspect as good.

4.7 Skills Development

The three month intensive English course at Level I helps the students very much in communications, as the medium of instruction in the DME is English. The group of students at Level I (in first year) is very different in terms of their communication skills in English. With our discussion with the students it was mentioned that they are not very happy with the way in which the English programme is conducted. The reviewers felt that the English department needs to consider the student feedback very seriously as the future careers of the students depend very much on communication skills.

Technical skills such as draughting and design are adequately organized for students at CAD/CAM/CAE Programmes. Manual methods as well as computer-aided systems are well organized and incorporated in the curriculum.

Management skills are delivered through several study modules (MN301, MN302, MN401, MN 404, ME402 etc.) at different levels in the programme, which give an ample opportunity

for students to acquire adequate knowledge in management skills. IT skills are also delivered through modules in levels 1,2 and during the June Term (Skills Development Term).

The six-month industrial training really exposes the students to hands-on operations and they gain that knowledge in practice and application.

The industrial visits, research seminars, lectures by specialists from both private sector and public sector, open further avenues for exposure of students to outside world.
The student body was satisfied with the skills development programme. The DME has a well-structured facility to deliver this programme.

Therefore the review committee has a strong feeling that the skill development aspect of the study programme is well looked in to. That may be the reason why the employability of their graduates in high.
We do not hesitate to grade this aspect as good.

4.8 Academic Guidance and Counseling

The student counselors and academic counselors are appointed formally and counseling aspects, both academic and non-academic, seem to run smoothly. During the discussion the reviewers had with students, it was mentioned by students that they have access to the Counselors freely and conveniently. The students as a body in comparison to other Universities is very quiet, tolerant and considerate. The student handbooks are delivered on time at the orientation programme at level 1 (in the 1st year) and subsequently at level 2 (in the 2nd year) when they are selected for the Department of Mechanical Engineering.

The university has a well developed website where one can reach the library catalogues, journals and electronic journals at will. There is an established mechanism to monitor and clock the attendance of students at lectures, tutorials, practical sessions etc.

When students need professional guidance on personal problems, the students are encouraged to consult the university counseling service. The reviewers feel that the rapport between the students and the teachers is at a high level, which is a unique feature in the department.
The teachers are very honest and the students understand them well. The reviewers feel that this aspect should receive a good grade.

5. CONCLUSIONS

Curriculum Design, Content and Review: The Faculty Curriculum Development Committee had revised the curriculum every 4 years since 1990. Past students' views were also taken into account in the curriculum review. The last curriculum review was done in 2004. Review team is satisfied with the development shown in this aspect. *Judgment: Good*

Teaching, Learning and Assessment Methods: A number of teaching methods are used and the courses are taught mainly by lectures, practicals, discussions etc. Assessment of all the courses has been done uniformly throughout the Faculty. To further improve the teaching and learning process it is recommended that better computer and laboratory facilities are provided. *Judgment: Good*

Quality of Students, Including Student Progress and Achievements: Students with a good performance at the GCE advance level apply for this course. The review team noted that the performance of students during the program shows an improvement. Almost all the students have successfully completed the degree, and a considerable number of them obtained classes at their first attempt. Many students find employment even before graduation or immediately after graduation. *Judgment: Good*

Extent and use of Student Feedback, Qualitative and Quantitative: The teacher evaluation by students is implemented on a regular basis at present. When the curriculum have been revised, feedbacks from the immediately passed out graduates, undergraduates and the industry were given due consideration. Generally it can be concluded that the students' feed back has been effectively used in the Department. *Judgment: Good*

Postgraduate Studies: At present, the DME has postgraduate (PG) taught courses and postgraduate research degrees. These are PhD by research (Three year full time and 5 years part time, maximum 10 years), Master of Philosophy (M.Phil) by research (21 months full time and 33 months part time, maximum 6 years), Master of Science (M.Sc.) degree with major component of research (12-15 months full time, maximum 3 years), Master of Engineering (M.Eng) degree with greater weightage on taught course (12-15 months full time and 21-24 months part time, maximum 4 years) and postgraduate diploma (PG Dip) (12-15 months part time, maximum 2 years). The students are happy with the guidance they get and wish for some more facilities such as faster internet and lab facilities, which the review team feels can be provided by the DME within the next two years.
Judgment: Good

Peer Observation: There is effective peer observation as elaborated in section 4.6. *Judgment: Good*

Skills Development: Students are given opportunities to develop their skills in areas such as presentation, computer and personal skills. It is recommended that the computer facilities available to the students be enhanced if means can be found. *Judgment: Good*

Academic Guidance and Counseling: 25 senior student counselors (03 from Mechanical) who are academic staff members conduct routine programs at the faculty level on Counseling. In addition, there are other facilities made available as shown in section 4.8. An academic staff member to whom a student is assigned acts as the advisor, who meets the student routinely and assists her/him in solving academic problems s/he faces. Provision of the services of a Full Time Professional Counselor through the University is a great step forward.
Judgment: Good

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

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

6. RECOMMENDATIONS

Based on the findings indicated above the review team wish to make the following specific recommendations.

- In most of the aspects the review team found the way things are done at the DME are commendable, and can serve as a model for other Departments in Sri Lankan Universities. While sharing the lack of funds and other problems inherent to all the Sri Lankan universities, the high moral, dynamism and positive attitude of the staff should be commended.
- It is recommended that the instructors be provided with training under the supervision of a senior staff member, before they carry out student experiments. The labs should be upgraded to support increased student numbers and to give every student hands-on experience wherever possible. The lab safety should be upgraded.
- To further improve teaching and learning process it is recommended that better computer and laboratory facilities are provided. The Department has obtained latest software which is commendable, but sometimes the students can access these software only at working times in the Department and Design software are not available elsewhere to the students.

7. ANNEXURES

ANNEX 1

Agenda for the Visit by the Review Team

Day 1 – Tuesday 27th December, 2005

09.00 – 09.30 Meeting with the Dean and Head of the Department
09.30 – 10.00 Discuss the Agenda for the Visit
10.00 – 10.30 Tea Break
10.30 – 11.30 Department Presentation on the Self Evaluation Report
11.30 – 12.30 Discussion
12.30 – 13.30 Lunch Break
13.30 – 15.30 Observing the facilities of the Department
15.30 – 16.30 Meeting with Departmental Academic Staff
16.30 – 17.30 Meeting with undergraduate students
17:30 – 18:00 Brief meeting of reviewers

Day 2 – Wednesday 28th December, 2005

08.30 – 09.00 Observe Teaching – Lecture (ME 423 – Industrial Process Design)
09:00 – 09:30 Observe Teaching – Lecture (ME 207 – Manufacturing Processes and Material Removal Processes)
09.30 – 11.00 Observe Documents (Working Tea)
11.00 – 11.30 Meeting with Technical Staff and Other Non-Academic Staff
11.30 – 12.30 Meeting with postgraduate students
12:30 – 13:30 Lunch Break
13.30 – 14.30 Observe Teaching Lecture (ME 421- CAD/CAM)
14.30 – 15.15 Observe Teaching – Practical Class (ME 302 – Fluid Power Systems)
15:15 – 15:30 Tea
15.30 – 16.00 Observe Presentations (ME 304 – Machine Design Project)
16:00 –16:30 Observe Teaching-Lecture (CS 288-Object Oriented Programming Using C++)
16:00 – 16.30 Observe Other Facilities (Library & Computer Centre)
16.30 – 17.00 Meeting of Reviewers

Day 3 – 29th December, 2005

08.30 – 09.00 Observe Teaching – Practical (ME 425–Energy Technology and Environment)
09.00 – 09.30 Observe Student Project Presentations (ME 304 – Machine Design Project)
10.00 – 10.30 Academic Guidance and Counseling Core Aspect Meeting
10.30 – 11.00 Reviewers Private Discussion
11.00 – 12.00 Meeting with Head and Staff for Reporting
12.00 – 13.00 Lunch Break
13.00 – 17.00 Report Writing

ANNEX 2
List of Persons Met During the Visit

Academic Staff Members:

1. Prof. Ananda Jayawardene, Dean, Faculty of Engineering, UoM
2. Dr. A.G. Thusitha Sugathapala, Head/Department of ME
3. Prof. R.A. Attalage
4. Prof. Rohan Tittagala
5. Dr. M.A.R.V. Fernando, Senior Lecturer
6. Dr. Kapila Perera, Senior Lecturer
7. Mr. M.S. Chandrasiri, Lecturer
8. Dr. Ranjan Perera, Senior Lecturer
9. Dr. U.P. Kahangamage, Senior Lecturer
10. Mr. Tivanka Wickramasuriya, Lecturer
11. Mr. Himan K.G. Punchihewa, Lecturer
12. Dr. V. Palitha C. Dasanayake, Senior Lecturer
13. Mr. Janaka Mangala, Lecturer
14. Mr. P.G. Jayatilake, Lecturer
15. Mr. S. Witharana, Senior Lecturer

Members of the Technical and Non-Academic Staff of the Department

16. Mr. A.D. Somasiri De Silva – Technical Officer
17. H.D. Priyantha Upul – Technical Officer
18. I.M. Janaka Priyankara – Machinist
19. H.M.R.P.B. Herath – Machinist
20. Mr. W.D.Piyadasa – Draughtsman (Special)
21. Mr. Dilantha Silva – Senior Staff Technical Officer
22. N.H. Dias – Technical Officer
23. W.G.J.H. Wickramasinghe – Chief Technical Officer
24. M.W. Ajith Jayalal – Lab Attendant
25. W.D.U. Fernando – Lab Attendant
26. S.D. Somasiri Fernando - Lab Attendant
27. B.M.D. Jayasundara – Drawing Office Assistant
28. U.D. Premadasa – Labourer
29. L. Piyasena Pieris – Labourer
30. K.D.N. Piyasiri – Motor Mechanic
31. N.U. De Silva – Lab Attendant

- Discussions were also held with 38 students representing second, third and fourth levels, and 8 postgraduate students.

ANNEX 3
List of Teaching Sessions Observed

28th December, 2005
Lecture (ME 207 – Manufacturing Processes and Material Removal Processes)
Lecture (ME 423 – Industrial Product Design)
Lecture (ME 421- CAD/CAM)
Lecture (CS 288 – Object Oriented Programming Using C++)
Practical class (ME 302 – Fluid Power Systems and Machinery) Level 3 Semester 1
Presentation (ME 304 - Machine Design Project)

29th December, 2005
– Practical Class (ME 425 Energy Technology and Environment)
- Student Design Project Presentations – 304 – Machine Design and Project

ANNEX 4
List of Facilities Observed

- Lecture Theatres
- Laboratories (Metrology, Production Engineering, Applied Mechanics, Control Systems Lab, Design and Drafting Centre, Auto Lab, Thermodynamics Lab)
- Office Space and Staff Rooms
- University Library and Computer Centre
- Bookstore and Photocopy Facilities
- Canteen Facilities

ANNEX 5
List of Documents Observed

- Performance criterion for B.Sc. Engineering degree program
- University corporate plan, Calendar for B.Sc. Engineering Undergraduate students
- Details of faculty subcommittees
- Detailed Syllabi of the Course Units conducted by the Department
- Minutes of the Departmental Meetings and the Minutes of the Curriculum Development Committee Meetings
- Past Question Papers, Marking Schemes, Final Year Students' Project Reports, Students' Practical Record Books
- Teaching Material (lecture and practical handouts)
- Summaries of the Teacher Evaluations by the Students and the Related Forms
- Summaries of the surveys conducted by the Department
- Research Papers and Other Publications by the Academic Staff Members of the Department
- CD on the Solid Waste separation project
- CD on Innovations UOM 2005 Exhibition
- MecMag – September 2005
- Document on Career Guidance Service