

STRATEGIES FOR TEACHING ENGINEERING MECHANICS

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This paper is the reflection of the outcome of teaching engineering mechanics by the author over the last two decades both at the University of Moratuwa and at the University of New South Wales. As the University of Moratuwa is in the stage of embarking on a semester based system, it would be valuable to extract some useful ideas from University of New South Wales, where semester based curricula were followed for over fifteen years.

As engineering mechanics is a fundamental mechanical engineering subject, it is advisable to introduce it in the first year of the degree program for one semester with emphasis on fundamentals in statics and dynamics. This would make some other subject to be reviewed. For example, the full year engineering drawing may have to be taught for one semester only in the first year. As many universities all over the world are reducing teaching time for engineering drawing with the view that solid modelling packages are available now and the students can study on their own once the fundamentals are introduced.

As engineering mechanics is a basic subject in mechanical engineering it is necessary to introduce fundamentals of engineering mechanics in the early stage of the degree program. This would facilitate teaching the subjects like mechanics of solids and thermodynamics. But the advanced topics can be taught in Robotics at a higher level. It is a matter of relevance.

Teaching engineering mechanics in the second year could be limited to one semester only; some sections in the current syllabus can be taught in design of machine elements. It would help to prevent any unnecessary overlaps in teaching of sections common to engineering mechanics and design. This leaves space for another subject. It could be a new subject to cater for the modern demand in Mechanical Engineering. The second year engineering mechanics course will be better served with two laboratory experiments and computer simulations or spreadsheet based assignments.

Engineering mechanics course in the third year could be reviewed with the focus that it emphasises mechanics of machines. It could mean a section or two in the existing second year mechanics moved to third year. Also it may lead to drop in a section or so in the third year existing syllabus. The

assignments must emphasize computer-based tasks as opposed to traditional methods.

The subjects of engineering mechanics and mechanical design could be taught with some industrial input. This would involve some scheduled industrial visit, computer simulations and occasional lecture by practising engineers to give a feedback on the practical relevance/irrelevance of the sections taught in the university.

It is a widely held view that engineering mechanics is not an easy subject. But educators have to find ways and means to make the subject appealing to students and at the same time teach the essential elements to have proper foundation and understanding of Mechanical Engineering. Continuous assessment is generally practised in universities where semester based curriculum is adopted, which includes several quizzes in a semester or a mid-semester examination. Students in general prefer continuous assessment, as they do not have to rely on a single examination for obvious reasons.

It is the responsibility of the educators that quality students should be attracted to pursue mechanical engineering degree program. It could mean the traditional ways of teaching and curricula to be reviewed continuously to meet the requirements of the future, which may lead to introduction of new subjects by reviewing existing subjects.

Dr. S. Kanapathipillai graduated with B.Sc.Eng.(Honours) degree in Mechanical Engineering from the University of Moratuwa in 1974. He received a Masters Degree from University of Adelaide in 1983 and a Ph.D. in Mechanical Engineering from the University of New South Wales in 1995. He was an academic in the Department of Mechanical Engineering of the University of Moratuwa from 1975 to 1988. He then joined the staff in the School of Mechanical and Manufacturing at the University of New south Wales. He has been teaching Engineering Mechanics and Mechanical Design for over twenty years. His research includes Acoustics and Noise Control and Higher Education and published over 15 scientific papers. He has been a consultant to industry in design and noise control over the last 10 years.