

# A COMPUTER BASED INTRODUCTION TO ENGINEERING LABORATORY WORK

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**Abstract** <sup>3</sup>/<sub>4</sub> Laboratory work underpins many topics in engineering education being the main vehicle for the introduction of many important elements to the student learning process. However it is expensive to resource both in terms of space, capital equipment and staff time. Whilst its value to the learning process is significant the pressures on other areas of the curriculum tend to devalue its important role in engineering education. Frequently the running of laboratory classes is passed to inexperienced staff as it is viewed to be something that requires little academic input. As a consequence the student learning experience is diminished and there is a dichotomy between the learning objectives and those achieved in practice. Because of the difficulties associated with laboratory scheduling it is frequently the case that experiments will be undertaken before the corresponding theory is covered in the lecture periods. The problems associated with explaining the theory and background to experiments within the laboratory session are considerable. The approach adopted at Salford for Fluid Mechanics laboratory classes has been to prepare PowerPoint presentations covering each laboratory exercise with embedded sound enabling students to watch and listen prior to the experiment being undertaken. The advantages associated with this method will be outlined.

**Index Terms** <sup>3</sup>/<sub>4</sub> Experimental, Laboratory, Fluid Mechanics

## INTRODUCTION

Running engineering laboratory classes effectively and efficiently can be academically demanding. Frequently large cohorts of students will be split into groups with typically 4-5 students working on any one experiment. Thus for a class size of 20 students 4 experiments may be running in parallel. Starting different experiments off within a limited time period is difficult, usually some groups must wait until others have been instructed and in subjects where noisy equipment is used the problems increase as the session proceeds. With a limit on the total time available for students to complete a particular task it is vital that students are as well prepared and informed to enable them to gain maximum benefit from the laboratory session. Using the pre-prepared PowerPoint presentation technique described here all groups can start simultaneously and those students who require more time to absorb instructions can replay the material in their own

time later. Students who have used the presentations have responded positively and from a staff view-point laboratory sessions can run smoothly with all groups being able to start at the same time. The presentations offer the possibility of students who miss exercises for valid reasons to catch up at a later date and in general allow for some consistency of approach to laboratory work to be achieved. Sample material is included in figure 1 below.

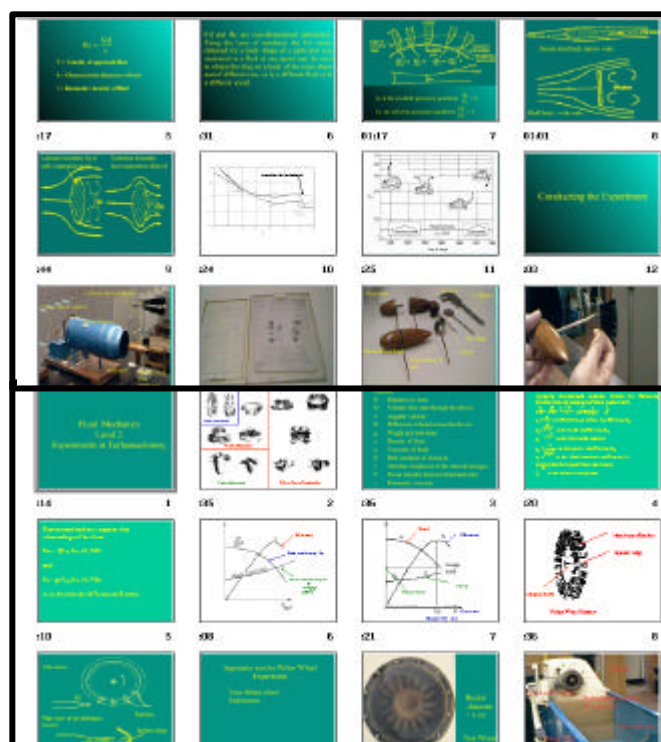


FIGURE 1 FLUID MECHANICS (LEVEL 2)

## CONCLUSIONS

A successful and efficient method of issuing instructions to accompany laboratory experiments has been developed. Student response and feedback to the method has been positive and encouraging. The ability for each group to work at its own pace was considered advantageous.

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