VAM 3012 Signal Analysis (60 hrs / semester)  
semester 2/2011

Lecturer:  
A/Professor Michael A. Sek. Room: D341, michael.sek@vu.edu.au

Unit information:  
www.staff.vu.edu.au/msek

Required Reading:  
www.staff.vu.edu.au/msek
www.mathworks.com

Recommended reading:
- [www.staff.vu.edu.au/vrouillard](http://www.staff.vu.edu.au/vrouillard)
- T.Beckwith, R.Marangoni, Mechanical Measurements, Addison Wesley

Content:

Learning Outcomes:
Students will have developed an understanding of processes and key issues related to modern measurement, and signal analysis principles and techniques relating to mechanical engineering practice. In particular, students will be able to solve a wide range of problems and carry out design tasks pertaining to sensor selection, calibration and evaluation, develop algorithms for a wide range of signal analysis techniques including first order system simulation, transient signals, synchronous averaging, moving rms analysis of broad-band random signals, Fourier analysis, spectral averaging and frequency response measurements. Students will have completed work designed to improve a number of generic skills including problem identification / formulation / solution, effective oral and written communication, experimental techniques, computer skills and the ability to use a systematic approach to engineering investigation and algorithm development as well as a capacity to undertake life-long learning.
METHOD
The unit will be delivered in a Project Based Learning mode, whereby the learning is initiated and influenced by the student. In 2011 the learning will be centred on two broad projects:

1. Analysis of stationary and nonstationary signals in the time and the frequency domains (weeks 1 - 6):
2. Frequency Response Function – measurement and dual channel signal analysis to determine mode shapes of a mechanical system (weeks 7 - 12)

DELIVERY MODE:
Sixty hours per semester comprising on average:
• One 2-hour lecture/workshop/seminar FOCUSING on topics related to the current project.
• One 3-hour hands-on activities relating to the current project. This will include experimental design, algorithm and simple software development for data acquisition and signal analysis, as well as team-based discussions and experimental work.
• At least five hours per week of effective study and work in students’ own time towards achieving the objectives of projects.

DETAILS OF ASSESSMENT
Formative assessment of two reports (based on experimental projects). Unsatisfactory reports can be resubmitted once.
- A total of two experimental projects are to be undertaken by all students enrolled in the subject.
- Each experimental project is to be undertaken in teams of two students. Experimental reports are due in week 6 and week 12.
- One report per team will be assessed as satisfactory (1) or unsatisfactory (0). Reports can be resubmitted once.
- Individual penalty for absence at a scheduled laboratory session without an approved Special Consideration Application is 1/6 out of 1 deducted from the mark for the satisfactory submission of a report.
- See a separate document for description of the projects, which will be made available at the first lab session.

Continuing progress assessment
- Each student is required to keep a bound notebook to document activities during the prescribed study time, to assist in learning and revision of the subject, and as the evidence of study towards achieving the competency. The notebooks will be randomly assessed during and at the end of the semester and during the formative assessment of reports.
- Short quizzes/tests/presentations assessing the continuing learning outcomes.

Final examination – closed book (3 hours)  
Max 90%

FINAL GRADE = CONTINUING PROGRESS + AVERAGE REPORT GRADE * EXAMINATION

BASIC RULES:
- All components of assessment are compulsory.
- Attendance at the lab sessions is compulsory and at lectures is strongly recommended.
- For additional assistance during consultation periods all members of the team are required to attend.