



Mechanical and Manufacturing Engineering

# Course Outline

Semester 2 2018

MANF4430

RELIABILITY & MAINTENANCE  
ENGINEERING

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### Contact hours

	Day	Time	Location
Lectures	Monday	14:00 – 17:00	OMB149

Please refer to your class timetable for the learning activities you are enrolled in and attend only those classes.

### Summary and Aims of the course

The course will introduce statistics, mathematics and associated techniques for analysing an industrial process for the purpose of maintaining and improving it. Major disciplines covered include issue analysis, data collection, statistical data analysis, process modeling, decision-making and implementation. The course focuses on developing experimental techniques using statistical methods to test the performance of the processes in a manufacturing industry. It lays the foundations for testing products, components, machinery and processes. This is necessary for the development of quality products and processes. This leads to the development of quality assurance methods for products as well as the development and understanding of the reliability of the processes on the shop-floor. This is necessary to maintain maximum up-time and return-on-assets for a manufacturing facility.

This course aims to develop the concept of data gathering, analysis and modeling using statistical methods. In attempting to determine if the processes or products are meeting set criteria, the manufacturing engineer should

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. Understand the different statistical methods available for analysis of different processes	PE1.1, PE1.2, PE1.3
2. Understand the importance of the maintenance and	

Date	Lecture Content (OMB149) 14:00 – 17:00	Suggested Readings
Week 3 Mon 6/08/18	Statistical Hypothesis testing	Textbook 1 – Chapter 7,8 and 9 and Lecture notes
Week 4 Mon 13/08/18	Analysis of variance (ANOVA) – One-way and Multiple Way	Textbook 1 – Chapter 12 and Lecture notes
Week 5 Mon 20/08/18	Goodness-of-fit test and Test for Association	Lecture notes
Week 6 Mon 27/08/18	Simple and multiple linear regression	Textbook 1 – Chapter 14 and Lecture notes
Week 7 Mon 03/09/18	Principal component analysis and factor analysis	Lecture notes
Week 8 Mon 10/09/18	Component reliability and Weibull analysis	Textbook 1 – Chapter 1, Textbook 2 – Chapter 1 and 2 and Lecture notes
Week 9 Mon 17/09/18	System reliability and condition mentoring	Textbook 2 – Chapter 6 and 7 and Lecture notes
Week 10 Mon 01/10/17	Public Holiday (No Lecture)	
Week 11 Mon 08/10/17	Maintenance Theory	Textbook 2 – Chapter 8 and Lecture notes
Week 12 Mon 15/10/18	Process identification, characterization and modelling	Lecture notes
Week 13 Mon 22/10/18	Wrap Wrap	

## 6. Assessment

### Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Online Quiz x 4	Multiple choice and short answer questions	40%	1, 2, 3 and 4	Lecture and demonstration material	Week 4, 7, 10 and 13	Same day as the due date	1 week after the quiz is closed
Group Viva Assignment 1	20 minutes per team + 1-page Executive Summary (excluding diagram)	30%	1, 2, 3 and 4	See below	Friday Week 7 07/09/18	1 week after the due date	On-the-spot feedback
Group Viva Assignment 2	20 minutes per team + 1-page Executive Summary (excluding diagram)	30%	1, 2, 3 and 4	See below	Friday Week 13 26/10/18	1 week after the due date	On-the-spot feedback





- a. Weekly online tests or laboratory work worth a small proportion of the subject mark,  
or
- b. Online quizzes where answers are released to students on completion, or
- c. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
- d. Pass/Fail assessment tasks.

## Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

## Examinations

You must be available for all tests and examinations. Final examinations for each course are held during the University examination periods, which are June for Semester 1 and November for Semester 2.

Provisional Examination timetables are generally published on myUNSW in May for Semester 1 and September for Semester 2

For further information on exams, please see the [Exams](#) section on the intranet.

## Online Quiz

Four quizzes (quiz 1, 2, 3 and 4) will be conducted online via Moodle. The format of the quiz is like those that are done on paper, which consist of multiple choice questions, calculations and short answer questions. The link to the quiz will be available on Monday of the quiz week from 16:00 to 17:00. Each student gets ONE attempt to complete the quiz within the time limit. The feedback of the quiz will be provided 1-week after the quiz is closed. Note that the quiz questions are randomly drawn from a question bank with similar theme and difficulty, numerical questions may appear with random input numbers, so students will not expect to get the exact same question. Students are expected to complete the quiz individually.

Special consideration and supplementary assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the information on UNSW's [Special Consideration page](#).

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism: [student.unsw.edu.au/plagiarism](http://student.unsw.edu.au/plagiarism) The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct

