Mechanical and Manufacturing Engineering

Course Outline

Term 1 2019

MANF4430

RELIABILITY AND MAINTENANCE ENGINEERING

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(sse)13(s)-4(o)13(n t)-s floor. This

Learning Outcome		EA Stage 1 Competencies
3.	Understand the various methodologies used in industry to estimate the level of reliability and remaining life of a critical component and system at a certain point in time, using statistical and mathematical techniques where appropriate	PE1.2, PE2.1, PE2.2
4.	Be able to conduct a reliability study and to make recommendations with respect to the maintenance plan and ongoing reliability program	PE3.1, PE3.4, PE3.6

4. [redacted]

Lectures, demonstrations and assessments in the course are designed to cover the core knowledge areas in Engineering Management. They do not simply reiterate the texts, but build on the lecture topics using examples and cases taken directly from industry to show how the theory is applied in practice and the details of when, where and how it should be applied.

Lectures and demonstrations are designed to develop several graduate attributes by creating an environment where information sharing, discussions, teamwork, communication, task completion and project role playing will take place. Since each of you may have come from a different engineering stream, your experiences are drawn upon to illustrate various aspects of cases covered, and this helps to increase motivation and engagement.

5. Course schedule

Date	Lecture Content (Ainsworth 202) Wednesday 09:00-12:00	Suggested Readings
Week 1	Issue analysis and data visualel	

Date	Lecture Content (Ainsworth 202)

[redacted]

Assignments

The assignment instructions will be posted on Moodle or handed out in class, and a reminder announcement will be made about due date for the assignments. The assignments support the learning outcomes by incorporating an appropriate mix of activities such as issue analysis and fact-based data analysis that support the design of appropriate solutions and strategies. The assignments also support collaborative team work and integration of different ideas and components into an overall coherent quality management strategy.

The following criteria will be used to grade assignments:

Viva

The assignment will be assessed in person and feedback given as part of an oral examination or ‘viva’. Each team member must be present during this formal examination in weeks 5 and 10. A system will be implemented on Moodle for booking a time with your lecturers. The team will still need to prepare appropriate documentation and material as preparation for this assessment.

Executive Summary

In addition to the Viva examination, each team is to provide a 1-page executive summary (excluding diagrams), outlining the key findings of the assignment.

Presentation

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 20 percent (20%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day.

Work submitted after the ‘deadline for absolute fail’ is not accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

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: February for Summer Term, May for T1, August for T2, and November/December for T3.

Please visit myUNSW for Provisional Examination timetable publish dates. For further information on exams, please see the Exams webpage.

Online Quiz

Two quizzes (Quiz 1, 2) 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 Wednesday of the quiz week from 11:00 to 12:00. 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.

Two quizzes (Quiz 3, 4) will be conducted in-class as closed-book, invigilated exam during lecture hours.

Calculators

You will need to provide your own calculator of a make and

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, visit: [student.unsw.edu.au/plagiarism.](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 Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here:
www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

10. Administrative matters

All students are expected to read and be familiar with School guidelines and polices, available on the intranet. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Computing Facilities
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Lab Access
- Makerspace
- UNSW Timetable
- UNSW Handbook
- UNSW Mechanical and Manufacturing Engineering

Appendix A: Engineers Australia (EA)

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineerin622 (	