THE UNIVERSITY OF NEW SOUTH WALES

SCHOOL OF MATERIALS SCIENCE AND ENGINEERING

MATS4213

Fractographic Analysis

Course Outline

Session 2, 2009

Course staff

Prof Alan Crosky
Lecturer

Room 213 School of Materials Science and Engineering (Building E8)
Phone: 9385 4424
a.crosky@unsw.edu.au

Consultation hours:
by appointment

Timetable

Lectures & Labs

Day	Time	Location
Wednesday	9:00-12:00	Law 301

Course outline

OBJECTIVE

To develop an understanding of the techniques and methodology used in the analysis of service failures.

COURSE OUTLINE

Classification of macroscopic and microscopic fracture mechanisms. Initiation and propagation of ductile, brittle, fatigue, creep, stress corrosion and corrosion fatigue fractures. Effect of material defects, design deficiencies and incorrect processing on the origin and cause of fracture. Analysis of various modes of fracture using fractographic techniques involving optical microscopy and scanning and transmission electron microscopy. Service failures.

ASSIGNMENTS

2 laboratory reports

LABORATORY WORK

21 hours laboratory work

FIELD WORK / VISITS

Nil

TIMETABLE

Wednesday 9.00-12.00

ASSESSMENT

60% by formal examination of 2 hrs in examination period and 40% by laboratory assignments. Late submission of assignments will incur a penalty of 5% of the total mark per day late. Assignments will be returned within 4 weeks of the due date. Requests for special consideration must be submitted on the form available from the Student Desk in the Chancellery and include medical certificates or other appropriate documents.

TEST / QUIZ

Nil

TEXTBOOKS

Nil

REFERENCES

Metals Handbook, 8th edition, Volumes 9 and 10, 9th edition, Volumes 11 and 12, 10th edition Volumes 11 and 19, ASM International.
Practical Failure Analysis (journal) ASM International
Engineering Failure Analysis (journal) Pergamon

Learning and teaching philosophy underpinning the course

The course is designed for students to actively engage in the learning process and analyse and synthesise the content in a real world environment.

Course information

Units of credit	3
How the course relates to other course offerings and overall program(s) in the discipline	An understanding of the mechanisms of failure in materials and their characteristic features is required for materials engineers in order to establish the cause of service failures so that appropriate remedial action can be taken.
Course aims	To develop an understanding of the common failure mechanisms and their distinguishing features.
Graduate attributes which will be gained through the course	• Research, inquiry and analytical thinking abilities • Capability and motivation for intellectual development • Communication • Information literacy • Group work • Research skills • Technology use • Communication skills in discipline specific content
Expected learning outcomes	In doing this course, you will learn to: • Identify the distinguishing features of different types of service failure. • Identify the materials and processing features responsible for failure. • Make informed decisions in recommending remedial action. You will also learn to: • Think critically in decision making and problem-solving • Communicate with correct terminology • Conduct online research • Work effectively in a team to solve problems
Teaching strategies	• Core concepts, theories and approaches will be covered in lectures. • These concepts will be synthesised in a practical context in the laboratory sessions.

Academic honesty and plagiarism

What is Plagiarism?
Plagiarism is the presentation of the thoughts or work of another as one's own.* Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students 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 items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne.

Continual course improvement

- We welcome feedback at all times on presentation of course materials and any other course-related matters, and will be happy to discuss any issues raised in the lectures.
- You will be asked to provide evaluative feedback through the UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process in Week 12.
- Feedback from prior assessments will be discussed in Lecture 1.

Administrative Matters

- You must attend at least 80% of all classes.
- Assignments must be submitted by the due date.
- If you are unable to submit work, attend laboratory classes, or attend either the mid-session or final exam on health grounds, you should make a request for special consideration by submitting the form available from the Student Desk in the Chancellery. Medical certificates or other appropriate documents must be included. You should also advise your lecturer.
- If you have a disability that requires some adjustment in your teaching or learning environment you are encouraged to discuss your study needs with the course convener prior to, or at the commencement of, your course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or www.equity.unsw.edu.au/disabil.html). Early notification is essential to enable any necessary adjustments to be made.