



THE UNIVERSITY OF
NEW SOUTH WALES

SCHOOL OF MATERIALS SCIENCE AND ENGINEERING

MATS1192

Design and Application of Materials in Science and Engineering

Course Outline

Session 2, 2009

Course staff

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Course Timetable

Week start Date	Week	Tuesday 3-5pm: Bus 220	Lecturer	Friday 2-4pm: Quad 1027	Lecturer
27-Jul	2	Lecture – introduction Bonding	SC	Packing of atoms in solid Modulus	SC
3-Aug	3	Yield and tensile strengths	SC	Dislocations and strengthening methods	SC
10-Aug	4	Fast Fracture	SC	Fatigue and creep	SC
17-Aug	5	Metal structure, phase diagrams	SC	Kinetic and structural changes	SC
24-Aug	6	The light alloys and steels	SC	Labs 1. Energy materials 2. Tensile Testing 3. Casting 4. Computing applications in Materials #Interview with academic staff (Week 8)	Demonstrators (SC, MH)
31-Aug	7	Mid-term test	SC		
14-Sep	8	Site Visit (ANSTO) ⁺	MH		
21-Sep	9	Site Visit (One Steel)*	MH		
28-Sep	10	Corrosion	SC	Ceramics and glasses	SC
5-Oct	11	Polymers and composites	SC	Bio-materials	SC
12-Oct	12	Conference	VS	Nano-materials	SC
19-Oct	13	Conference	VS	Conference/Tutorial	VS/SC

Please note that this is a tentative timetable and the dates for site visits may change owing to unexpected circumstances.

⁺ For visit to ANSTO, students must submit their personal information in advance (the exact date will be announced in due course) . Proof of identify (driving licence for local students, passport for overseas students) must be provide on the date of visit. Please allow 2 hours for travelling.

* Visit to One Steel Rooty Hill Plant on Tuesday, 22 September, 3.00 - 5.00pm. You have to wear cotton long pants and shirts with long sleeves, covered shoes. Please allow 2 hours for travelling

Interview with academic staff will commence in Week 8 and interview report will be submitted in Week 10.

Course outline

The learning and teaching philosophy underpinning the course (based on UNSW Learning Guidelines)

- **Students are actively engaged in the learning process.**
Students will use the knowledge acquired in lectures of different materials and their processing technologies in analysing results of laboratories, completing online

tutorials and selecting a material and presenting it to the student conference and preparing a website.

- Effective learning is supported by a climate of inquiry where students feel appropriately challenged.**
 Students will be expected to investigate their material of choice for the student conference and website. They will be expected to source information for completion of lab reports.
- Learning is more effective when students' prior experience and knowledge are recognised and built on.**
 Students will apply concepts learnt in computing classes to spreadsheet laboratories, conference presentation and website report. Knowledge learnt in lectures will be applied in online tutorials and provide background information for industrial visits.
- Students become more engaged in the learning process if they can see the relevance of their studies to professional and disciplinary contexts**
 Students will undertake three industrial visits which cover a broad spectrum of the materials profession and apply concepts learnt in class to materials design and applications.

Course information

Units of credit	6
Parallel teaching involved in this course	None
How the course relates to other course offerings and overall program(s) in the discipline	The course provides a context for materials study, informs students on fundamental materials properties for future study and calls upon skills learnt in computing courses for the presentation of assignments
Course aims	To learn: (a) fundamental materials property-structure relationships pertinent to the design and application of components. (b) Context of materials science and engineering in the discipline and society
Graduate attributes which will be gained through the course	<ul style="list-style-type: none"> • Research, inquiry and analytical thinking abilities • Capability and motivation for intellectual development • Communication • Computing skills
Expected learning outcomes	The ability to: <ol style="list-style-type: none"> 1. Describe basic property-structure relationships in materials 2. Understand context of materials science and

	<p>engineering in design and applications within society</p> <p>3. Communicate above using a range of media</p>
Teaching strategies	<ul style="list-style-type: none"> • Theory and concepts will be addressed in lectures. • Laboratories will provide hands-on experience of material properties • Industrial visits will provide context to materials studies • Website preparation and conference will provide practise in communication of materials concepts. • Online tutorials will enable students to test their knowledge and identify area for further study.

Assessment

4 x laboratory reports	8%
1 x interview report	2%
5 x online tutorials	10%
Mid-session quiz	10%
Conference presentation and report as website	20%
Final exam*	50%

***Exam must be passed to pass the course**

Laboratory Reports:

Written laboratory reports are required for each demonstration and should be submitted at the end of the demonstration. The reports will be subsequently graded and returned two weeks later.

Interview with Academics Report

Students are divided into groups of three. Each group will be asked to interview an academic staff (Teaching or research only) in the School of Materials Science and Engineering. The group will complete an interview report which includes the following areas:

1. Background of the area(s) research of the academic staff they interviewed
2. Contributions of the academic staff in this research area
3. Future trend of the research
4. Comments

Please note that the report will be about 2-3 pages in length. Do not just copy the biodata or publications of the academic staff (you may, however, put these information into an appendix).

Online tutorials:

Tutorials will become available on the course WebCT Vista site in the same week as relevant material is taught in the lectures. Students will have approximately 10 days to complete the tutorial including the quiz which must be done in 1 hour. Students are expected to inform themselves of submission deadlines by regularly checking the WebCT site.

Mid-session Quiz:

A one-hour long quiz will be held covering all material covered in lectures and tutorials in the course up to that time.

Conference Presentation and Report as Website:

Students will be asked to make a 5-minute presentation using PowerPoint and prepare a report on the topic in the form of a website. Students should select a Materials Industry of their choice and ensure that the presentation and website cover the following (the distribution of marks out of 10 is indicated):

- Product, production process, raw materials, process parameters, production volume, sale price of product, safety and environmental issues. (3 marks)
- Product properties, applications of the product and end-of-life disposal. (3 marks)
- Alternatives with respect to the material and/or process to enhance sustainability. (2 marks)
- Style (2 marks)

Abstract

A title and 100-word abstract of the paper must be submitted a month before the conference (to allow planning for the conference)

Presentation (10 marks)

The presentation should be prepared on PowerPoint slides. 5 minutes will be allocated to each presentation and students should use a maximum of 1 slide per minute. 'Style' will include the way in which the student presents themselves, the clarity of the presentation, including slides, and the ability to stimulate interest in the audience. Students are requested to bring a printed copy of their slides to hand out to the audience. The final Powerpoint file for the presentation should be submitted 1 day before the 1st day of the conference by 9am (i.e. 12/10/09).

Website (10 marks)

A report of the presentation topic should be prepared in the form of a website containing approximately 4 linked pages. Students are free to host the website at a location of their own preference and it may be hosted on the School web server if students wish. Students are responsible for ensuring the site functions. 'Style' will include technical stability, layout, ability to portray the information and clarity. The web URL must be available to the course staff and other students by 9am on 22nd September. Students are asked to send the abstract and the web pages in word/power point via e-mail to Prof. Sahajwalla at the same time.

Administrative Matters

- Students should attend at least 80% of all classes. **Attendance at the following is compulsory: laboratories, industrial tours, conference.**
- All assessment tasks submitted after the deadline will receive a penalty of 10% of the maximum grade for every day late, or part thereof.
- All submissions will be via the course WebCT Vista site unless stated otherwise.
- Students unable to attend compulsory elements of the course, submit assessment tasks on time or attend the final exams on health grounds 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. Students should also advise the lecturer.
- Students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their 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. Information on designing courses and course outlines that take into account the needs of students with disabilities can be found at: www.secretariat.unsw.edu.au/acboardcom/minutes/coe/disabilityguidelines.pdf

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 11 or 12.
- Feedback from prior assessments will be discussed in lecture 1.
- Students are encouraged to address any problems regarding teaching of this course at the annual staff-student meeting.
- Randomly students are asked to answer some short questionnaires for feedbacks on the course.

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.

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† Adapted with kind permission from the University of Melbourne.