THE UNIVERSITY OF NEW SOUTH WALES

SCHOOL OF MATERIALS SCIENCE & ENGINEERING

Mats3564

Polymer Engineering - 1

S-2 2009

Tuesdays 10 -1

MSE G-11

Safety Instructions :

OHS regulations require that students must bring to Laboratory class safety glasses and lab-coats.

Students – please note these important things

1. Students should attend at least 80% of all classes.
2. Assignments submitted after the deadline will receive a 10% of maximum grade penalty for every day late, or part thereof.
3. Students unable to submit assignments 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.
4. 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 at the end of the course. Feedback from prior assessments will be discussed in lecture 1.

LECTURER Assoc Professor Sri Bandyopadhyay
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The learning and teaching philosophy underpinning the course (based on

UNSW Learning Guidelines

• Students are actively engaged in the learning process. It is expected that, in addition to attending classes, students read, write, discuss, and are engaged in

solving problems in polymer micro and macro aspects and in the analysis of materials behaviour

• Effective learning is supported by a climate of inquiry where students feel appropriately challenged.

Problems involving **polymer science & engineering** are challenging; students will be given assignments that will motivate deep analysis of various phenomena in materials science and engineering.

• Learning is more effective when students' prior experience and knowledge are recognised and built on.

The course is built on prior courses in chemistry, mechanical behaviour, and structure-property relationship

• Students become more engaged in the learning process if they can see the relevance of their studies to professional and disciplinary contexts

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MATS 3564 Polymer Engineering - 1

LECTURER	Assoc Prof Sri Bandyopadhyay			
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OBJECTIVE

- **To teach a 3 HPW, 3 UOC course on Polymer Engineering 1 : to provide understanding/skills of / with the underlying mechanisms on Mechanical behaviour of polymers. Elastic Modulus of polymer chains; Critical effects of temperature on behaviour of thermoplastics under load. Comparisons with thermosets.**

COURSE OUTLINE

- Factors contributing to strength and toughness.
- Relationship to Processing behaviour
- Yield, deformation and fracture - Mechanisms
- Toughened / Strengthened Polymers
- Crazing, - Mechanisms

Effect of environment

Additives are important ingredients of the polymer component manufacturing industry- thus both Unplasticised PVC [rigid and brittle] and plasticised PVC [soft and malleable] can be made by using the same basic polymer, but adding different ingredients. Likewise the resistance to degradation can also be significantly enhanced by using various stabilising agents.

CONTENTS

Lectures 22 h
Tutorial 8 h
Laboratory 6 h

Planned Laboratories :
a) Compression Moulding of Thermoplastic Polymers
b) Making of Polymer Foams
c) Laminating of Fibre Composite Materials

Handouts will be given during the lab class;

Laboratory report: One report combining all the 3 experiments to be submitted Friday wk 10 : the results and discussion part should be emphasized.

FIELD WORK / VISITS

TBA

TIMETABLE

Tuesday 10 -1 MSE G-11

Attendance Minimum 80% necessary

ASSESSMENT

- Lab : 15
  - Laboratory reports are to be submitted in wk 10 – One report combining all the 3 experiments : the results and discussion part should be emphasized.
- Mid-term exam : 15
  - Wk 6
- Individual assign : 10
  - Due week 7; Presentation - week 8 / 9
- Final Exam, 60 marks
  - End of session

Total Marks : 100

REFERENCES

1. I.M. Ward: Mechanical Properties of Solid Polymers, J. Wiley.
2. J.A. Brydson: Plastics Materials, 7th Ed.
3. A.J. Kinloch and R.J. Young: Fracture Behaviour of Polymers, Applied Science, London, 1983.
4. N.J. Mills: Plastics Microstructure & Engineering Applications, 2nd Ed.
5. N.G.McCrum, C.P.Buckley and C.B.Bucknall : Principles of Polymer Engineering , 2nd Ed, Oxford Science Publications

- Occupational Health and Safety policies and expectations:

www.riskman.unsw.edu.au/ohs/ohs.shtml

Academic honesty and plagiarism :
Be aware of UNSW Penalty Policy on 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.