MEC E 569 Mechanics and Design for Composite Materials
September - December, 2011

Lectures: Wednesday 5:00 – 8:00 pm ETL E2-002

Instructor: Professor Zihui Xia

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Office Hours: Wednesday 4:00-5:00 pm or by appointment

TA: Mohammad Al-Amin Khan Chowdhuri, khanchow @ualberta.ca
TA Office hours: Monday, 12:00-2:00 pm at Help Desk, 3rd Floor, Mec Building


Homepage: e-class: https://eclass.srv.ualberta.ca/portal/ (use your GPU login and password) where lecture notes and other course materials are posted.

Pre-requisite: MEC E 380.

Examinations: Examinations are 'closed book'.
Midterm exam: Oct 12, 6:30-8:00pm, ETL E2-002.
Final exam: Dec. 7, 5:00-8:00pm, ETL E2-002.
Project due: Dec. 16, electronic version in word or pdf files.

Mark Distribution:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Assignments</td>
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<td>Midterm exam</td>
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<td>Final exam</td>
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<td>Project</td>
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The final mark will be assessed based on a combination of University grade distribution curve and absolute mark measurement.

Assignments: at the end of lecture note of each chapter.

Course Objective: Obtain knowledge of advanced composite materials, stress/strain/failure analysis and design methods for laminated composite structures

Course Outline:

1. Introduction to composite materials: classification, application, terminology, manufacturing methods.
3. Micro-mechanical analysis of a lamina: prediction of mechanical properties of composites based on properties of their constituents (fiber and matrix) including stiffness, strength and coefficients of thermal and moisture expansion.

4. Analysis of laminates (Classical Laminated Plate Theory): global stress-strain relation for laminate based on individual properties of the laminae and their lay-up, stresses and strains in individual laminae, hygrothermal effects in laminates.

5. Failure analysis of laminates: damage mechanisms, progressive failure analysis for a laminate.

6. Design of laminated composite structures: laminated beam, laminated plate, other design issues.

7. A final design project will be included in the course.

8. A software PROMAL will be used throughout the course in assignments and in the design project.

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behavior (available on the University Governance website at: http://www.uofaweb.ualberta.ca/governance/studentappeals.cfm) and avoid any behavior which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.