University of Alberta  
Department of Mechanical Engineering  
Mec E 563 Finite Element Method for Mechanical Engineering  
Sept –Dec 2011

Instructor: Dr. Walied Moussa  
Phone: 492-6027  
Email: walied.moussa@ualberta.ca  
Office: MecE 5-8N

Teaching assistant:  
1. Mohamed El-Gowini (elgowini@ualberta.ca)  
2. Suzan El-Shaer (elshaer@ualberta.ca)  
3. Imad Khaled (ikhaled@ualberta.ca)

Lecture: ETLE1-007 Monday, Wednesday, Friday 8:00-8:50  
Lab: D1,D5 and D6: Monday-Mec E 3-3, Mec E 3-26 and Mec E 4-16 (14:00 – 17:00)

1. FEM Discretization and the Direct Stiffness Method  
   a. Basic concepts of structural modeling  
   b. Review of the stiffness method of structural analysis.  
   c. Modeling stiffness, loads and displacement boundary conditions.  
   d. Advanced modeling: general constraints, substructuring.

2. Formulation of Finite Elements.  
   b. Development of continuum elements, shape functions, consistent loads.  
   c. Isoparametric elements for plane stress.  
   d. Numerical integration  
   e. Convergence requirements.

   a. Pre processing: model definition.  
   b. Element level calculations.  
   c. Equation assembly.  
   d. Equation solver.  
   e. Post processing: strain and stress recovery.

- Policy about course outlines can be found in §23.4(2) of the University Calendar. 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 Behaviour (online at www.governance.ualberta.ca) and avoid any behaviour 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.

- Final Grade letter will be assigned based on the total mark received following the faculty suggested mark distribution.

- No access to past exams will be given but in class exercises will be good representative of the type of questions expected in these exams.

- Recommended study material:  
  *** Class notes and notes published on the course website at WebCT

Grades:  
Assignments 5%  
Mid-term 15%  
Project Midterm Report 10%  
Project Final Report 30%  
Final exam 40%