

20-MECH -747- Advanced Finite Element Method
Fall Quarter 2003

- Instructor: Dr. Dong Qian, Assistant Professor of Mechanical Engineering
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<http://www.min.uc.edu/~dqian> and <http://blackboard.uc.edu>
- Textbook: ***Nolinear Finite Elements for Continua and Structures*** by Ted Belytschko, Wing Kam Liu and Brian Moran, John Wiley & Sons, 2001.
- Class: MWF 1:00-1:50 PM, 643 Baldwin Hall.
- TA: Ms. Xiaolin Chen (office hour to be announced)
- Office Hours: Dr. Qian: 2:00-3:00 PM, MW. or stop by, 406B Rhodes.
- Subjects: Nonlinear finite element methods.
- Prerequisites: Knowledge of some continuum mechanics, particularly indicial notation, capability of programming in MATLAB and introductory course in finite elements.
- Topics : 1D Lagrangian FEM formulation, continuum mechanics, total Lagrangian and updated Lagrangian formulation, explicit and implicit integration, Newton's method and constraints, arc-length method and stability of the solutions, numerical and material instability.
- Computer Usage:
- Students will primarily use Matlab with the options to use C, C++, Fortran, etc. and write a simple FEM code.
 - Use of ANSYS to solve static problems will be introduced in this Quarter through one or two ANSYS lab sessions, if time permits.
- Grading: 20% homework; 30% midterm exam; 50% final project.
- Homework: Regular homework due 1 week after day assigned. Computer homework due 2 weeks after day assigned. Late submission will not be graded.
- Special Needs: If you have any special needs related to your participation in this course, including identified visual impairment, hearing impairment, physical impairment, communication disorder, and/or specific learning disability that may influence your performance in this course, you should meet with the instructor to arrange for reasonable provisions to ensure an equitable opportunity to meet all the requirements

of this course. At the discretion of the instructor, some accommodations may require prior approval by Disability Services.

Policy on academic dishonesty: Academic dishonesty is a serious matter and will be dealt with as provided for in the student code of conduct by University of Cincinnati.