



**Locations:**

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## **Fracture, Damage & Failure Using LS-DYNA**

**Instructor: Dr. Ala (Al) Tabiei**

**1.5 Days - \$1,250 Students \$950 w/student ID**

**Includes on site continental breakfasts, lunches, breaks, class dinner**

**Includes 30-day LS-DYNA demo license to practice**

**Prerequisite:** Introduction to LS-DYNA Class, or equivalent experience.  
Students should have a command of the LS-DYNA keywords and options associated with fracture, damage and failure materials

**Description:** This advanced class is on failure and fracture in LS-DYNA. It provides information on the use of LS-DYNA for most problems that involve failure and fracture. The class will provide understanding of what formulation is used for a particular situation.  
Examples are used to illustrate the points made in the lectures.

### **Course Outline**

- **Introduction and Historical Review**
    - Brittle Failure
    - Ductile Failure
  - **Introduction and Fundamental Theoretical Concepts**
    - Failure Theories
    - Damage Models
    - Fracture Mechanics
  - **Element Erosion Advantages & Short Comings (solution to the problem)**
  - **Current LS-DYNA Capabilities to Model Failure and Damage**
  - **Current LS-DYNA Capabilities to Model Fracture**
  - **Fracture in Lagrangian, Eulerian, SPH, XFEM, EFG, and DEM Methods**
  - **LS-DYNA Fracture Capabilities Verification examples**
  - **MAT\_ADD\_EROSION and the GISSMO Model**
  - **Material Models with Failure**
    - Isotropic Materials
    - Hyperelastic Materials
    - Composite Materials
    - Geotech Materials
  - **Modeling Delamination and Debonding in LSD-YNA**
    - Cohesive Elements
    - Tied Contact with Failure
  - **Summary and Concluding Remark**
- Workshop:** There will be several examples, which are designed to understand and reinforce the lectures and the concepts presented in the course.
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