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**ON LINE****Implicit LS-DYNA**

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

**2 Days - \$1,000 Students \$500 w/student ID**

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

**Prerequisite:** Introduction to LS-DYNA Class, or equivalent experience.  
Students should have a knowledge of the LS-DYNA keywords and options associated with Implicit analyses.

**Description:** The class is designed for students to use LS-DYNA Implicit for linear and nonlinear static and dynamic analysis/simulations. Detailed descriptions are given of the data required to run implicit analysis. Examples are used to illustrate the points made in the lectures. The course will provide users with experience of running and trouble-shooting an actual LS-DYNA Implicit analysis. There will be several examples, which are designed to understand and reinforce the lectures and the concepts presented

**The course is useful To:**

- Engineers that want to use LS-DYNA/Explicit to perform quasi-static analysis.
- For engineers with LS-DYNA and NIKE3D and other implicit codes experience who want to use the keyword format for Implicit problems.
- For engineers/researchers working in the area of deformation and strength of isotropic and most common materials, metal forming, as well as those who are working on biomechanics problems.

**Day 1 & 2**

- Finite Element Modeling. Do you need Implicit or Explicit Analysis?
- Current LS-DYNA Implicit Capability (material models, elements, contacts, etc.)
- Introduction to Nonlinear Continuum Mechanics
- The Nonlinear Finite Element Static and Dynamic Equations
  - Geometric Nonlinearity
  - Material Nonlinearity
  - Contact Nonlinearity
- Nonlinear solution strategies
- Introduction to Inelasticity and Plasticity
- Fundamental Modeling Techniques and Input Syntax
- Linear and Nonlinear Static Analysis
- Linear and Nonlinear Dynamic Analysis
- Stress Initialization Implicit/Explicit
- Contact Problems and Implicit Formulation
- Stability Problems and Non-convergence
- Implicit Formulation and Some Common Material Models (Plasticity, Rubber, etc.)
- Understanding and Resolving Divergence Problems
- Stress Initialization Implicit/Explicit, Explicit/Implicit, and multi-steps simulations
- The difference between explicit and implicit simulations (comparison between explicit and implicit will be performed using two examples).
- Ways to battle non-convergence
- Quasi-static analysis using explicit and implicit LS-DYNA
- How to tell if your FE results are correct .