



# IFS Academy

Training for the future!!!

## **ANSYS Advanced Heat Transfer Analysis Course Curriculum**

### **Chapter 1: Overview**

- A. Related Seminars/Training
- B. Other Sources of Information

### **Chapter 2: Fundamental Concepts**

- A. Nomenclature
- B. Typical Units
- C. Modes of Heat Transfer
- D. Fundamental Characteristics
- E. Error Estimation
- F. What Makes A Thermal Analysis Nonlinear?
- G. Comparison to Structural Analysis
- H. Element Library
- I. Workshop

### **Chapter 3: Steady State Heat Transfer (no mass transport)**

- a. Definitions
- b. Thermal Loads and Boundary Conditions
- c. Thermal Analysis Template
- d. Steady State Heat Transfer Example
- e. Workshop

### **Chapter 4: Additional Considerations for Nonlinear Analysis**

- A. Preprocessing Considerations
- B. Loading and Solution
- C. Nonlinear Steady-State Solution Procedure
- D. Time Considerations

- E. Starting Temperature and
- F. Convergence 4-37
- G. Output Controls and Postprocessing
- H. Workshop

#### **Chapter 5: Transient Analysis**

- A. Definitions and Preprocessing
- B. "Time" and Solution Procedure
- C. Initial Conditions
- D. Time Integration and Loading
- E. Postprocessing
- F. Workshop

#### **Chapter 6: Complex, Time and Spatially Varying Boundary Conditions**

- A. Tabular Boundary Conditions
- B. Primary Variables
- C. FLUID116 and SURF15x
- D. Special Considerations
- E. Defining and Checking Tables Using APDL
- F. Examples
- G. Time Step Control
- H. Output Control
- I. Function Tool
- J. Workshop

#### **Chapter 7: Additional Convection/Heat Flux Loading Options and Simple Thermal/Flow Elements**

- A. Surface Effect Elements
- B. Convection Links
- C. Contact Resistance
- D. 1-D Thermal Flow with FLUID116
- E. Interfacing with Surface Effect
- F. Elements (FLUID116)
- G. Example with Mass Transport
- H. Workshop

## **Chapter 8: Radiation Heat Transfer**

- A. Overview
- B. General Characteristics
- C. ANSYS and Radiation
- D. Form Factors
- E. Modeling Radiation in ANSYS
- F. Using Surface Effect Elements
- G. Using Link Elements
- H. Radiation Matrix Utility (AUX12)
- I. Radiosity Solver Method
- J. Example
- K. Workshop

## **Chapter 9: Phase Change Analysis**

- A. Terminology and Applications
- B. Latent Heat and Enthalpy
- C. Solving Phase Change Analyses
- D. Postprocessing
- E. Example

## **Chapter 10: Special Features Advanced Topics      10-1**

- A. Special Features
- B. Coupled-Field Analysis
- C. The Direct Method
- D. The Sequential Method
- E. Physics Environments
- F. Thermal Stress Analysis
- G. Detailed Procedure of Thermal Stress
- H. Thermal Contact
- I. Workshop

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