SYLLABUS

The course syllabus shown is based on the information available at the drafting of this outline. Instructors and/or course lectures may change.

Monday
8:30 – 10:00 Basic Techniques for Reducing Machinery Vibration, Dr. Vance
Reviews basic vibration theory and shows how it is used for diagnostic and troubleshooting

10:00 – 10:30 Break

10:30 – 12:00 Introduction to Rotordynamics, Dr. Vance
The Jeffcott model, Critical speeds and Natural Frequencies

12:00 – 1:30 Lunch Break

1:30 – 3:00 Direct and Cross-Coupled Stiffness and Damping Coefficients and Their Effect on Rotordynamics, Dr. Vance
Cross-coupling and fractional frequency whirl, effect of support stiffness

3:00 – 3:30 Break

3:30 – 5:00 Rotordynamics Overview and API Requirements, Dr. Murphy

Tuesday
8:30 – 10:00 Case Studies Dealing with Critical Speed Problems, Dr. Childs

10:00 – 10:30 Break

10:30 – 12:00 More Material on Rotordynamics, Dr. Childs
Bent shaft, Orthotropic supports, Parametric Excitation, Newkirk and Morton effect

12:00 – 1:30 Lunch Break

1:30 – 3:00 Gas Seals and Their Effect on Steam Turbine and Compressor Rotordynamics, Dr. Childs

3:00 – 3:30 Break

3:30 – 5:00 Liquid Seals and Their Effect on Pump Rotordynamics, Dr. Childs
**Wednesday**

8:30 – 10:00  Rotodynamic Instability Explained and Vibration Damping Devices for Turbomachinery, Dr. Vance
   Includes demonstrations of internal friction and aerodynamic negative damping, squeeze film dampers, wire mesh, and TAMSEALSTM

10:00 – 10:30  Break

10:30 – 12:00  Introduction to Computer Modeling of Rotodynamics, Dr. Murphy

12:00 – 1:30  Lunch Break

1:30 – 3:00  Torsional Vibrations Overview and Analysis, Dr. Vance

3:00 – 3:30  Break

3:30 – 5:00  Torsional Dynamics Overview with Steady State and Transient Analysis, Dr. Murphy

**Thursday**

8:30 -10:00  Squeeze Film Dampers, Dr. San Andrés
   Design, Operations, Models and Technical Issues

10:00 – 10:30  Break

10:30 – 12:00  Oil Free Bearings for Turbomachinery, Dr. San Andrés

12:00 – 1:30  Lunch Break

1:30 – 3:00  Design and Application of Fluid Film Bearings, Dr. Zeidan
   Fluid film bearing fundamentals, advantages and disadvantages of bearing types and Bearing analysis programs

3:00 – 3:30  Break

3:30 – 5:00  Fluid Film Bearing Failures, Identification and Corrections, Dr. Zeidan

**Friday**

8:30 – 10:00  Planning and Making Rotodynamic Measurements, Dr. Vance

10:00 – 10:30  Break

10:30 – 12:00  Making Analysis and Measurements Work Together, Dr. Vance
   Case studies of an automotive turbocharger, an aircraft turbine engine, and a cable plow

12:00-12:30  Lunch Break

12:30 – 2:00  Computer Modeling of Transient Rotodynamics, Dr. Murphy

2:15 – 3:45  Computer Modeling Demonstration, Dr. Murphy