Introduction to Industrial Gas Turbines and Centrifugal Compressors
Instructors: Dr. Jeff Moore, SwRI; Dr. Rainer Kurz, Solar Turbines; Mr. Griffin Beck, SwRI; Dr. Natalie Smith, SwRI; Mr. John Macha, SwRI; and Mr. Hector Delgado, SwRI.

Days 1 & 2 of the course presents a unique opportunity to join the experts and learn what you need to know in order to apply and operate gas turbines and gas compressors in your operation, as well as, how interact and network with your peers in the field of turbomachinery applications. Topics covered will include gas turbine and compression function, applications, inlet air filtrations, water washing, fuel, surge, control, and testing. In addition to the theoretical presentations, real life case studies will be presented by the instructors in an interactive forum, which will further enhance the students’ skills in troubleshooting gas turbine and gas compressor issues. Acquiring and perfecting these skills will enable students to return to the workplace and perform their job with a much higher level of performance and accuracy.
Day 3 – Wednesday, November 20, 2019
8:30 AM to 5:00 PM

**Root Cause Failure Analysis of Gas Turbines**
Instructors: Mr. John Macha, Mr. Hector Delgado, Mr. Charles Krouse, Mr. Aaron Rimpel, Mr. Seth Cunningham, Ms. Mirella Vargas, and Dr. Jason Wilkes, all with SWRI

Day 3 will include a tutorial with case studies that is designed to provide both a structural and technical insight into the root cause failure analysis of typical gas turbine failures. A thorough RCFA investigation involves utilizing multidisciplinary expertise of metallurgical examination, fluid-structure interaction, fatigue and fracture analysis, corrosion assessment, thermodynamics, and structural dynamics. Day 3 will show how the information gained from each discipline can be combined to reach conclusive determination of the root cause of common gas turbine failures. Day 3 will demonstrate investigative tools to distinguish between various contributing causes such as: design deficiencies, manufacturing defects, adverse environmental conditions, operating errors, and intentional or unintentional changes of the machinery process that precede the failure.

Day 3 will also include a hands-on portion that will focus on Rotordynamics and Vibration Analysis. Students will have the unique opportunity to practice what they have learned by taking part in a live demonstration on rotordynamic issues and characterization of key instabilities in the gas turbine laboratory at SwRI. Real life case studies will further enhance the students’ skills in troubleshooting rotodynamic issues and, vibration analysis. Acquiring and perfecting these skills will enable students to return to the workplace and perform their job with a much higher level of performance and accuracy.

Day 4 – Thursday, November 21, 2019
8:30 AM to noon

**Piping, Combustion, and Dry Gas Seals**
Instructors: Ms. Sarah Simons, Dr. Jacob Delimont, Ms. Meera Towler, Dr. Timothy Allison, all with SWRI

Day 4 will discuss piping considerations for centrifugal compressors including vortex-sheddng. The basics of combustors will then be covered discussing the design considerations including dry low NOx combustors. Finally, dry gas seals will be covered including best practices and common failure modes. The course will conclude with a summary of active research and development programs.