

REGISTRATION FORM

(last day to register : Friday July 28,2023

Or register online at www.cryocourses.com

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Pre-registration and Full payment (Credit Card , check or Purchase Order) must accompany any registration. We cannot process registrations at the course. **We accept VISA, MC, AMEX, Diners, Discover, and JCB. We are an encrypted data secure site.**

Method of Payment

Credit Card (fill out below/secure site)

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[Payable to CRYOCO LLC]

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[Register Online at www.cryocourses.com](http://www.cryocourses.com)

Or

[Contact us or email this form to:](mailto:djroth@cryocourses.com)

djroth@cryocourses.com

[Or call direct with registration information to:](#)

David-John Roth

CRYOCO LLC

5 Indian River Ave., Unit 1207

Titusville, FL 32796

(305)-972-8847

IMPORTANT INFORMATION ABOUT THE COURSE

Dates: July 31 to August 4, 2023

5 days - Monday through Friday

Time: 8:00 AM to 5:00 PM daily

Location:

The class is held at the Colorado School of Mines in Golden, Colorado in the Petroleum Room at the CSM Green Center.

Fees: \$3,250 per student. Full payment is due upon registration. Registration deadline is July 28, 2023.

- **Included: copy of 1068 slide presentation class notebook of course notes and data for each student, data charts package, plus one copy each of the hardback textbook: Cryogenic Engineering 2nd Ed., Marcel Dekker, written by Dr. Thomas Flynn. and David-John Roth.**
- **Continental Breakfast, snacks and refreshments are served morning and afternoon daily.**

Registration Fee does NOT include travel/transportation or hotel lodging, which need to be arranged by attendees on your own.

- Welcome packet with important hotel and campus maps information is sent upon successful registration for the course.
- A full list of area hotels and campus information is sent upon paid registration in the course registration welcome packet.

In General : Hotels Located adjacent to the CSM campus are the Table Mountain Inn and Golden Hotel in downtown Golden. Within 2 or 3 miles of campus are numerous other hotel choices that require transportation.

Room availability at some of these hotels and air travel can be limited during the summer as Golden Colorado is a summer vacation destination so please book early.

July 31 to August 4, 2023
at the Colorado School of Mines

CRYOCO LLC Cryogenic Engineering and Safety Annual 5-Day Course

This 5 day course is designed to provide a solid foundation in cryogenic engineering for both degreed engineers, and non-degreed personnel, including operations and technicians using cryogenics.

Register Online
at www.cryocourses.com



CRYOCO LLC
David-John Roth
SME III Cryogenics

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The course is tailored to build a quick and thorough knowledge for working with cryogenic systems, using them safely, in all aspects of design all in one week. The hardware and all the equipment components are well defined in both presentation, methodology and in numerous photographs and films. Photos and lecture presentations of the internal parts and operational films present a thorough understanding of how these systems work in detail. Photographs of internal construction and materials that are not typically visible are explained.



This course is designed for engineers, technicians, and operations personnel in aerospace, research and test facilities, nuclear power, military applications, transportation, and process industries.



Safety with Cryogenic Systems is Priority One.

SYLLABUS: WHAT YOU WILL LEARN

Thermodynamics– Review of first principles and those relations directly applicable to cryogenics

Fluid Properties– Cryogenic fluids (LNG, LO₂, LN₂, LAR, LH₂, LHe) as examples of cryogenic fluids properties and data, processes and uses of fluids, plus handout T-S data books. Defines what's different with cryogenic fluids in bulk and transfer systems.

Materials– Materials properties, acceptable materials, materials compatibility, insulation and techniques, superconductivity, and other intrinsic properties. Live demonstrations with LN₂.

Cryogenic Equipment– Tanks & Pressure Vessels, cryogenic pressure piping, valves, PRV's , joining and connecting systems , lifespans and internal construction.

Refrigeration and Liquefaction– Basic hardware, refrigeration cycles, liquefaction, Carnot efficiency, cryocoolers, power, performance and sizing.

Design– Bulk transfer and Storage, Heat leak, Heat Transfer, quality, performance, cool-down, thermal and mechanical cycling, and systems design overview.

Instrumentation– Proper selection and Uses of techniques, equipment, and how to measure for Temperature, mass flow, pressure.

Vacuum Technology– Review of Proper equipment use and selection, vacuum quality, how to use with proper insulation techniques, out gassing, materials compatibility.

Cryogenic Safety– Working safely and productively with cryogenic fluids and equipment, proper siting and QD relationships, equipment failures, accidents, high pressure gas systems, venting, flaring, flammability, process safety and site safety.. Oxygen and Hydrogen as examples of materials compatibility, asphyxiation, hazard and risk, risk assessments, inspections, and code compliance for **ASME Section VIII, Division 1 and ASME B31.3**.

Photographs and archives: The course is supplemented with numerous photographs and video to from work and vendors compiled from over 30 years of experience of the instructors. These venues allow visual analysis and demonstration of processes and failures from the safe view of lab demonstrations equipment not typically available to engineers and workers in the workplace on a daily basis. These are valuable insights to personnel for safe work practices and respect for the job.

Instructors:

David-John Roth, Chief Engineer/SME III– Cryogenics
Mr. Roth has taught Cryogenic Engineering for 44 years . He is currently based at Kennedy Space Center working on the cryogenic systems design, launch pad refurbishment, with the Fluids and Propulsion Group in support of the NASA SLS manned space program. Mr. Roth is Lead Instructor of CRYOCO LLC has worked on numerous design and build projects with the Dept. of Defense, US Air Force, Navy, nuclear energy, National Lab Systems, and commercial industry as well as expert witness and root cause investigations. His experience in all aspects of cryogenic component hardware, bulk storage and transfer systems, fabrication and design spans 40+ years of equipment, both large and small, in the cryogenics industry.



Offered by CRYOCO LLC

The city of Golden, Colorado is located just 20 minutes from downtown Denver and about 40 minutes from Denver International Airport (DIA).

The Colorado School of Mines is located in the city of Golden directly west of Downtown Denver at the foothills of the Colorado Rocky Mountains.

The 2023 course is currently scheduled to be held in the spacious Petroleum Room at the Green Center located in the center of the campus.