



Students are eligible to earn CEU's for Courses held in the US. All the on-site Courses include a tour of CN's Advanced Laboratories and ample opportunity to discuss real-life examples and questions with lecturers.



Corporate Headquarters

217 Billings Farm Road
White River Junction,
Vermont 05001-9486 USA

Phone 802 296 2321
Fax 802 296 2325
education@ConceptsNREC.com
www.ConceptsNREC.com

2012 Course Information & Registration Form

Concepts NREC Courses are for turbomachinery industry professionals who need to know the latest design tools/capabilities, who want to expand their product range, or who specify, install, use, or troubleshoot turbomachinery equipment. All Courses listed here are to be held at **CN's** Corporate Headquarters in White River Junction, VT. Some Courses will also be offered at International locales. Please check our website, where this information will be added when dates and locations are confirmed, or contact us to get sent these notices.

TURBOMACHINERY: Experimental Techniques for Turbomachinery Development

March 19-22 • \$2,500

The ability to test and diagnose a new turbomachinery stage or system is often the difference between success and failure for a new product. Various disciplines must be mastered for the process to work well and achieve a sensible economical outcome. Learn about test project organization (planning, scoping studies, various check-outs), execution (understanding flow rate, speed, power, pressure, temperature, and traversing) and wrap-up (documentation, data processing, and model building).

TURBOMACHINERY: An Introduction to Improving Design and Performance

April 17-20 • \$2,600

This comprehensive introduction and overview of the design and performance of turbomachines covers the essential elements of axial and radial turbomachinery and fundamental principles of fluid mechanics, thermodynamics, and structural mechanics. Come away with a sound understanding of the basic principles which govern the flow through any turbine, pump, compressor, or fan, with failure mechanisms and life prediction methods.

TURBOMACHINERY: Mechanical Design of Turbomachinery

May 14-16 • \$1,950

This course focuses on structural dynamics, rotordynamics, and bearing design for pumps, fans, compressors, and turbines. It covers the essential design concepts in these areas and demonstrates the application of these principles with extensive practical examples. Multiple lecturers, all experts in their fields, bring with them varying philosophies and backgrounds.

AXIAL TURBINES: Improving Performance and Optimizing Design*

July 16-18 • \$2,000

RADIAL TURBINES: Improving Performance and Optimizing Design*

July 19-20 • \$1,400

[*These Courses offered in sequence to enable attendance at both, if desired. Registrants for both Courses receive a discount.]

Techniques for optimizing the design of Radial and Axial Turbines will be emphasized in these Courses. The technology base of information is surveyed, and the process of design is described in detail, from specification through meanline analysis blade geometry generation, including CFD and FEA analysis.

CENTRIFUGAL PUMPS: Advances in Design, Performance, and Problem-Solving

August 20-24 • \$3,200

Learn the basic phenomena occurring in inlets, impellers, diffusers, volutes, and return channels. The entire development and design process, from 1D to 3D viscous methods, is taught while stressing velocity triangle optimization, cavitation, blade loading, flow, and structural analysis, with special emphasis on stability, laboratory, and model development.

TURBOCHARGERS: Advanced Integration and Designs for Internal Combustion Engines

Sept. 17-19 • \$1,950

The design principles of turbochargers, engine-turbocharger matching, and performance of turbocharged engine systems are taught, as well as methods to ensure that compressor and turbine are correctly matched to the engine, with emphasis on the utilization of exhaust gas energy. Advanced turbocharger system concepts (i.e., variable geometry and compounding) are covered, with emphasis on the problems confronting the engine industry today (i.e., the need for fuel economy and reductions in exhaust emissions), and how turbocharging influences these demands.

CENTRIFUGAL COMPRESSORS: Improving Design for Better Performance and Cost

Oct. 29-Nov. 2 • \$3,200

Understanding the behavior and structural integrity of centrifugal compressors is essential to meeting competitive market needs. Learn about inlets, impellers, diffusers, volutes, and return channels — the entire development/design process from 1D to 3D. Preliminary cycle work, velocity triangle optimization, blade loading considerations, viscous flow field, and structural analysis, as well as surge, are emphasized.

CUSTOM COURSES & TRAINING— Concepts NREC Courses can be customized to suit a project or organization's particular needs. The content, schedule and instructors are determined in consultation with the client company to provide the exact training desired. And because this training is typically held at the customer's facility, there can be tremendous participant travel time/expense savings. Call 802.296.2321 or e-mail education@ConceptsNREC.com for more information.

Registration Information

Registration fees are in US Dollars and are due in advance as attendance is limited. The required Course Textbook, Lecture Notes, a Certificate of Completion, and daytime refreshments are included. Registering without payment does not reserve space. Enrollment priority will be given in the order of payment received.

Registered attendees will be notified of cancellations no later than two weeks prior to the Course start date. The address provided on this form will be used for notification. Registrants may cancel and receive a full refund if notice is received two weeks prior to the Course start date. After that, payment may be applied toward other CN Courses, Workshops, Events, or Publications.

Choose Your Courses

<u>✓</u> COURSE	<u>DATES</u>	<u>LOCATION</u>	<u>FEE*</u>
___ Turbomachinery: Experimental Techniques for Turbomachinery Development	Mar 19-22, 2012	Vermont / USA	\$2,500
___ Turbomachinery: An Introduction to Improving Design & Performance	Apr 17-20, 2012	Vermont / USA	\$2,600
___ Turbomachinery: Mechanical Design of Turbomachinery	May 14-16, 2012	Vermont / USA	\$1,950
___ Axial Turbines: Improving Performance & Optimizing Design ^	Jul 16-18, 2012	Vermont / USA	\$2,000
___ Radial Turbines: Improving Performance & Optimizing Design ^	Jul 19-20, 2012	Vermont / USA	\$1,400
___ Centrifugal Pumps: Advances in Design, Performance, & Problem Solving	Aug 20-24, 2012	Vermont / USA	\$3,200
___ Turbochargers: Advanced Integration & Design for Internal Combustion Engines	Sep 17-19, 2012	Vermont / USA	\$1,950
___ Centrifugal Compressors: Improving Design for Better Performance & Cost	Oct 29 - Nov 2, 2012	Vermont / USA	\$3,200

^ Participants who register for BOTH the Axial and Radial Turbine Courses pay \$3,250 total, which includes one copy of the Course Textbook.

* Receive a \$100 discount if Course fee is received at least 21 days prior to Course start date. For three or more students from the same company location, deduct 25% for the third and subsequent registrations. Full-time students and educators may deduct 33%.

Participant Information

Mr. Ms. Mrs. Dr. Professor

First Name _____ Last Name _____

Job Title _____ Company _____

Mailing Address (with Mailstop, if appropriate) _____

City _____ State/Province _____ Country _____ Postal Code _____

Phone _____ Fax _____ E-mail _____

Export Compliance Information		I am a US citizen. <input type="checkbox"/> Yes <input type="checkbox"/> No	
If No, please state your country of residence, country of origin and country of citizenship, as well as type of Visa or Green Card, or whether you will enter the US under a Visa Waiver Program: _____			
The primary purpose for the technology/information gained from this course will be (please specify):		I declare that the technology/information that I purchase through this CN Course is not for Nuclear, Chemical Weapon, or Missile Test and will not be re-exported to any country or national of another country without prior written permission from CN.	
<input type="checkbox"/> Military <input type="checkbox"/> Commercial <input type="checkbox"/> Educational		Signature: _____	

Payment Information

My company is a current APS (Agile Product Support) Member.

APS Members can attend one FREE Course per year. However, the Course Textbook is not included. Do you want to purchase the Course Textbook? Yes / No

\$ _____ Total (from above, include discounts) Check Visa Mastercard AmEx

Credit Card Number _____ Exp Date (mm/yy) _____ Sec Code _____

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E-mail this form to: education@ConceptsNREC.com or Print out/Fax to: 802.296.2325