

Setting Standards in Practical Learning



Assessing and Improving Reliability of Rotating Equipment

September 13-14, 2010 • Calgary, AB

Efficient Power Generation: Gas Turbines, Co-Generation, Combined Cycle Plants

September 13-17, 2010 • Edmonton, AB

Mechanical Engineering for Non-Mechanical Engineers

September 20-24, 2010 • Edmonton, AB

Process Equipment and Piping Systems: Application, Design and Operation

October 18-21, 2010 • Edmonton, AB

Continuing Education Units (CEUs)

EPIC Educational Program Innovations Center has been approved as an Authorized Provider by the International Association of Continuing Education and Training (IACET), 8405 Greensboro Drive, Suite 800, McLean, VA 22102. In obtaining this approval, EPIC Educational Program Innovations Center has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice internationally. As a result of our Authorized Provider membership status, EPIC Educational Program Innovations Center is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards.

CEUs indicate the number of hours invested by you in the course to acquire new knowledge and skills. As an IACET Authorized Provider, EPIC Educational Program Innovations Center offers CEUs for its programs that qualify under IACET guidelines, therefore the CEUs awarded by EPIC are recognized internationally. They are convertible to professional development hours (PDHs) required by professional engineering associations and learned engineering societies. One CEU is equal to ten PDHs.

In order to successfully complete an EPIC course and earn the indicated CEUs, participants must demonstrate achievement of the learning outcomes listed for the program. This can be achieved by taking part in the discussions, case studies, workshops, practice exercises, etc. as well as the question and answer periods and any tests or assignments that may be administered. Those who are unable to demonstrate achievement of the learning outcomes (due to lack of participation) or who have missed more than 5% of the course will not be awarded the indicated CEUs. Successful completion of EPIC courses qualifies you to receive a certificate of completion from EPIC Educational Program Innovations Center. This certificate indicates the CEUs earned by you.

EPIC On-Site Program A Special Opportunity

EPIC courses are available as private on-site programs when you need to have a group of employees trained within your organization. They can be identical to the program offered in EPIC brochures, or modified to suit your specific requirements. Take advantages of this opportunity to save time and travel expenses by having our instructor(s) come to you.

For more information on these programs, please visit our website at www.epic-edu.com or call Tim Chugh at 1-888-374-2338 ext. 242 or email him at tchugh@epic-edu.com.

www.epic-edu.com



Continuing Education Units Awarded

After participating in this course, you will be able to:

discover how to monitor the condition of rotating machinery and how to diagnose problems using state-of-the-art technology including thermal, lubricant and vibration-based fault detection and diagnostic techniques

gain a working knowledge of the techniques of reliability engineering and the ability to apply them effectively in improving the maintenance, maintainability, and reliability of rotating machinery

develop the principles and practice of reliability-centered maintenance and of condition monitoring, how to interpret the measurements and symptoms, and how to diagnose associated faults

add to your ability to evaluate the economic impact of reliability improvement activities and to achieve cost-effective maintenance of your plant equipment

broaden your technical knowledge base leading to increased contributions in plant reliability, integrity and reduced downtime as well as enhance your career advancement potential

Description

Reliable operation of the rotating equipment in any plant is its life blood. Engineers must have an integrated viewpoint focusing on it through design, operation and maintenance. This seminar comprehensively presents from such an integrated viewpoint state-of-the-art techniques and methodologies for improving reliability of rotating equipment.

Topics include reliability basics; maintenance philosophies and strategies, their relationships to each other, and their effective application; machinery condition monitoring; machinery condition assessment and asset management; effective fault diagnosis techniques; failure mode and causal analysis; life-cycle strategies to promote increased reliability; reliability improvement program development and implementation including structure and personnel considerations; and business ramifications of reliability improvement.

The course will comprise lectures and workshop to maximize your benefits. Additionally, an optional "Question and Answer" period is included to provide you with opportunity to get expert answers on your specific questions.

Objective

To provide a comprehensive understanding of the fundamentals and techniques underlying the assessment of rotating machinery reliability, detection and diagnosis of faults, and best practices for cost-effective reliability improvement.

Who Should Attend

Design, maintenance, machinery and plant engineers, supervisors and technicians as well as operations personnel involved in operation, condition assessment, troubleshooting and maintenance of rotating equipment in the manufacturing, chemical processing, pharmaceutical, petrochemical, power, mining, pulp and paper, food, and other process industries. Recent graduates will benefit within the short period of two days from years of experience of the instructor.

Program Outline

Instructor: Faculty: Nabil Al-Khirdaji, Kappa Associates International

- Welcome, Introduction, Workshop Preview, Learning Outcomes and the Assessment Method
- Reliability Engineering
- Maintenance Methods and Strategies
- Reliability Improvement Program Development and Implementation
- Economics of Machinery Failures and Reliability
- Effectiveness of Reliability Deficiency Corrections
- Vibration in Rotating Machinery
- Industrial Lubrication
- Question and Answer Session with Instructor
- Machinery Component Failure and Analysis
- Fault Causes, Detection, and Diagnosis
- Machinery Condition Monitoring
- Machinery Failure Analysis and Prevention
- Workshop
- Questions and Answers and Feedback to Participants on Achievement of Learning Outcomes

Efficient Power Generation: Gas Turbines, Co-Generation, Combined Cycle Plants

3.0 CEUs/30 PDHs

After participating in this course, you will be able to:

perform computer simulation of gas turbines, co-generation, and combined cycle plants and plot the trends for different scenarios

identify all components and subsystems of the various types of gas turbines, steam power plants, co-generation, and combined cycle plants

explain the advantages, applications, performance and economics of co-generation and combined cycle plants

describe the functions of compressors, turbines, governing systems, combustors, deaerators, feed water heaters, transformers, generators, and auxiliaries

determine the maintenance required for gas turbines, steam power plants, and generators to minimize their operating cost and maximize their efficiency, reliability, and longevity

analyze the environmental emissions

specify the latest instrumentation and control systems of gas turbines and combined cycles

increase your knowledge of predictive and preventive maintenance, reliability and testing

apply selection consideration to co-generation and combined-cycle plants

operate the gas turbine for an extended operating period by avoiding unnecessary outages and maintenance activities.

Description

De-regulation of the electricity markets is sweeping across the world. There will be increasing opportunities for highly efficient power generating plants, such as combined cycle and co-generation, to compete against the older plants of established utilities. These new plants are environmentally friendly and more than twice as efficient as the older fossil and nuclear generating plants. Independent Power Producers and utilities are planning to construct additional combined cycle and co-generation plants due to their short construction lead-time, low capital investment, long-term fuel price stability, low emissions, lower transmission costs, increased reliability, and short pay-back period.

This course covers in detail each of the components such as compressors, gas and steam turbines, heat recovery steam generators, deaerators, condensers, lubricating systems, instrumentation, control systems, transformers, and generators, as well as monitoring and governing systems. The selection considerations, operation, maintenance and economics of co-generation plants and combined cycles will also be covered.

This seminar provides also in-depth computer simulation of gas turbines under steady-state and transient conditions. The analysis performed by gas turbine simulators provides the following benefits.

Objective

To provide a comprehensive understanding of computer simulation of gas turbines, combined cycle and co-generation plants as well as their selection criteria, operation and maintenance requirements, and economics.

Who Should Attend

Process engineers, control engineers, equipment engineers, mechanical engineers, electrical engineers, project managers, technicians, maintenance personnel, energy and design consultants, optimization specialists, utilities coordinators and other technical individuals.

Special Features

The following is included with your registration:

A book (600 pages) titled "POWER GENERATION HANDBOOK" published by McGraw-Hill in 2002 and authored by the instructor / A USB key or CD covering additional information about power generation and computer simulation / Each delegate will receive a copy of the gas turbine computer simulation program - please bring the operational data of your gas turbines, co-generation and, combined cycle plants. The instructor will be able to perform simulation of your data to reduce unnecessary maintenance activities, optimize the profits, and minimize environmental emissions.

Faculty: Philip Kiameh, University of Toronto, Ontario Power Generation

- Welcome, Introduction, Workshop Preview, Learning Outcomes and the Assessment Method
- Review of Thermodynamics Principles
- Steam Power Plants; Components; Turbines and Auxiliaries
- Steam Turbine Maintenance
- Power Station Performance Monitoring
- The Turbine Governing Systems; Protective Devices and Instrumentation; and Lubrication Systems
- Gland Sealing System
- Gas Turbine Design
- Case Study: Gas Turbine Calculations
- Gas Turbine Compressors and Axial-Flow Turbines
- Gas Turbine Materials, Lubrication and Fuel Systems; Bearing and Seals; Instrumentation and Control Systems; Performance Characteristics; Operating and Maintenance Considerations; and Emission Guidelines and Control Methods
- Combined Cycles
- Single-Shaft Combined-Cycle
- Steam Turbine Selection for Combined-Cycle Power System
- Absorption Chillers
- Workshop I : Selection Considerations of Combined Cycles and Co-Generation Plants
- Workshop II: Applications of Co-Generation and Combined Cycle Plants
- Workshop III: Cogeneration Application Considerations
- Economic and Technical Considerations for Combined Cycle Performance Enhancement Options
- Selection of the Best Power Enhancement Option for Combined Cycle Plants
- Economics of Combined Cycles Co-Generation Plants
- Workshop IV: Computer Simulation of Gas Turbines
- Transformers, their Components and Maintenance
- Synchronous Generators
- Generator Components, Auxiliaries and Excitation; Testing, Inspection and Maintenance
- Questions and Answers and Feedback to Participants on Achievement of Learning Outcomes

After participating in this course, you will be able to:

apply at your workplace, the practical knowledge you will learn regarding the operation and maintenance of mechanical equipment
make informed decisions by appreciating the importance of interaction between mechanical engineering and other disciplines
add to your ability to achieve cost-effective installation and operation of equipment and systems
discover the many codes and regulations governing the operation of mechanical equipment and apply to your own projects

Description

The procurement, installation and operation of equipment is often under the control of Engineers and Technicians who, although qualified in their own discipline, may not have received formal Mechanical Engineering training. To be effective, Engineers and Technicians of all disciplines should have a fundamental understanding of the principles that dictate the design, operation and maintenance of Mechanical equipment. This understanding will benefit not only the individual, but also the industry in which the individual is employed. This course is designed to meet the needs of Engineers and Technicians of all disciplines and will also benefit Mechanical Engineers seeking to refresh their knowledge. Exercises illustrating many of the concepts are included in the course.

Complimentary Text Book

Upon attending the course a text book entitled 'Mechanical Design of Machine Elements and Machines' will be provided. This text provides a comprehensive basis of Mechanical Engineering concepts to be used to complement the course material presented and for future reference.

Objectives

To provide a basic understanding of the design theory behind mechanical components typically found in industry / To outline the key features of a variety of mechanical equipment types / To provide an awareness of the codes and regulations that governs the installation and operation of mechanical equipment.

Who Should Attend

Industrial and commercial plant and facilities engineers and operators, consultants, property managers, project engineers, design engineers, armed services personnel and other technical personnel who are involved in the operation and maintenance of mechanical equipment, systems and processes. Professionals who need to add to their current experience and knowledge of mechanical engineering. Mechanical engineers who require practical knowledge of certain aspects of mechanical engineering or who need to refresh their knowledge. New graduates will benefit from the practical industrial experience of the instructor.

Faculty: Alan Powell M.Sc., P.Eng., Program Director, EPIC

- Welcome, Introduction, Workshop Preview, Learning Outcomes and the Assessment Method
- Mechanical Engineering-An Overview
- Engineering Materials
- Metal Fabrication Processes
- Mechanics of Materials
- Torque and Power
- Power Transmission
- Lubrication
- Bearings
- Pressure Vessels
- Liquid Storage Tanks
- Heat Transfer Systems and Equipment
- Fired Boilers, Process Heaters and Heat Recovery Equipment
- Fluid Engineering
- Industrial Piping
- Pumps
- HVAC and Refrigeration Systems
- Instrumentation and Control
- Fans, Blowers and Compressors
- Process and Instrument Diagrams
- Miscellaneous Mechanical Components
- Equipment Reliability
- Questions and Answers and Feedback to Participants on Achievement of Learning Outcomes

Process Equipment and Piping Systems: Application, Design and Operation

After participating in this seminar, you will be able to:

size and select major process equipment for specific applications with the understanding of equipment design gained from this course
improve plant availability and productivity by applying industry standards and best practices in designing business focused facilities
identify key requirements of relevant design and operation standards and industry practices
design, operate and maintain pressure, thermal, and fluid handling equipment
assess the degradation and condition of process equipment as well as make the run/repair/replace decision
achieve measurable improvement in the mechanical reliability level in the plant and a reduction in the failure rates

Description

Engineers in process plants need an integrated and practical understanding of the key design, operation and maintenance aspects of major process equipment. This course aims at providing participants with the skills to design and build business-focused facilities that can be safely and effectively operated and maintained while complying with all applicable regulatory requirements and company policies and procedures. To achieve this end, the process equipment and piping systems must have the required level of reliability to perform their intended function, at the least life cycle cost, over their specified life.

This course builds on a focused and practical coverage of engineering materials properties and selection method and provides structured procedures and applicable formulae and methods for the mechanical design of pressure equipment, thermal equipment, piping systems and machinery – pumps, compressors and drives. It also emphasizes the importance of interactions and common understanding by engineering, operations and maintenance groups of the equipment design aspects and envelopes and the criticality of operating and maintaining the equipment within its design envelopes.

Who Should Attend

Professional and technical personnel in the petroleum, process, power, manufacturing, and other related industries. Mechanical engineers and designers as well as process engineers, project engineers, and other discipline engineers will benefit from this course. It is a "must take" course for recent engineering graduates who want to advance in their career by learning from others' industrial experience. Inspectors and other operations and maintenance technical personnel involved in the operation and maintenance of process equipment and piping systems will also benefit from this course.

Faculty: Nabil Al-Khirdaji, President, Kappa Associates International

Welcome, Introduction, Workshop Preview, Learning Outcomes and the Assessment Method

- **Key Design Considerations, Guidelines and Practices**
- Process Equipment - An Overview
- Plant Integrity and Reliability
- Equipment Design Bases and Methodology
- Business-Focused-Facilities – Appropriate quality at lowest life cycle cost
- Safety by Design
- Compliance with Regulations and Acts - HS&E requirements and considerations

Design and Operation of Pressure Equipment

- Pressure Vessels and Reactors
- Liquid Storage Tanks
- Piping Systems
- Overpressure Protection

Design and Operation of Thermal and Fluid Handling Equipment

- Process Heaters
- Boilers
- Heat Exchangers
- Pumps
- Compressors
- Electric motors

Degradation and Condition Assessment of Process Equipment

- Degradation processes in Fixed Equipment
- Industrial Failures and Failure Prevention
- Inspection and Testing
- Fitness-For-Service Assessment
- Machinery Condition Monitoring

Questions and Answers and Feedback to Participants on Achievement of Learning Outcomes

5 Easy Ways to Register

If you have any questions, or require assistance, phone Ruby at: 1-888-374-2338 ext. 222

You may fax the completed form to: 1-800-866-6343 (24 hours)

Our mailing address is: EPIC Learning Centre 5759 Coopers Avenue Mississauga, ON L4Z 1R9

You may e-mail the completed form to Ruby at: rsubben@epic-edu.com

You may register online by completing our online form at: www.epic-edu.com

Course Locations:

Calgary

Radisson Hotel Calgary Airport
2120-16th Avenue NE, Calgary, AB T2E 1L4
Tel: 403 291-4666

Edmonton

Delta Edmonton Center Suite
10222-102nd Street, Edmonton, AB T5J 4C5
Tel: 1-800-661-6655

Attendee(S): Please list additional names on separate copies made from this registration form.

Mr/Mrs/Ms _____

Position _____

Company/Organization _____

Nature of Business _____

Address _____

City _____ **Province** _____ **Postal Code** _____

Tel. (Office) _____ **Tel. (Residence)** _____

Fax _____ **E-mail** _____

Please provide both business and residence telephone numbers in case of changes.

YES, I would like to receive notification of upcoming courses by E-mail

How did you hear about this course?

Tax Information:

If tax-exempt, enter tax-exempt number below and attach copy of tax-exempt certificate

Questions? Phone our Toll Free at (888) 374-2338 ext. 222. **GST# R135 276 467**

Exempt # _____

Payment (Payment must be received before the seminar/course start date.)

Tuition (Canadian funds): \$ _____

Plus GST or HST: \$ _____

Total amount due: \$ _____

Certified/Company Cheque or Money Order# _____

(Payable to EPIC Educational Program Innovations Center) Purchase order # _____

Purchase orders must be received in advance of the course

Accounts Payable personnel: _____

Tel.: _____

Charge to:   

Card Number _____ EXP. Date _____

Authorized Signature _____



Yes, Sign Me Up For:

- Assessing and Improving Reliability of Rotating Equipment**
Course Code: 01-0912-2119
September 13-14, 2010 • Calgary, AB
The fee for the course is \$1,295 + GST.
If you register after August 13, 2010 the fee increases to \$1,465 + GST.
- Efficient Power Generation: Gas Turbines, Co-Generation, Combined Cycle Plants**
Course Code: 01-0906-2119
September 13-17, 2010 • Edmonton, AB
The fee for the course is \$2,895 + GST.
If you register after August 13, 2010 the fee increases to \$3,265 + GST.
- Mechanical Engineering for Non-Mechanical Engineers**
Course Code: 01-0907-2119
September 20-24, 2010 • Edmonton, AB
The fee for the course is \$2,810 + GST.
If you register after August 20, 2010 the fee increases to \$3,210 + GST.
- Process Equipment and Piping Systems: Application, Design and Operation**
Course Code: 01-1023-2119
October 18-21, 2010 • Edmonton, AB
The fee for the course is \$2,495 + GST.
If you register after September 17, 2010 the fee increases to \$2,695 + GST.

Group Discounts and Withdrawals

Registration covers all program materials, refreshments during breaks and lunch but excludes accommodation. For organizations sending more than one participant, the following discounts to the course fee apply: 10% discount to the second, 15% to the third, 20% to the fourth and 25% to the fifth and subsequent registrations.

To withdraw from a course, you must send your request in writing with the official receipt to our office:

- Fifteen or more business days in advance: full refund less \$50.00 administration charge.
- Five to fourteen business days in advance: non-refundable credit of equal value for any future EPIC seminar within one year. Credits are transferable within your organization.

In case of an unexpected event occurring after this time, you may send someone else to take your place without any additional cost. If a speaker is not available due to unforeseen circumstances, another speaker of equal ability will be substituted. EPIC reserves the right to cancel or change the date or location of its events. EPIC's responsibility will, under no circumstances, exceed the amount of the fee collected. EPIC is not responsible for the purchase of non-refundable travel arrangements or accommodation or any associated cancellation/ change fees. To avoid any fees or charges, please call to confirm that the course is running before confirming travel arrangements and accommodations.