Essential Concepts of Bearing Technology

INSTRUCTORS:
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COURSE INFORMATION

Course Description
This course is specially designed for engineers and others with technical backgrounds that have had limited exposure to rolling element bearings and need to adapt their technical training to bearings or seek an upgrade to their technical knowledge. The Essentials Course focuses on understanding basic internal geometry, tribology, bearing attributes and applications and explores the basic concepts around manufacturing methods, loads, internal load contacts, lubrication and failure.

Who Should Attend
Those wanting to learn about rolling bearing technology beyond what is available in general catalogs. A basic understanding of mechanical principles, bearing terminology and bearing fundamentals required. Suggested attendees include new bearing application hires, bearing design, bearing users, customer technical support, sales and marketing management, manufacturing and quality control.

Learning Objectives

- Basic understanding of the different types of rolling element bearings and their applications.
- Basic understanding bearing loading types and their sources.
- Understanding of the load distribution within bearings and resulting contact stresses.
- Understanding the types of internal stresses and bearing load ratings.
- Understanding of why bearings fail.
- Understanding of how lubricant films are developed in the rolling element contacts.
- Understanding of the importance of lubrication on bearing life.
- Basic understanding of bearing deflections and preload.
- Understanding of bearing life calculations used in standards.
- Introduce bearing materials and standards overview.

Required Textbook
Essential Concepts of Bearing Technology Manual by Dan Snyder, Tim Ovaert, and Vern Wedeven
Essential Concepts of Bearing Technology 5th Edition by Tedric A. Harris & Michael N. Kotzalas

COURSE OUTLINE

- Rolling Bearing Types, Attributes, Typical Applications,
- Macro-geometry & ISO and ABMA Dimensional Standards
- Bearing Loads & Applications: Static and Dynamic
- Mounting Arrangements and Fitting Practices, Held/Free, Methods

- Contact Stresses – Surface & Subsurface
- Fatigue Initiating Stresses
- Bearing Load Sharing & Internal Loading
- Introduction to Bearing Pre-Load
- Materials for Ball & Roller Bearings
- Concepts in Friction, Lubrication & Wear
- Ball & Roller Bearing Deflections & Stiffness
- Bearing Lubricants, EHL & Lubrication Methods
- Failure Modes in Rolling Bearings
- Bearing Life Standards & Calculation Methods

STUDENT FEEDBACK AND GRADING PROCEDURES

Assignments
There will be a opportunities for question and answer as well as group work or an assessment.

COURSE MANAGEMENT

Weather Delays and Cancelations
We will communicate any cancellations, delays or other concerns for safety prior to class via email, voicemail, and/or text message. Please be sure that we have all pertinent contact information as you travel to your class location.

Attendance for Domestic and International Students
Please be mindful that these are short, accelerated courses. Attendance is extremely important. If you are going to be absent from any class day, please contact the course coordinator.

Plagiarism, Cheating and other types of Misconduct
Plagiarism[1], cheating and other types of misconduct are unacceptable.

Students with Disabilities
Students requiring assistance and accommodation should complete the Special Accommodation Request form and submit it to Stephanie Smialek, Education Manager at smialek@motionpower.org. She can be reached at 773-302-8026.

Grievance Procedures
Students who have concerns about the class are encouraged to contact Stephanie Smialek, Education Manager, at smialek@motionpower.org or 773-302-8026.

Outline Changes
The instructor reserves the right to modify the outline during the course of the class.

LEARNING AND OTHER RESOURCES

Links for writing resources:
- grammar.ccc.commnet.edu/grammar

1 Plagiarism is defined as "the use or close imitation of the language and thoughts of another author and the representation of them as one's own original work."

- www.merriam-webster.com

Links for Math resources:

- www.sosmath.com
- Khan Academy on www.youtube.com

Links for time management, study skills and note taking resources:

- www.mindtools.com
- www.testakingtips.com

Links for career resources:

- https://www.agma.org/newsroom/jobs/

Industry News:

- https://www.agma.org/newsroom/industry-news/