Lubrication and Wear: Advanced Concepts

INSTRUCTORS:
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COURSE INFORMATION

Course Description
Lubrication & Wear: Advanced Concepts - Designed for engineers and scientists in the rolling element bearing, gear, and power transmission industries who desire a more fundamental knowledge of component-relevant topics in the lubrication and wear areas within the field of tribology. The science behind lubrication and wear continues to evolve. This course introduces attendees to important terminology; surface topography measurement, characterization, and application; the mechanics of surfaces in contact; the development of lubricant films; and failure of rolling element bearings. The purpose of this course is to increase relevant technical knowledge and bridge the gap between component design and component failure, as a result of relative motion between surfaces in contact.

Who Should Attend
Scientists and engineers who desire a more fundamental background in the theory and application of the science of tribology, as applied to mechanical power transmission components undergoing relative motion.

Learning Objectives

- Understand basic concepts and terminology in tribology
- Familiarity with surface characterization theory and methods
- Calculation of fluid-film lubrication parameters
- Introduction to tribology by design (TBD) methods
- Understanding bearing life and failure through theory and examples

Required Textbook
Lubrication and Wear: Advanced Concepts Manual by Tim Ovaert and Vern Wedeven

COURSE OUTLINE

1. Basic concepts and terminology in tribology
2. 2-D and 3-D surface topographical characterization
3. 2-D and 3-D surface contact mechanics
4. Asperity contact models
5. 2-D and 3-D elastohydrodynamic lubrication (EHL)
6. Heat generation due to friction
7. Mixed lubrication
8. Wear in EHL and mixed lubrication
9. Tribology by design in rolling element bearing applications
10. Bearing life, performance applications, and failure

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
- 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/

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."

Industry News:

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