231: Understanding AGMA 917-B97

INSTRUCTOR:
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COURSE INFORMATION

Course Description
This course provides a working, clause-by-clause understanding of AGMA 917-B97, the industry reference for designing fine-pitch spur and helical gears (20–120 diametral pitch). Rather than a passive read-through of the Information Sheet, the course builds attendees' calculation skill directly: involute gear theory, standard and operating geometry, profile shift, tooth thickness, backlash, contact ratio, and bending/contact stress are all worked live using real gear examples.

Three running examples anchor the material — a fine-pitch spur gear, a case-hardened fine-pitch helical gear, and a coarse-pitch gear used to illustrate where 917-B97's guidance is universal to involute gearing versus specific to the fine-pitch range. Attendees leave with a complete picture of the standard's 15 clauses, from theory and design synthesis through materials, manufacturing, inspection, and load rating.

Who Should Attend
Gear design engineers, manufacturing and quality engineers, and technical managers who design, specify, or review fine-pitch gearing and want a working command of AGMA 917-B97's design equations and application guidance.

Learning Objectives

- Apply involute gearing theory to explain how pressure angle, base pitch, and contact ratio govern gear mesh behavior
- Calculate standard and operating gear geometry, profile shift, tooth thickness, and backlash for fine-pitch spur and helical gears
- Evaluate transverse and face contact ratio, and compute bending and contact stress using the AGMA geometry factor and Hertzian contact methods
- Select appropriate materials and heat treatments — including case hardening — for fine-pitch gear applications
- Distinguish which guidance in AGMA 917-B97 applies universally to involute gearing versus specifically to the fine-pitch (20–120 DP) range
- Navigate the full scope of the Information Sheet — design synthesis, backlash control, drawings and tolerancing, materials, manufacturing, inspection, lubrication, bearings, and load rating

Materials
Textbook will be provided by MPMA

COURSE OUTLINE

1. Welcome, Objectives, & Scope of AGMA 917-B97
2. Definitions, Symbols & Reference Standards
3. Theory of Involute Gearing

4. Application Considerations & Preliminary Design
5. Design Synthesis & Analysis – Geometry, Profile Shift, Backlash (Worked Example: Spur Gear)
6. Design Synthesis & Analysis – Contact Ratio, Loads, & Stress (Worked Example: Helical Gear)
7. Design for Control of Backlash
8. Materials & Heat Treatment (Worked Example: Case Hardened Helical Gear)
9. Drawings, Tolerancing, Manufacturing, Inspection, Lubrication & Bearings
10. Load Rating & Testing
11. Capstone: Coarse-Pitch Gear Example & Scope Discussion
12. Wrap-Up, Resources, & Q&A

STUDENT FEEDBACK AND GRADING PROCEDURES

Assignments
There will be several short worked examples included throughout the course to ensure knowledge transfer.

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 our Education inbox at education@motionpower.org. Or we can be reached by calling 703-684-0211.

Grievance Procedures
Students who have concerns about the class are encouraged to contact any Education Department staff at education@motionpower.org or by calling 703-684-0211.

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/