



Basic Training for Gear Manufacturing

INSTRUCTORS:

Dwight Smith

Email: gearguy1@colemfgsystems.com

Robert Wasilewski

Email: RWasilewski@pagglc.com

Peter Grossi

Email: pgrossi@pagglc.com

COURSE INFORMATION

Course Description

Learn the fundamentals of gear manufacturing in this hands-on course. Gain an understanding of gearing and nomenclature, principles of inspection, gear manufacturing methods, and hobbing and shaping. Utilizing manual machines, develop a deeper breadth of perspective and understanding of the process and physics of making a gear as well as the ability to apply this knowledge in working with CNC equipment commonly in use.

It is recommended that you spend a minimum of 1 hour reading and reviewing the material each day.

Who Should Attend

Although the Basic Course is designed primarily for newer employees with at least six months' experience in setup or machine operation, it has proved beneficial to quality control managers, sales representatives, management, and executives.

Learning Objectives

- Demonstrate understanding of the evolution, history, and function of gears
- Show and describe 14 gear tooth features
- Describe six typical gear characteristics that are measured
- Demonstrate knowledge of gauging vs. measurement
- Utilize and describe a variety of analysis methods
- Troubleshoot many of their own problems, because they fully understand the process

Required Textbooks (Provided by AGMA)

Basic Training for Gear Manufacturing manual by Dwight Smith

Supplementary Course Materials (articles, websites, etc.)

- Basic Gear Manufacturing – Spur / Helical Gear Drawings
- Depth Correction for Measurement over Pins / Span Measurement
- Various Causes of Involute Profile & Lead Errors

Materials and Tools for Learning

- CNC Equipment – Gear Measurement Machine (GMM)
- Manual Gear Hobbers
- Manual Shapers

COURSE OUTLINE

The classes are divided into morning and afternoon sessions, spent alternatively in the classroom and on the shop floor working with the machines.

Classroom Training Topics	Hands-On Training Activities
<ul style="list-style-type: none"> Definition of gear terms Discussion and explanation of AGMA gear quality standards Use of multiple-start hobs Hunting ratios Gear inspection Gear hobbing Gear shaping Gear shaving Gear skiving Gear grinding Broaching Interpretation of inspection charts Solving gear manufacturing problems 	<ul style="list-style-type: none"> Read blueprint and process sheets for correct gear information, including: Type of gear Number of teeth Pitch Pressure angle Spur/Helical gear Finish or pre-shave hob Depth or root diameter Right or left hand for helical gears Concentricity notes Mount hob arbor and hob on machine and indicate Indicate hob Set hob angles for spur and helical gears Mount work arbor on machine and indicate Mount work piece on work arbor and tighten Indicate work piece Install index, feed, and Hob RPM change gears and differential change gears (for helical gear) Position hob on 2nd full lead from end Set length, type and direction of cut Touch off on gear blank diameter with cutter Count number of teeth Clear cutter up and down and set depth of cut for rough cut. Measure span over specified number of teeth or dimension over pins per drawing requirement. Utilize Factors for Depth Correction. Finished piece inspection (GMM)

STUDENT FEEDBACK AND GRADING PROCEDURES

Assignments

A Pre-test and post-test are administered during this course. Immediate feedback is given and the material is reviewed by the instructor.

COURSE MANAGEMENT

Weather Delays and Cancellations

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

Plagiarism¹, 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/>

Industry News:

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

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."