Basic Training for Gear Manufacturing

INSTRUCTORS:
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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.

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.

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 – Helical Drawings
• Depth Correction for Over Pins Span Measurement

Materials and Tools for Learning
• CNC Equipment
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.

<table>
<thead>
<tr>
<th>Classroom Training Topics</th>
<th>Hands-On Training Activities</th>
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<tbody>
<tr>
<td>• Definition of gear terms</td>
<td>• Read blueprint and process sheets for correct gear information, including:</td>
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<tr>
<td>• Discussion and explanation of AGMA Standards</td>
<td>• Type of gear</td>
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<td>• Use of gear wires and micrometers</td>
<td>• Number of teeth</td>
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<td>• Use of tooth verniers</td>
<td>• Pitch</td>
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<td>• Hob characteristics and selection</td>
<td>• Pressure angle</td>
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<td>• Calculation of index, feed and RPM gearing</td>
<td>• Spur/Helical gear</td>
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<td>• Calculation of differential gearing for helical gears</td>
<td>• Finish or pre-shave hob</td>
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<td>• Gear blank inspection and qualification</td>
<td>• Depth or root diameter</td>
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<td>• Use of multiple-start hobs</td>
<td>• Right or left hand for helical gears</td>
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<td>• Hunting ratios</td>
<td>• Concentricity notes</td>
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<tr>
<td></td>
<td>• Mount hob arbor and hob on machine</td>
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<td></td>
<td>• Indicate hob</td>
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<td></td>
<td>• Set head angles for spur and helical gears</td>
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<tr>
<td></td>
<td>• Mount work arbor on machine and indicate</td>
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<td></td>
<td>• Mount work piece on work arbor and tighten</td>
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<tr>
<td></td>
<td>• Install index, feed, and RPM gearing and differential</td>
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<td></td>
<td>• Set hob on first lead</td>
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<td></td>
<td>• Set length, type and direction of cut</td>
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<td></td>
<td>• Touch off on OD of blank with cutter</td>
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<tr>
<td></td>
<td>• Count number of teeth</td>
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<td></td>
<td>• Clear cutter up and down and set depth of cut for rough cut</td>
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<td></td>
<td>• Factors for depth changes</td>
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<td></td>
<td>• Finished piece inspection</td>
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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.

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

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. Casandra Blassingame, Director, blassingame@agma.org or Kellyanne Broom, Coordinator, broom@agma.org.

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 Kellyanne Broom at broom@agma.org. She can be reached at 703-838-0069.

Grievance Procedures
Students who have concerns about the class are encouraged to contact Casandra Blassingame, Director of Education at blassingame@agma.org or 703-838-0055.

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.testtakingtips.com

Links for career resources:
- https://www.agma.org/newsroom/jobs/
- 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.”