



COURSE OUTLINE

Course Number MET122	Course Title Industrial Measurements	Credits 3
Hours: Lecture.lab 2/3	Co-or Pre-requisite none	Implimentation F/2017

COURSE DESCRIPTION

Introduces measurement and dimensioning concepts used in industrial manufacturing environments. Topics include shop mathematics, shop safety practices, measuring devices, and a basic understanding of shop drawing techniques including geometric dimensioning and tolerancing (GD&T). Corresponding labs reinforce lectures with practical examples which follow NIMS certification requirements.

Required Text: **Precision Machining Technology 2nd Edition**
By Peter J. Hoffman and Eric S. Hopewell
Publisher: Delmar/Cengage Learning
ISBN-9781285444543

Optional **Machinery's Handbook**
By Erik Oberg and Franklin D. Jones
Publisher: Industrial Press
ISBN-10: 083112900X ISBN-13: 978-0-8311-2900-2

Revision date: 4/4/2017

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General Objectives

Course Competencies/Goals

Students will be able to:

1. Use shop drawings and measuring tools to evaluate manufactured parts. (GEKG 1, 2 / CS A, B)
2. Become familiar with industry reference materials for material compositions and machining calculations. (GEKG 2, 4 / CS A, B, D)
3. Demonstrate ability to interpret part features using drawing dimensions and tolerances. (GEKG 1, 2 / CS B, D, E)
4. Use basic shop math to perform conversions between metric and English systems. (GEKG 2, 4 / CS A, B, E)
5. Accurately interpret results on commonly used measuring tools. (GEKG 1, 2, 4 / CS A, B, D)
6. Learn and follow proper shop safety practices and policies. (GEKG 1, 3 / CS A, B, D, F)
7. Become familiar with commonly used machine tools and cutting bits. (GEKG 1, 4 / CS B, D)

General Education Knowledge Goals [GEKG]

Goal 1. Communication. Students will communicate effectively in both speech and writing.

Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

MCCC Core Skills [CS]

Goal A. Written and Oral Communication in English. Students will communicate effectively in speech and writing, and demonstrate proficiency in reading.

Goal B. Critical Thinking and Problem-solving. Students will use critical thinking and problem solving skills in analyzing information.

Goal D. Information Literacy. Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Goal E. Computer Literacy. Students will use computers to access, analyze or present information, solve problems, and communicate with others.

Goal F. Collaboration and Cooperation. Students will develop the interpersonal skills required for effective performance in group situations.

Unit Objectives

Unit I - Basic Shop Math, Tools and Safety

The student will be able to:

1. Perform fractional to decimal conversions for tooling. (CG 2, 4)
2. Perform conversions between English and metric systems. (CG 2, 4)
3. Identify commonly used machine tools and applications. (CG 7)
4. Perform material measurements using calipers (dial and vernier) and micrometers. (CG 1, 4)
5. Perform measurements using vernier height gauge. (CG 1, 4)
6. Become familiar with the proper use of shop solvents, cutting fluids and layout materials. (CG 6)
7. Become familiar with the safe practices when using hand and power tools. (CG 6, 7)

Unit II - Shop Drawing Standards, Layout and GDT

The student will be able to:

1. Understand the dimensioning standards commonly used on manufacturing drawings. (CG 1, 3)
2. Identify and become familiar with commonly used drawing views and nomenclature. (CG 3)
3. Perform proper material layout using shop drawings and measuring tools. (CG 1, 3)
4. Become familiar with tools used for basic, semi-precision and precision layout. (CG 1, 3)
5. Develop basic understanding of Geometric Dimensioning and Tolerancing (GD&T). (CG 1, 3)
6. Determine if a manufactured part is within tolerance using measuring tools and drawings. (CG 1, 3)

Unit III - Machine Tool Basics and Materials

The student will be able to:

1. Become familiar with the machine tools used for drilling, cutting and milling. (CG 2, 7)
2. Calculate proper machine speed and feed rates using reference material. (CG 2, 7)
3. Identify the differences between ferrous and nonferrous materials. (CG 2, 4)
4. Become familiar with different hardening processes used in manufacturing. (CG 2)
5. Research material strength and hardness using reference material. (CG 2)

Method of Instruction

Learning will take place via classroom instruction, demonstrations, and student activities, as well as through textbook reading and homework assignments. Lab activities will augment this. Use of equipment and manual skills will be developed in the lab.

Student Evaluation

Students' achievement of the course objectives will be evaluated through the use of the following:

- Three unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives. (GO 2, 3, 4 and 7)
- Lab grade based on shop projects and lab assignment results. (GO 1, 3 and 5)
- In class participation, homework and attendance. (GO, 3, 5 and 6)

Evaluation Tools	Percentage of Grade
3 Unit Tests	50%
Lab Assignments/ Shop Projects	25%
Homework / In-Class Assignments	25%
Total	100%