COURSE OUTLINE

Course Number: AMT 102
Course Title: Machine shop analysis methods
Credits: 3

Hours: Lecture.lab
Co-or Pre-requisite: MAT115
Implimentation: F/2019

COURSE DESCRIPTION

Introduces students to the algebraic, geometric, and trigonometric concepts essential to solving problems commonly encountered in Machine shop environment. The course will review of arithmetic followed by elements of measurement, algebra, graphing, geometry, and introductory trigonometry.

Required Text: Technical Shop Mathematics, Third Edition
By Thomas Achatz
Publisher: Industrial Press, 2017

Revision date: 4/4/2019

Course Instructor: Michael Hanna
Ext. 3828,
hannam@mcce.edu
Office Hours: Thursday 3pm – 5:30 pm or by appointment

General Objectives
Course Competencies/Goals

Students will be able to:
1. Perform all fractional and decimal operations commonly encountered in Machine shop environment (addition, subtraction, multiplication and division)
2. Perform all measurement calculations length, area, volume, weight.
3. Solve algebraic equations and commonly encountered in machine shop environment (electrical, power and hydraulic)
4. Perform Tapers and Other Tooling Calculations Requiring Proportions
5. Perform shop trigonometry calculations Sine Bars and Sine Plates, Hole circle spacing, coordinate distances,
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 1 – Review of basics of mathematics
   1. Signed number operations,
   2. common fractions, decimal fractions,
   3. operations with percent, exponents
   4. algebraic expressions

Unit 2 – Measurement
   1. Length, Area, Volume, angle, weight, mass, temperature and pressure

Unit 3 - Transforming and solving shop formulas
   1. electrical
   2. horse power
   3. hydraulic formulas

Unit 4 – Ratio and proportion,
   1. coolant dilution
   2. gear ratios
   3. Tapers and Other Tooling Calculations Requiring Proportions

Unit 5 – Triangles and circle theorems
   1. Special Lines in Triangles,
2. Similar Triangles,
3. Pythagorean Theorem,
4. Congruent Triangles,
5. The Projection Formula,
6. Hero’s Formula

Unit 6 - Trigonometry fundamentals, oblique angle trigonometry, shop trigonometry
1. Solving Sides of Triangles Using Trigonometric Functions,
2. Special Triangles and the Unit Circle,
3. Solving Oblique Triangles Using Right Triangles,
4. Special Laws of Trigonometry Sine Bars and Sine Plates, Hole circle spacing, coordinate distances

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.
- Lab grade based on shop projects and lab assignment results.
- In class participation, homework and attendance.

<table>
<thead>
<tr>
<th>Evaluation Tools</th>
<th>Percentage of Grade</th>
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<tbody>
<tr>
<td>3 Unit Tests</td>
<td>50%</td>
</tr>
<tr>
<td>Lab Assignments/ Shop Projects</td>
<td>25%</td>
</tr>
<tr>
<td>Homework / In-Class Assignments</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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