COURSE OUTLINE

Course Number	Course Title	Credits
AMT 102	Machine shop analysis methods	3
Hours: Lecture/lab	**Co-or Pre-requisite**	**Implementation**
3/0	MAT115	Fall 2022

Catalogue 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.

General Education Category:
Not GenEd

Course coordinator:
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Required Text: Technical Shop Mathematics, Third Edition

By Thomas Achatz

Publisher: Industrial Press, 2017

Student Learning Outcomes (SLO):
Students will be able to:

1. Preform all fractional and decimal operations commonly encountered in Machine shop environment (addition, subtraction, multiplication and division). **(ILG 2,4, PLO,3)**
2. Perform all measurement calculations length, area, volume, weight. **(ILG 2,4, PLO,3,4)**
3. Solve algebraic equations commonly encountered in machine shop environment (electrical, power and hydraulic). **(ILG 2,4, PLO,3)**
4. Preform Tapers and Other Tooling Calculations Requiring Proportions. **(ILG 2,4, PLO,3,4)**
5. Perform shop trigonometry calculations Sine Bars and Sine Plates, Hole circle spacing, coordinate distances. **(ILG 2,4, PLO,3,4)**

Institutional Learning Goals (ILG)
Institutional Learning Goal 2 Mathematics: Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
Institutional Learning Goal 3 Science: Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
Institutional Learning Goal 4 Technology: Students will use computer systems or other

appropriate forms of technology to achieve educational and personal goals.
Institutional Learning Goal 10 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.
Institutional Learning Goal 11 Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes (PLO)

1. Maintain a safe and organized workspace.
2. Interpret blueprints to manufacture parts.
3. Apply shop and tool room mathematics as needed.
4. Complete part inspection using appropriate instruments such as micrometers, calipers, and scales.
5. Set up and operate a manual drill press, lathe, milling machine, grinder and press brake.
6. Set up and operate CNC machines (lathe and mill).
7. Use NC programming (G and M codes) to control movement and cutting processes.
8. Understanding of statistical quality control.
9. Understanding of the broad spectrum of manufacturing technologies.
10. Pursue NIMS certification.

Unit Objectives

Unit I Review of basics of mathematics **(SLO 1)**
The student will be able to:

1. Perform calculation involving signed number operations, common fractions and decimal fractions.
2. Perform calculation involving operations with percent, exponents, and algebraic expressions.

Unit II Measurement **(SLO 2)**
The student will be able to:

1. Convert between different units of length, area, volume, angle, weight, mass, temperature and pressure.

Unit III Transforming and solving shop formulas **(SLO 3)**
The student will be able to:

1. Solve electrical, horsepower, hydraulic and machine shop formulas.

Unit IV Ratio and proportion, (**SLO 4)**
The student will be able to:

1. Solve problems involving coolant dilution, gear ratios and tapers.

Unit V Triangles and circle theorems (**SLO 5)**
The student will be able to:

1. Solve problems involving special Lines in triangles, similar triangles, Pythagorean theorem and congruent triangles.
2. Use the projection formula and Hero's formula.

Unit VI Trigonometry fundamentals, oblique angle trigonometry, shop trigonometry (**SLO 5)**

The student will be able to:

1. Solve for length of sides of triangles using trigonometric functions, special triangles and the unit circle.
2. Solve oblique triangles.
3. Apply special laws of trigonometry for sine bars and sine plates, hole circle spacing and 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:

- Two-unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives.
- In class participation, homework and attendance.

Evaluation Tools	**Percentage of Grade**
2 Tests	70%
Homework / In-Class Assignments	30%
Total	100%