Course Prefix/No.: **IMT 163**
Course Title: **Problem Solving for Mechanical Applications**
Lecture Hours/Week: **1.0**
Lab Hours/Week: **6.0**
Credit Hours/Semester: **3.0**

Distance Learning Attendance/VA Statement
Textbook Information

COURSE DESCRIPTION
This course covers basic mechanical concepts, analysis of machines, troubleshooting techniques, and basic shop and production floor math.

COURSE COMPETENCIES
Upon successful completion of this course, the student should be able to:

Module 1 – Basic Mathematical Concepts
- Define the characteristics of simple linear and quadratic equations
- Explain the process of solving simple linear and quadratic equations
- Identify the variable, the coefficients, and the constant terms in simple linear and quadratic equations.
- Discuss the solution techniques of simple linear and quadratic equations
- Demonstrate the solution of simple linear and quadratic equations

Module 2 – Basic Mechanical Concepts
- Define the fundamental units used to analyze mechanical problems and the basic derived units such as force and pressure
- Explain the operating principles governing simple machines
- Identify various types and classes of simple machines such as first-, second-, and third-class levers.
- Discuss the function and use of simple machines and combinations of simple machines
- Demonstrate the ability to construct and use simple machines

Module 3 – Gears
- Define the operating principals of various gear sets such as spur, worm, and helical.
- Explain the use of gearing to effect increases or decreases in shaft speed and torque
- Identify various gear sets by observation of actual machines and schematic diagrams
- Discuss applications of gears and gear boxes in industrial environments as well as troubleshooting of common gear and gear box malfunctions
- Demonstrate the ability to calculate speed, torque, and horsepower outputs of gear sets and the ability to disassemble and reassemble a simple gear box

Module 4 – Bearings

- Define the operating principals of various bearings such ball, roller, and thrust
- Explain the appropriate use of specific bearings for various load and speed combinations
- Identify various bearings by observation actual machines and schematic diagrams
- Discuss applications of bearings in industrial environments as well as troubleshooting of common bearing malfunctions
- Demonstrate the ability to correctly install and remove bearings from shafts and housings

Module 5 – Vibration Analysis

- Define the meaning of “vibration analysis” as it applies to industrial machines
- Explain the methods of vibration data collection
- Identify probable causes of bearing and gear box problems based on observation of general vibration data graphs
- Discuss the importance of vibration data and accurate data collection procedures
- Demonstrate the ability to collect and correctly analyze vibration data

Module 6 – The Preventative Maintenance (PM) System

- Define the general theory, components, and implementation of a plant-wide PM system
- Explain the purpose of a PM system and the importance of scheduling PM tasks in a factory or production setting
- Identify common maintenance tasks for industrial machinery such as conveyers, pumps, and hydraulic systems
- Discuss the typical layout of and information contained in a computer-generated PM job sheet
- Demonstrate the ability to read, follow, and collect data based on a PM job sheet for a simple machine in the lab

MINIMAL STANDARDS

Assignments and attendance must be completed as designated in “Evaluation Strategies/Grading.” Criteria for minimal acceptable performance will be provided by the instructor.

REQUIREMENTS

Attendance Policy

The college attendance policy, stated in the college handbook, will be honored. The instructor will provide specific requirements for the course.

Academic Honesty

Students are expected to adhere to the college policy regarding student conduct as stated in the college handbook.

Assignments

Students are expected to complete all assignments and any supplementary exercises designated by the instructor.

EVALUATION STRATEGIES/GRADING
Successful completion of the course requires the completion of each of the six modules, all tests/projects, and all assignments with an average of 70 percent. In addition, the student must score a minimum of 70 points each in the area of Lab Work and Work Attitude.

Grading Scale:

A = 90.0 – 100
B = 80.0 – 89.9
C = 70.0 – 79.9
D = 60.0 – 69.9
F = 00.0 – 59.9

Evaluation Method:

Tests/Projects (minimum of four total)	40.0% of Final Grade
Lab Work	40.0% of Final Grade
Work Attitude	20.0% of Final Grade
Total	100.0%

Work Attitude is defined as:

- Participation
- Cooperation
- Appearance
- Effort
- Safety
- Responsibility
- Professionalism
- Attendance
- Self Motivation
- Works Independently

METHODS OF INSTRUCTION
Lectures, reading assignments, projects, discussions, video presentations, multimedia presentations, and web content are the major teaching methods used in this course.

ENTRY LEVEL SKILLS
A student entering this course should have an appropriate entrance score indicating an understanding of shop math and a mechanical aptitude demonstrating interest in industrial mechanics.

PREREQUISITES: RDG 031 or equivalent and MAT 031 or equivalent

CO-REQUISITES: None

Disabilities Statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Offices (SR) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.

Effective: 2011SP