MONROE COUNTY COMMUNITY COLLEGE
enriching lives

Outline of Instruction

Division:	Science/Mathematics	**Area:**	Mechanical Engineering Technology
Course Number:	MATH 160	**Course Name:**	Math Applications in Engineering Technology
Prerequisite:	MATH 124 or MATH 159 or MATH 164		
Corequisite:	NONE		
Hours Required:	**Class:** 15	**Lab:** 30	**Credits:** 2

Course Description/Purpose

This course is an introduction to the concepts of statistics and calculus as they apply to engineering technology, focusing on the application of spreadsheet and math analysis software. Computer resources provided include Microsoft Excel and the Maple computer algebra packages. Topics range from experimental data reduction to numerous examples from mechanical and electrical systems.

Major Units

- an introduction to statistical analysis of data sets
- practical application of statistics to experimental results
- an introduction to derivatives and integrals of functions
- a tutorial on the operation of a common computer spreadsheet program (example: Microsoft Excel)
- a discussion of general applications of derivatives and integrals to electromechanical system components
- a tutorial on the operation of common math analysis programs (examples: MathCAD and/or TK Solver)
- a tutorial on linking graphs or formulas to a word processing document (example: Microsoft Word)
- applications of calculus to engineering mechanics problems (stress and deflections of beams, columns and fasteners)
- applications of calculus to heat transfer problems (conduction, convection and radiation)
- applications of calculus to electrical problems (resistor, capacitor and inductor circuits)

Educational/Course Outcomes

Student learning will be assessed by a variety of methods, including, but not limited to, quizzes and tests, journals, essays, papers, projects, laboratory/clinical exercises and examinations, presentations, simulations, portfolios, homework assignments, and instructor observations.

Cognitive Each student will be expected to *Identify/Recognize* . . .

- trends in experimental data through statistical analysis;
- how derivatives and integrals of functions can model electromechanical system response;
- how different software packages can be properly used to analyze math equations;
- limitations of math software vs. manually solving equations using traditional methods.

Performance Each student will be expected to *Demonstrate/Practice . . .*

- proper rounding of numbers, reduction of units of measure, use of scientific notation;
- sketch a situation based on a written explanation;
- choose the correct formula for a problem in simple statistics or calculus topics;
- use a spreadsheet to plot experimental data, find important statistical information, plot trend lines and moving averages;
- use a math package to solve for unknown variables in an algebra equation, to derive derivatives or integrals of a function symbolically, and arrive at numeric solutions for derivatives at a point on a curve or definite integrals; include an intro to ODE's;
- building a technical report in a word processor using graphs, tables or math formula from an external package (a Word document with an Excel graph and a TK Solver results table)