# COURSE OUTLINE: MTH146 - MATHEMATICS

Prepared: Mathematics Department
Approved: Corey Meunier, Chair, Technology and Skilled Trades

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| **Course Code: Title** | MTH146: MATHEMATICS |
| **Program Number: Name** | 4039: MECH. ENG. TN-MANUFA<br>4080: CIVIL ENG TECHNICIAN |
| **Department:** | MATHEMATICS |
| **Semesters/Terms:** | 20F, 21W |
| **Course Description:** | By the end of this course students will have demonstrated the ability to graph, describe, and evaluate quadratic, exponential, and logarithmic functions. Algebraic properties will be applied to expressions with rational exponents and radicals. Students will use numerical methods along with graphs charts, and tables to effectively describe data. Critical thinking and problem-solving skills will be developed through exposure to applied problems involving ratios, proportions, variation, normal distribution and statistical process control. |
| **Total Credits:** | 4 |
| **Hours/Week:** | 4 |
| **Total Hours:** | 60 |
| **Prerequisites:** | MTH145 |
| **Corequisites:** | There are no co-requisites for this course. |
| **Substitutes:** | MTH143, MTH613 |
| **Essential Employability Skills (EES) addressed in this course:** | EES 3 Execute mathematical operations accurately.<br>EES 4 Apply a systematic approach to solve problems.<br>EES 5 Use a variety of thinking skills to anticipate and solve problems.<br>EES 10 Manage the use of time and other resources to complete projects. |
| **Course Evaluation:** | Passing Grade: 50%, D<br><br>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation. |
| **Other Course Evaluation & Assessment Requirements:** | |
| **Books and Required Resources:** | Basic Technical Mathematics with Calculus by Washington and Boue<br>Publisher: Pearson Edition: 11<br>ISBN: 9780134289915<br><br>Calculator -<br>Sharp EL-520XTB (available in the bookstore) |

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.

**Course Outcomes and Learning Objectives:**

| Course Outcome 1 | Learning Objectives for Course Outcome 1 |
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| Ratios, Proportions, and Variation | 1.1 Solve application problems involving ratios and proportions.<br>1.2 Develop formulas and solve application problems involving direct, indirect and joint variation. |
| **Course Outcome 2** | **Learning Objectives for Course Outcome 2** |
| Exponents and Radicals | 2.1 Convert between fractional exponents and radicals.<br>2.2 Simplify expressions with rational exponents.<br>2.3 Simplify radicals by removing perfect powers and by rationalizing the denominator.<br>2.4 Add, subtract, multiply, and divide radicals. |
| **Course Outcome 3** | **Learning Objectives for Course Outcome 3** |
| Factoring | 3.1 Factor expressions by removing common factors.<br>3.2 Factor binomials that are a difference of squares.<br>3.3 Factor trinomials. |
| **Course Outcome 4** | **Learning Objectives for Course Outcome 4** |
| Quadratic Equations | 4.1 Describe quadratic equations and functions.<br>4.2 Solve quadratic equations by factoring.<br>4.3 Solve quadratic equations by completing the square.<br>4.4 Solve quadratic equations using the Quadratic Formula<br>4.5 Graph quadratic functions using the vertex, x-y intercepts, and the axis of symmetry. |
| **Course Outcome 5** | **Learning Objectives for Course Outcome 5** |
| Exponential and Logarithmic Functions | 5.1 Define logarithmic and exponential functions.<br>5.2 Graph logarithmic and exponential functions.<br>5.3 Convert expressions between exponential and logarithmic form.<br>5.4 Solve logarithmic equations by converting to exponential form.<br>5.5 Solve exponential equations by applying the power law of logarithms. |
| **Course Outcome 6** | **Learning Objectives for Course Outcome 6** |
| Data Management and Statistics | 6.1 Organize data into frequency distributions, frequency histograms or frequency polygons.<br>6.2 Calculate the mean, median and mode for a set of data.<br>6.3 Calculate the range and standard of deviation for a set of data.<br>6.4 Explain the concept of the standard normal distribution, how it relates to determining standard deviation, and its importance for inference.<br>6.5 Calculate event probabilities based on transforming raw scores to z-scores.<br>6.6 Apply statistical process control to real world problems.<br>6.7 Recognize and describe types of correlation.<br>6.8 Apply the principles of linear and non-linear regression to |

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| | practical examples such as predictive and preventative scenarios. |
| **Evaluation Process and Grading System:** | **Evaluation Type** / **Evaluation Weight**<br>Tests / 100% |
| **Date:** | June 11, 2020 |
| **Addendum:** | Please refer to the course outline addendum on the Learning Management System for further information. |