| Class/Section       | Extended Technical Mathematics  
|                    | M114-01 (8-9am), M114-02 (12:40-1:40pm), & M114-04 (11:30-12:30pm)  
| Formerly Math 122  |
| Instructor/Office  | Richard Pierce  HSCT 110  
| Room/Time/Days     | HSCT 103  M-W-F  
| Email/Phone        | rpierce@msubillings.edu / 406.247.3087  
| Office Hours       | MWF 10:20 – 11:20, Tues 9 -10am, Thurs 2 – 3pm  
| Website            | www.msubillings.edu/cotfaculty/pierce  
| Cell Phones        | Please refrain from receiving or sending calls/texts from cell phones during class. If the device must remain on during class, please set the ringer to vibrate.  
|                    | **No cell phones allowed out on test days!**  
| Text               | Introductory Technical Mathematics, 5th Ed. Smith & Peterson  
| Course Description | Prerequisite: M 111, M 095, or appropriate placement scores  
|                    | Applies math to problems drawn from diverse occupational fields. Provides college level study of measurement, algebra, geometry, and trigonometry as needed to solve mathematical applications in a trade or technical work environment.  
| Calculator         | A scientific calculator (fraction capabilities preferred) is **required** for this course. If your particular program requires a specific calculator, now is the time to learn to use it. For those of you planning on purchasing a calculator for this course, the bookstore usually carries the TI-30X II and I strongly recommend it.  
| University Policies| ***Disability Support Services (DSS)***  
|                    | Students with disabilities, whether physical, learning, or psychological, who believe that they may need accommodations in this class, are encouraged to contact Disability Support Services (DSS) as soon as possible to ensure that such accommodations are implemented in a timely fashion. Please meet with DSS staff to verify your eligibility for any classroom accommodations and for academic assistance related to your disability. Disability Support Services is located in the Academic Support Center. COT, 247-3029 (voice/tty/video phone) 8:30am - 3:00pm  
|                    | Main Campus, 657-2283 (voice/tty) and 657-2159 (voice/tty/video phone) 8:00am – 5:00pm.  
| Helpful resources  | **Academic Support Center (ASC)**  
|                    | Free tutoring services for students are available in the Academic Support Center at the COT, A035, Monday through Thursday, 8 a.m.-6 p.m. and Friday, 8 a.m.-5 p.m. The Academic Support Center on the senior campus is open from 8 a.m.-7 p.m. Monday through Thursday, 8 a.m. -5 p.m. Friday, and 9 a.m. – noon.
Saturday. Tutors are available to assist students with math, writing, reading, anatomy and physiology, and other specialty areas for specific majors. See [http://www.msubillings.edu/asc/](http://www.msubillings.edu/asc/) for more information or call 247-3022 (COT) or 657-1641 (senior campus).

- There is online tutoring offered through the ASC. Hours vary during the week and weekend so check their website. [http://www.msubillings.edu/asc/Online_Tutoring_Center.htm](http://www.msubillings.edu/asc/Online_Tutoring_Center.htm)

- Your classmates would make a great study group. Get to know each other and ask for each other’s help. You can also email each other through portal for more communication.

- Your instructor has office hours. These hours are dedicated to students and their questions.

### Grading Policies

- **Chapter Exams**
  There will be three exams throughout the semester. Each exam is worth 100 points. It is possible that one of the exams may be or part may be a take home exam. **NO** make-up exams will be given unless the student receives permission to take an exam **prior** to exam day. I will do my best to keep the classroom quiet and beneficial to your testing. I can not control a student that may have a cold or loud students in the hall. This is part of taking a test or any working environment you will be part of in the future. For this reason, all students are required to take all tests in the classroom unless they have a DSS card or permission from me.

- **Graded Assignments**
  There will be specific homework assignments given, collected, and graded throughout the term. Homework assignments will be given weekly. **For homework, everyday the assignment is past the due date will cost you 10 points. This will start at the beginning of class, so have your work done BEFORE class.** Because of this penalty, I will drop your lowest (one) weekly homework grade. We will also have assignments from the book and projects. These are **not included** as weekly homework and **CANNOT** be dropped. Assessment will be based on points earned from a combination of assignments, attendance, quizzes, and exams. In the more difficult sections, there may be problems assigned from the text.

- **Final Exam**
  A cumulative final exam will be given at the end of the semester. The final is worth 200 points. Each student **must** take the final.

- **Allowance**
  In the event of a missed exam or a low score, you will be able to substitute your final exam grade (percentage) for one of the exam grades or the homework percentage. If more than one exam is missed, the score for that exam will be recorded as a “0”.

- **Attendance**
  Success in this course depends highly upon student participation and attendance. If a class is missed, it is the responsibility of the
student to obtain class notes and suggested homework problems from another student or the internet. Students may miss up to five class periods with no impact to their grade. For each absence, in excess of the five allowed, one percentage point will be deducted from the course grade.

- **Grade assignments**
  - A  90 – 100%
  - B  80 – 89%
  - C  70 – 79%
  - D  60 – 69%
  - F  59% and below

### Cheating

Your student handbook ([http://www.msubillings.edu/studenthandbook/](http://www.msubillings.edu/studenthandbook/)) clarifies what happens when you cheat. Note that cheating falls under the heading Academic Misconduct, which includes all acts of dishonesty. When academic dishonesty occurs or is alleged to have occurred, the instructor has the right and obligation to take appropriate action which may include a verbal or written reprimand or warning, a grade of “F” for the assignment or test involved or a grade of “F” for the course. I take this very seriously. Please do not cheat.

### Course Outcomes

Students successfully completing Extended Technical Mathematics will be able to apply the material acquired to:

- Utilize and apply algebraic skills, geometric principles and theorems, and trigonometric relationships to solve industrial and technical applications in academic and workplace situations.
- Communicate with appropriate technical mathematics terminology in an academic and a workplace setting.
- Integrate technology as appropriate to solve mathematically related problems.
- Determine the viability of a result or data.

### Course Goals

- Accurately utilize math skills acquired in prerequisite courses pertaining to whole numbers, fractions, decimals, percents, graph interpretation and algebra.
- Apply the order of operations to multi-faceted calculations.
- Recognize the need for realistic rounding of results as needed in the trades (3.2 gallons>>4 gallons)
- Compare and/or contrast the precision versus accuracy of a measurement.
- Interpret calculator displays for significant digits and precision.
- Apply the rules/use of significant digits when necessary.
- Convert units of measurement within and between systems of measurement
  - Customary (Metric) system
  - English system
- Solve problems from industrial/technical fields relating to lengths, areas, volumes, and capacities.
- Solve applied problems involving mixed dimensions.
- Perform operations on signed numbers.
- Convert numbers between standard and scientific notation.
- Complete conversions between binary and base 10 numeral representations.
- Complete conversions of measurements with attention to metric prefixes.
- Utilize the algebraic skills needed for many industrial/technical applications.
- Identify and combine like terms
- Complete symbolic manipulation involving addition, subtraction, multiplication, division, and exponents
- Evaluate algebraic expressions
- Solve equations involving any combination of addition, subtraction, multiplication, exponent, or roots.
- Algebraically manipulate a formula from a trade area to solve a given formula for one of the variables by which it was defined.
- Setup and manipulate direct and indirect variation problems
- Graph lines and interpret linear equations by determining slope, vertical-intercepts, etc.
- Apply quadratic equations to an applied situation.

- Apply geometric principles and theorems to solve industrial/technical applications.
  - Perform arithmetic calculations with angle measurements both in decimal-degrees and in degree-minute-second measurements.
  - Apply relationships established by parallel lines cut by a transversal
  - Apply the principles of isosceles and/or equilateral triangles
  - Using the Pythagorean Theorem to determine the sides of a right triangle.
  - Using the Pythagorean Theorem to determine if a triangle is a right triangle.
  - Apply the principles of congruency to a variety of polygons and shapes.
  - Apply appropriate theorems to circles and their chords, arcs, sectors, segments, areas, and angles
  - Compute areas of a variety of polygons, compositions of polygons, and segments or sectors of circles
  - Compute volumes, surface areas, and weights of cylinders, cones, pyramids, prisms, spheres, and composites of the aforementioned solids.

- Utilize trigonometric relationships and trigonometry to solve industrial/technical applications of right triangles.
  - Operate a calculator to evaluate trigonometric expressions
  - Identify the parts of a right triangle with respect to their trigonometric relationship.
  - Use trigonometry to calculate the missing dimensions of a right triangle.
  - Sketch a triangular representation of a given situation and use trig to solve it.