**Guided Self-Placement for Math Courses**
Last Update March 2024

**Basic facts:**

1. Our math courses separate into three tiers:
   - a. Developmental and Adult Basic Ed
   - b. College Level: Program-Specific
   - c. College Level (with Support and without Support): Meet MN Transfer Curriculum Goal Areas

2. The following course descriptions will help you assess which courses best fit your needs. These include sample content, prerequisite knowledge, and a list of programs that require and/or accept each course.

3. If you wish, you may inquire at Student Service about placement exams, GPA, and other criteria that have been used in the past to place students into courses. This is no longer a requirement, however.

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**Note:** Changes in color indicate jumps between the three levels of courses.

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<th><strong>MATS 0075 Number Sense</strong></th>
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<td>Adult Basic Ed: 1 cr.</td>
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**Required for programs:**
None

**Accepted by Programs:**
None

**Target Audience:**
Primarily intended for students who wish to brush up on basic math (fractions, etc.), such as those headed to HEAL 1150 dosage calculations or any other program course involving basic math.

**Builds on Knowledge from:**
“None.”

**Some Things You Will Learn:**
1. 62.5% is equivalent to what fraction?
2. Math operations with fractions, such as:
   \[
   \frac{1}{3} + \frac{3}{4}, \quad \frac{4}{5} \div \frac{4}{7}
   \]
3. What is 30% of 25? What percent of 55 is 17?

**Special Notes:**
This one-credit course is NOT eligible for federal financial aid.
MATS 0810 College Algebra Support Lab (Co-req with MATS 1300-01)
1 cr.

Required for programs: None

Accepted by Programs: None

Target Audience:
Primarily intended for students who can benefit from two hours per week of homework support. For students enrolled in the day section of College Algebra. A professional tutor, licensed in K12 math, joins the instructor to team teach two days per week.

Builds on Knowledge from:
None.

Some Things You Will Learn:
Solve for x:
\[
\frac{3}{5} \left( \frac{1}{6} - 5x \right) = 4 - (x - 3)
\]
Express in simplified radical form:
\[
\frac{3}{\sqrt[3]{54x^5}}
\]
Factor completely:
\[
12x^3 - 18x^2 + 27x
\]
Find the coordinates of the vertex, x-intercepts, and y-intercepts, in simplified radical form;

Then, sketch a graph:
\[
f(x) = \frac{1}{2} (x - 3)^2 - \frac{8}{3}
\]

Special Notes:
This one-credit co-requisite course is NOT eligible for federal financial aid.
MATS 1000 Math for Welders
College Level: Program-Specific: 3 cr.

Required for Programs: Welding Technology
Accepted by Programs: Welding Technology

Target Audience:
Students in the Welding Technology program.

Builds on Knowledge From:
Basic math at ABE level (see MATS 0075 Number Sense).

Some Things You Will Learn:
 Begins with a review of basic math, then goes into real world applications of geometry and trigonometry. Such as:

1. Find the surface area and volume of a dimensioned trapezoidal prism:

   ![Trapezoidal Prism Diagram]

   [This Photo by Unknown Author is licensed under CC BY]

2. Find the missing side length using trig ratios:

   ![Trigonometry Diagram]

3. Determine the number of full seamless 3” x 5” pieces that can be cut from an 8’ x 10’ sheet of steel.

Special Notes:
What if you’ve had calculus already? Do you still need this course?
Yes and no: Yes, because it contains enough different content to preclude a one-for-one substitution, but no, if you’re motivated enough to self-study and attempt a test-out. Please contact the instructor if you are interested in this option.
**MATS 1205 Math for Electricians**  
College Level: Program-Specific: 3 cr.

**Required for Programs:**  
Electrical Construction & Maintenance

**Accepted by Programs:**  
Electrical Construction & Maintenance

**Target Audience:**  
Students in the Electrical Construction & Maintenance program.

**Builds on Knowledge from:**  
Basic math at ABE level (see MATS 0075 Number Sense).

**Some Things You Will Learn:**  
Begins with a review of basic math, but introduces some algebra (solving systems of equations in application of Kirchhoff's laws), trig (phasor analysis of AC circuits), and other topics relevant to electricians:

1. Given $P = 34$ kW and $E = 985$ mV, find $R$ (use $P = E^2/R$).

2. Given a series RLC circuit with $R = 35$ kΩ, $X_L = 20$ kΩ, and $X_C = 5$ kΩ, find the circuit impedance, phase angle, apparent power, and true power. Show the phasor diagram for your analysis.

3. Solve for all currents and voltages in the circuit below:

![Circuit Diagram](image)

**Special Note:**  
*What if you’ve had calculus already? Do you still need this course?*

Yes and no: Yes, because it contains enough different content to preclude a one-for-one substitution, but no, if you’re motivated enough to self-study and attempt a test-out. Please contact the instructor if you are interested in this option.
MATS 1340 Math for Engineering Technology
College Level: 4 cr, meets Goal 4

Required for Programs: Accepted by Programs:
Civil Engineering Tech Construction Management AS/AAS Industrial Engineering Tech (recommended) Individualized Studies Minnesota Transfer Curriculum

Target Audience:
Engineering Tech majors wishing to fulfill Goal-4 Minnesota Transfer Curriculum by learning the most relevant parts of College Algebra, trigonometry, and statistics in a single course.

Builds on Knowledge From:
Students should feel very comfortable converting among fraction, decimal, and percent forms of a number, and be able to solve basic linear equations involving at least two steps. (See MATS 0700 Foundations of College Math).

Some Things You Will Learn:
Areas and volumes of composite shapes, including irregular shapes and prismsoids using Simpson’s Rule; unit conversions, including units of force, energy, and power; vector analysis of forces for structures in static equilibrium; uncertainly analysis of repeated measurements.

Typical problems:

1. Using \( P = \frac{1}{2} \pi V^2 \), find the wind speed required for a windmill to generate 40 kW of electricity. Write your assumptions for the density of air and the diameter of the blade circle, and show your unit analysis.

2. Demonstrate the use of Simpson’s Rule to estimate the area of this island paradise, in acres. The horizontal measurements shown below are spaced 200’ apart.

![Island diagram](image)

3. Solve for the forces in each truss member below. Be sure to state whether each is in tension or compression!

![Truss diagram](image)

Special Notes:
None.
MATS 1240 Quantitative Reasoning
College Level: 4 cr, meets Goal 4

Required for Programs:  
None

Accepted by Programs:  
Software Development
Network Administration
Information Systems Management
Individualized Studies
Minnesota Transfer Curriculum

Target Audience:  
Students wishing to fulfill Goal-4 of the Minnesota Transfer Curriculum by taking the most “every-day practical” math course we have on offer.

Builds on Knowledge From:  
Students should feel very comfortable working with fractions, decimals, percentages, and especially proportions (see MATS 0700 Foundations of College Math).

Experience creating and analyzing basic graphs and charts will also be useful (see, for example, https://youtu.be/hGdKSP_a0qU & related videos). Though Excel is used for this purpose in the course, no prior experience with Excel is necessary.

Some Things You Will Learn:  
Brings proportional reasoning to a college level. Students learn to build Excel spreadsheets while critically analyzing claims made in the media, personal finances, and the like. Open-ended questions are used to encourage a habit of independent research.

1. Using Excel, work out an amortization table for a $50,000 loan at 7.5% APR, compounded monthly, with monthly payments of $800. How long will it take to pay down this loan, and how much total interest will you pay?

2. Assume that caffeine has a half-life of 4 hours. If you drink a large Caribou in the morning and a medium Caribou at lunch, how much caffeine will you still have in your system at bedtime? Is this acceptable? If not, how might you adjust your Caribou drinking habits (assuming you love the stuff too much to give it up)?

3. Look up the U.S. national debit for the years 1980 and 2020. Use this data to predict the national debt in 2050, using (a) a linear model, and (b) an exponential model. Which do you believe is more accurate (if either), and why?

Special Notes:  
None.
MATS 1251 Statistics
College Level: 4 cr, meets Goal 4

Required for Programs:
Marketing (AND College Algebra)
Business Admin (AND College Algebra)
Exercise & Sports Science A.S.

Accepted by Programs:
Software Development
Information Systems Management
Networking Administration
Individualized Studies
Minnesota Transfer Curriculum

Target Audience:
Students wishing to fulfill Goal-4 of the Minnesota Transfer Curriculum by learning to analyze data using accepted statistical methods.

Builds on Knowledge From:
Students should feel very comfortable converting among fraction, decimal, and percent forms of a number, and be able to solve basic linear equations involving at least two steps. (See MATS 0700 Foundations of College Math).

Experience creating and analyzing basic graphs and charts will also be useful (see, for example, https://youtu.be/hGdKSP_a0qU & related videos). Though Excel is used for this purpose in the course, no prior experience with Excel is necessary.

Some Things You Will Learn:
Basic principles of probability; probability distributions, including binomial, Poisson, and the normal distribution (bell curve); how to take good samples; confidence intervals; hypothesis testing. Examples:

1. A poll of 40 Iowans finds 18 of them “feeling the Bern.” According to this data, what is the percentage of Iowans who will vote for Bernie Sanders? What is the margin of error for this poll, at the 95% confidence level?
2. Biff rolls twenty, six-sided dice. Find the probabilities that he rolls
   a. exactly three sixes, and
   b. at least three sixes.
3. A new drug is tested on 214 people, and 193 of them get better. Test the claim at the 99% level that the drug is at least 90% effective.

Special Notes:
None.
PHIL 1250 Introduction to Logic  
College Level: 3 cr, meets Goal 4

Required for Programs:  

Accepted by Programs:
Individualized Studies
Minnesota Transfer Curriculum

Optional Elective for these programs:
Software Development AAS
Network Administration AAS
Information Systems Management AAS

Target Audience:
Students taking college level coursework.
Students who wish to fulfill Goal 4 of the Minnesota Transfer Curriculum.

Builds on Knowledge From:
Reading. Critical Thinking. Learning to identify the logical patterns in our thinking is a first step to understanding the logical implications of our thinking. In this class, we will learn to identify patterns and learn to use rules to determine implications. This can be helpful in understanding the logic behind processes in general human problem solving as well as in computer programming.

Some Things You Will Learn:

Example #1
Determine what is implied in the following according to categorical logic.

You are shopping for a phone. Your friend says, “All Samsung devices are well designed.” The salesperson says, “No Samsung devices are well designed.” How do you evaluate this information so that you can make an informed shopping decision? Your friend and the salesperson can’t both be right, so we think that one or the other must be right. But it may be useful to recognize that both statements could be false. If they were both false, then it’s possible some Samsung devices are well designed. This would be a logical reason to further research Samsung when shopping for technology. Perhaps we could use this same approach to evaluating similarly contrary claims about a political party and its platform.

Example #2
Determine whether the following is a strong argument.

1. There’s a 50% chance that replacing the spark plug wires will fix the problem of rough idling on the old Blazer. (premise)

2. Your customer wants you to fix the rough idling problem. (premise)

3. You should replace the spark wires with new ones. (conclusion)

Special Notes:
None.
MATS 1300-01 College Algebra (Co-req with College Algebra Support Lab)
College Level: 4 cr, meets Goal 4

Required for Programs:
Marketing (AND Statistics)
Business Admin (AND Statistics)
Sport Management
Biomedical Equipment Tech

Accepted by Programs:
Construction Management AS/AAS
Software Development
Networking Administration
Information Systems Management
Individualized Studies
Minnesota Transfer Curriculum

Target Audience:
Those with high competence in basic algebra who wish to earn the most widely transferable of our college math credits.

Some Things You Will Learn:
College Algebra basically amounts to precalculus without trig. Students move beyond reasoning proportionally and manipulating algebraic expressions, towards a habit of careful analysis of functions, especially including graphical transformations, composition and inverses, and exponential and logarithmic growth and decay. Sample problems:

1. Sketch a graph of the following function, being sure to solve for the intercepts (including their multiplicity), locate any asymptotes (vertical, horizontal, or oblique), and account for any holes:

\[ f(x) = \frac{2x^2(x + 4)}{(x - 2)^2(x + 3)} \]

2. Recall the formula for the Learning Curve, given below. If \( A = 100 \) and \( L(5) = 20 \), find \( L(10) \). Then, make up a real-life scenario this could be describing!

\[ L(t) = A \left( 1 - e^{-kt} \right) \]

3. Write the formula for the function graphed below.

Hint: use your knowledge of the parent function and transformations.

Special Note:
Meets Mon/Wed/Fri for two hours each. The second half of each Monday and Wednesday class is reserved for a homework lab, with both the instructor an embedded ABE tutor circulating to help all students succeed. This model of instruction has proven effective in increasing grades and reducing withdrawal rates.
MATS 1300-59 College Algebra (Online section, "without support")
College Level: 4 cr, meets Goal 4

This course is identical to the day section of College Algebra (see previous page), with the following exceptions:

1. All content is delivered using an asynchronous-online format (videos, textbook, optional discussion forum).

2. Assignments are submitted by scanning and uploading to a dropbox.

3. Two proctored exams must be taken by appointment at DCTC. Morning, afternoon, and evening slots will be offered. (If you are out of state, please contact the instructor ahead of time to discuss possible arrangements.)

4. While online tutoring services are available, there is no special lab component as in the day section. Students signing up for the online section should be confident in their abilities to work independently in our most rigorous math course.