MATH 102: Precalculus: Analytic Geometry and Trigonometry

(3 credits, Gen Ed: R1)

Time and Place: MWF 12:20-1:10 (Fully Remote; Synchronous-Optional)
This course will have no attendance requirement. Lectures are on recorded videos. Homework and exams are online. The TAs and I will have live office hours on Zoom. My office hours and Zoom link are listed below. The Precalculus weekly Help Center schedule and Zoom link will be posted on Moodle once it is finalized.

Instructor: Jeff Beaulieu (please call me Jeff)
Zoom link: on Moodle
Office Hours: MWF 10:00am-11:00am, noon-1:00pm, or by appointment
Email: beaulieu@math.umass.edu (please include "Math 102" in your subject line)

Teaching Assistants: There will be two TAs assigned to this course who will hold Zoom office hours in the Precalculus Help Center. In addition to these two TAs, there will be other Precalculus TAs in the Help Center who can also help you with the material in this course. Feel free to visit with any of the TAs on the weekly Help Center schedule. This schedule will be posted on our Moodle course page when it is confirmed.

Course Description: Math 102 covers the second half of the topics in Precalculus. These include the algebra of functions, composite functions, one-to-one and inverse functions and their graphs, exponential and logarithmic functions and their graphs, equations and graphs of parabolas and circles, standard position angles, radian measure, arc length, right triangle trigonometry, the unit circle, trigonometric functions and their graphs, and inverse trigonometric functions and their graphs.

Moodle Course Webpage: The Moodle course webpage contains the syllabus, the semester lecture schedule of topics (includes exam dates), a more detailed course topics list, and information on where you can go for help with course material. Exam grades will be posted here, as well. Also, see the note below about the news forum.

To access our Moodle course page, follow the link: https://moodle.umass.edu/

Sign in using your Net ID and password. This brings you to your main Moodle page. Each course you are taking this semester that has a Moodle course page will have a link. Click on the Math 102 link.

Note: Messages will be sent to students from the instructor through Moodle. All messages sent throughout the semester will also be saved in the "news forum." A link to the news forum should be visible at the top of the Moodle course webpage.

General Education: This course carries three credits and will satisfy the R1 (Basic Math Skills) general education requirement for graduation. The General Education Program at the University of Massachusetts Amherst offers students a unique opportunity to develop critical thinking, communication, and learning skills that will benefit them for a lifetime. For more information about the General Education Program, please visit the web page: http://www.umass.edu/gened.

Learning Outcomes for General Education: Content and Critical Thinking are addressed in Math 102.

1) *Content: Know fundamental questions, ideas, and methods of inquiry/analysis used in the discipline.* This course presents students with the necessary skills to navigate composite, one-to-one, and inverse functions, as well as the equations and graphs of exponential, logarithmic, trigonometric and inverse trigonometric functions. Equations and graphs of parabolas and circles are also explored. Angles, arc length, degrees, and radians, as well as right triangle trigonometry are also investigated.

2) *Critical Thinking: Creative, analytical, quantitative, & critical thinking through inquiry, problem solving, & synthesis.* This course engages students with opportunities to use the skills listed above by presenting them with examples involving real world applications in lecture and on the homework. Examples of this are using trigonometric functions to determine the height of a mountain and using logarithms to solve an exponential equation involving the wolf population of Isle Royale National Park.

Learning Outcome for the R1 Designation: Math 102 satisfies the objective of the Basic Math Skills (R1) requirement: *Offers Instruction of Basic Math Skills*

This course explores topics in Analytic Geometry such as composite, one-to-one, and inverse functions; exponential, logarithmic, and conic sections (parabola, circle) equations and graphs; standard position angles, radian measure, and arc length; right triangles; the unit circle; trigonometric functions, their inverses, and their graphs.

Satisfaction of the R1 and R2 General Education Requirements: The following is information on how to satisfy the R1 and R2 General Education requirements for graduation, along with a discussion of the difference between the Math Placement Test and the R1 Exemption Exam.

1) Basic Mathematics Skills (R1) and Analytic Reasoning (R2) Designated Courses

The following courses offered by the Department of Mathematics & Statistics satisfy ***only the R1 requirement*** for graduation: Math 011, 100, 101, 102 104.

The following courses offered by the Department of Mathematics & Statistics satisfy ***both the R1 and R2 requirements*** for graduation: Math 113, 121, 127, 128, 131, 132, 233, 235, and Stat 111, 240, and 501.

Note: A continuously updated list of University courses (including courses outside the Department of Mathematics and Statistics) that satisfy the R1 and R2 requirements can be viewed here: http://www.umass.edu/registrar/students/general-educationacademic-requirements/r1r2-gen-ed-requirements

2) The R1 (Basic Mathematics Skills) Exemption Exam vs. The Math Placement Test

The R1 (Basic Mathematics Skills) Exemption Exam
The R1 Exemption Exam is not the same as the Math Placement Test. The R1 Exemption Exam is a test of basic math skills only, nothing else. Passing this test will satisfy the R1 requirement for graduation, but will not result in the awarding of any credits. This test is administered a couple of times each semester through the Department of Mathematics and Statistics. More information about this test (including dates, topics, results) can be found here:
https://www.math.umass.edu/undergraduate/r1-exemption

The Math Placement Test
The Math Placement Test is not the same as the R1 Exemption Exam, and your score on it does not have anything to do with satisfying the R1 or R2 requirement for graduation. The Math Placement Test is taken by students online before orientation. Your score on the Math Placement Test is used only as a guide as to where you currently are in your math ability (whether it be arithmetic or on the doorstep of calculus). The Math Placement Test is administered through the New Students Program on OWL. More information about this test can be found here:
http://www.umass.edu/newstudent/placement-and-exemption-exams#Placement
and here: http://www.umass.edu/newstudent/placement-exam-directions

Course Topics:

1. Algebra and Composition of Functions
2. One-to-One and Inverse Functions
3. Exponential Functions and their Graphs
4. Common and Natral Logarithms
5. Logarithmic Functions and their Graphs
6. Equations and Graphs of Conic Sections (Parabolas and Circles)
7. Angles in Standard Position
8. Radian Measure and Arclength
9. The Unit Circle
10. Right Triangle Trigonometry
11. Trigonometric Functions and their Graphs
12. Inverse Trigonometric Functions and their Graphs

Course Objectives:

Upon successful completion of the course, students will be able to:

1. add, subtract, multiply, divide, and identify the composition of functions
2. identify and graph the inverse of a function
3. evaluate logarithms, including common and natural logarithms
4. solve exponential and logarithmic equations and convert between the two notations
5. use various properties of logarithms to solve equations
6. graph parabolas and circles based on properties from their standard form equations
7. locate angles in standard position
8. measure angles in radians and degrees, and convert between the two units
9. understand the unit circle and identify trigonometric function values of an angle given a point on the unit circle (or on any size circle)
10. define and use trigonometric ratios to evaluate trigonometric function values for an acute angle in a right triangle
11. understand and graph trigonometric functions
12. understand and graph inverse trigonometric functions

Course Materials: This course uses an online homework and exam system to which students are required to purchase access. An electronic version of the textbook is accessible through the online system, so ***it is not necessary to purchase a hard copy of the textbook***. If you prefer to have your own hard copy, it is possible to find and purchase one online. Also, access to a scientific calculator will be necessary.

1) My Math Lab **(required):** This is the online homework system. We refer to it, affectionately, as "MML." The registration process for MML is outlined below. The textbook can be accessed through MML. Please see the note below if you have previously taken Math 101, 102, or 104, as you will not need to purchase access again.

2) Calculator (**access** required): A graphing calculator can be helpful, but it is not necessary. Access to a scientific calculator will be necessary for working through some homework problems (has buttons for sin, cos, tan, log, ln). Calculators will be allowed for use on exams in this course. Be mindful that online calculator display access is free on many websites.

3) Textbook (**access** required): *Algebra and Trigonometry* by Robert Blitzer, sixth edition. Pearson. 2018. [The cover has a yellow chili pepper and a city skyline.] Again, the textbook can be accessed through MML.

Registering for My Math Lab: To register for MML, you will need your UMass email address and the MML course ID (on Moodle).

Purchasing MML Access: You may pay while registering, or you can choose the two-week, free, temporary access option (please see below for more information on this free temporary access option). To register, and to get the negotiated $75 UMass student price, please go to **mymathlab.com** and register as a student.

***[Note:** If you already have an MML account for which you previously purchased long-term access to the current book for this course (i.e. if you've taken Math 101, 102 or 104 before with this book), then you will most likely not need to purchase access again. Simply log into your existing MML account, click on "enroll in another course" (somewhere near the top of the screen), and enter the MML course ID for this section of Math 102. Please let me know if you've taken one of these courses with an older edition of the current book.]*

Free, Temporary MML Access: It's important to register on the website and begin your assignments as soon as possible. If you cannot presently afford the long-term access, or if you are unsure if you will be staying in this course, there is an option to register, initially, for **free temporary access on the mymathlab.com website.** If you choose to register using this temporary access, you'll need to purchase long-term access and update your registration within two weeks to retain/regain access to the assignments (see instructions on the mymathlab.com website). Any work you do on the assignments up to that point will be saved automatically.

Note: While registering on mymathlab.com, you'll reach the payment page where you would purchase access. The free temporary access option should be visible on this page. Sometimes, it can be hard to find, as it may be in small print.

Working on Problems in MML: One of the benefits of using MyMathLab is that you will have the opportunity to try homework problems multiple times. Occasionally, a syntax issue may arise while working on these problems (the system isn't perfect), but multiple attempts on a problem and a reading of the specific directions for the problem should help. MML automatically saves all work that has been done on a problem, so you don't have to. No need to "submit" after completing an assignment. The system saves all work automatically.

When you first encounter a problem to do in MML, you work out the answer (perhaps on paper) and then enter your answer in the space provided. Click on "check answer." If it's correct, you'll get a green check mark, and you can attempt the next problem on the assignment. Be mindful that you can click on the "similar problem" button to get a fresh problem if you'd like more practice on that type of problem. If you get the similar problem wrong, you'll be asked if you want to keep the best attempt. You won't lose your green check mark if you choose to keep the best attempt. [Note: if you use the "similar problem" button *after the due date has passed*, then you will be assessed a ten percent penalty on that question for each day that you are past the due date, even if you previously earned a green checkmark on that question. Please do not use the similar problem button in an assignment *after the due date* for the purpose of practicing. Before the due date is safe; after the due date, not so much. Since the final exam is not cumulative, this will likely not be an issue.]

If, however, you answer the original problem incorrectly, then you'll see a red X and possibly a hint. You can then try that same problem again. If you get it wrong a second time, then, again, a hint (often the same hint) is displayed. You can then try it a third time. If you get it wrong on the third attempt, then it shows you the correct answer. You may then click on "similar problem" for a fresh problem of the same type with three new attempts. Including the original problem, you have five fresh problems per question. That means fifteen attempts for each question. If you're not having success after a couple of fresh problems, and before you exhaust all of your attempts, please seek help from the TAs (information about TA availability will be posted on Moodle when it's ready) or from me during my office hours (on the syllabus).

Trouble-Shooting: My Math Lab will operate on a PC or a Macintosh computer.
If you ever experience trouble accessing MML or the assignments, try the following:

1) If you initially registered using the free access, is the temporary period over? If so, follow the directions in your MML account to upgrade to purchased long-term access.

2) You may need to "enable pop-ups" in your web browser. If you're not sure how, please contact UMass IT for help with this.

3) If you are using Safari as your web browser, try a different browser.

4) If you are still having problems accessing MML, try a different device if one is available.

5) Perhaps you have multiple Pearson accounts? Go to the MML login page, click on "forgot my password," and follow the instructions. You'll receive an email reporting your login information for all of your accounts with Pearson. This may be helpful to see.

6) If none of the above resolves your access issues, please contact UMass IT (413-545-9400) or the My Math Lab student help line (1-800-677-6337).

Homework: Homework will be assigned and completed through My Math Lab (see above). Due dates are visible next to each open assignment on MML. An assignment will open on the day the material in it is first discussed in lecture. It will be due at the time of the exam which covers the material in that assignment. It's your responsibility to be aware of the due date for each assignment, and it's strongly recommended that you keep up with the assignments as the material is introduced.

Extensions will be allowed for students who have extenuating circumstances or who have extended time on assignments as part of their accommodations, but this will be done on an assignment-by-assignment basis and only after the student notifies me by email before the assignment in question is due, so we can agree on an acceptable extension.

Note: Again, I highly recommend that you do the assignments as the material is introduced. It is easy to get overwhelmed by assignments that pile up for whatever reason. Assignments are expected to be done BEFORE the exam that covers that material. Assignments are intended to help you practice the concepts that will be tested, so you have time to ask us questions to clear up any confusion before the exam. Extensions will not be granted for assignments just because they pile up and become overwhelming. Please plan accordingly. Assignments that are not completed by their respective due dates may still be worked on after their due dates with a ten percent penalty on the work done after the due date for each day that you are past the due date. Again, be mindful not to practice on assignments that are past the due date.

Exams: There will be three semester exams and a final exam. The final exam will not be cumulative. All exams will be taken through My Math Lab. The dates of the first three exams are on the Semester Schedule (posted on our Moodle page). The final exam will be scheduled by the Registrar's Office and the date will be communicated to you once it is scheduled. More specific information about exam times on these posted exam days will be communicated when the details are finalized. I will be reasonably flexible on these times. I will also expect students to take these exams in a distraction-reduced setting and adhere to all norms of academic honesty (please see the Academic Honesty section toward the end of this syllabus).

Exam Make-up Policy: Please contact me if you know you will need to miss a scheduled exam time or if you do miss an exam time due to unforeseen circumstances. Again, I'm willing to be reasonably flexible on exam times.

Course Grade: There are five graded parts to this course (20% each): the three semester exams, the final exam, and the homework. During the semester, exam and homework scores will be posted on MML. At the end of the semester, exam scores and homework averages will be posted on the Moodle course webpage.

Letter Grades: Course grades will be assigned based on the following scheme:

Percentage	Letter Grade
89.5-100	A
86.5-89.49	A-
82.5-86.49	B+
78.5-82.49	B
74.5-78.49	B-
70.5-74.49	C+
66.5-70.49	C
62.5-66.49	C-
58.5-62.49	D+
54.5-58.49	D
54.49 and below	F

Recorded Lectures: These recordings will be accessible through the "Echo360 Recorded Lectures" link just below the "news forum" near the top of our Moodle page. These will serve as the lectures for the course. Please let me know if you ever have trouble accessing these recordings. These recordings are from previous semesters. Please ignore any references in them to exam times and other irrelevant scheduling information. Skip over the handing back of exams in the beginning of some lectures. Focus on the presentation of material. Feel free to stop the recording to work on a given problem before I work through it. There may be "class exercise" examples I give students time to work on during these lectures. Feel free to work on those, as I go over them following their collection.

Student Success Early Alert Program: After the first exam, you may receive a message from the Early Alert Program. This program was initiated to help students who are not on a path to successfully complete the course to get in touch with resources that can help them get back on track. The alert is just that. It's not punitive. So if you receive an early alert message from your academic dean's office, please email me to set up a meeting in which we can discuss a plan that helps you to do better in the course.

Student-Athletes: Student-athletes are required to provide a schedule of competition to the instructor within the first week of class. This is primarily to identify potential conflicts with exam dates.

Students Needing Accommodations: If you have a documented disability, and you are in need of accommodations, please talk to me as soon as the semester begins. You will be asked to provide documentation through the Office of Disability Services. Extra time on exams will be provided. Extra time for assignments will be on an assignment-by-assignment basis, and students with this accommodation will need to discuss this with me when they realize an extension is necessary for a particular assignment, so we can determine an appropriate extended due date.

Academic Honesty: Cheating will not be tolerated, and violators will be prosecuted through the Provost's Office. Cheating is when you submit work that is not your own or when you help others to do so. Penalties can be failure of the course, academic probation, suspension, and expulsion. There's plenty of help available in this course. Please seek it out early and as often as needed.

Note: Exams will be accessed through My Math Lab. Calculators will be allowed. It is expected that students will not use class notes, recorded lectures, a textbook, a "cheat sheet," the internet (other than the MML exam window and a calculator display), email, texting, a video meeting, a phone (rotary dial or other), a smart watch, a dumb watch, talking with others, a secret handshake, a time machine, a decoder ring, mental telepathy, or any other communication device or method, no matter how meticulously clever or industrious. Working with others on homework is fine (in fact it's encouraged). Working with others on exams is not. Exams are a way for an individual student to demonstrate their knowledge of the material without help from any other source. Please let me know if you ever have a question on what constitutes cheating on an exam. I'll be happy to help.

Drops, Withdrawals, Pass/Fail Option, Incompletes: Consult the lecture schedule for the last day to drop the course with no record (end of add/drop) and the last day to withdraw from the course (only a "W" will appear on your transcript). Taking a course using the Pass/Fail option depends on various requirements and circumstances. In normal times, a course taken on a Pass/Fail basis cannot be used to satisfy a Gen Ed requirement. This may also be true of some courses required by your major. In

abnormal times, such as in Spring and Fall 2020, the Pass/Fail option may be extended to these requirements, as well as the number of courses allowed to be taken using the Pass/Fail option. However, this very unusual modification of the Pass/Fail Option Policy is decided upon by the Faculty Senate in each of these unusual semesters. As of now, no such modification to the policy has been announced for Spring 2021. If it is, I will send out a link to the modified policy.

A grade of "Incomplete" can be given only for a compelling reason (e.g. serious illness). To receive an incomplete, you must be passing the course.