Math 170 – Calculus I
Fall 2013 – MWF 7:30-8:40am – PPHAC 232

Instructor – Dr. Trisha Moller
Office: PPHAC 223
Phone: 610-861-1335
Email: metmm01@moravian.edu
Office hours: MWF 8:45-9:15am or by appointment

Course Materials – The basic text is *Calculus, Single Variable, Second Edition*, by Jon Rogawski. In addition, all students are expected to have a graphing calculator and bring it to class. We recommend the TI-83plus; instructions will be provided on this calculator, but students who wish to use a comparable calculator may. Please refrain from using your cell phone or smartphone during class, unless asked to use as a resource.

Course Goals – In this course, you will be learning the mathematical language of change. Upon completion of this course, a student will be able to compute the basic techniques of differentiation and integration, understand and compute the prior concepts proving these processes, and understand the connection between the two operations, both theoretically and computationally. A student will also have a deeper insight into the power of Calculus as a tool for modeling real world situations, and be able to work with functions graphically, algebraically, numerically, and verbally.

Course Topics – We will briefly review Ch.1 and cover most sections of Ch.s 2-5. The topics to be covered are a review of Precalculus concepts, graphical and algebraic understanding of limits, the definition of a derivative, differentiation rules, techniques for graphing functions, applications of derivatives, the definition of an integral, graphical and algebraic understanding of integrals, and the Fundamental Theorem of Calculus.

Attendance – Class attendance is required. My definition of "Attendance" includes being prepared for class. Thus, bringing a textbook/notebook/pencil to class, reviewing notes before class, completing the homework assignments before the next class meeting, and participating in class discussions are all expected of each student.

If a student is absent, he/she must inform the instructor via email before or on the day of the absence. It is the student's responsibility to keep up with all work covered in class and all assignments, even if absent from class.

Workload – For every hour in class you should expect to spend 2 hours doing work outside of class. Thus, you are expected to put in **7-8 study hours per week**! Math is not a spectator sport; you cannot learn math without lots of practice!

Exams – There will be **two** in class exams and a cumulative final exam. If you must miss an exam, it is your responsibility to contact me *in advance* to make arrangements.

Study Guide – You are required to complete a study guide outline of each section of the textbook. These are due on each exam day and should be used as a study tool.

Proficiency Tests – In addition to the regular exams there will be **two** proficiency exams. When these exams are first given in class your recorded score will either be a 0% or 80-100%. If you receive a 0% then you may retake the exam as often as necessary within 4 weeks of the original exam date. When you score at least an 80% on a retake, your recorded score will be changed to an 80%. Thus the only way to receive a score of more than 80% is to do well the first time you take the test. NOTE: While a student may not earn a passing grade in Math 170 without earning at least 80% on each proficiency test, earning a passing grade on these tests is no guarantee of an overall passing grade for the course.

Culture Points – You are required to complete **15 Culture Points** by the end of the semester. There are no specific assignments for this portion of the course. Rather, there are many opportunities for you to explore mathematics in our culture. Activities that foster cultural awareness include (but are not limited to): attending talks, discussing a mathematical topic with a fellow student or professor outside of class, giving a talk, reading articles, or solving problems. More details are explained in the Culture Points section at the end of the syllabus. You must submit assignments worth a total of at least 5 Culture Points by *midterm*.

Homework/Quizzes – Homework assignments will constitute an important part of this course and will be assigned daily. The problems assigned for homework represent a bare minimum, and you should work extra problems to ensure mastery of the material. It is vital that you do all the homework problems assigned; you should keep all your work in a binder or notebook for reference.

Homework will be collected every **FRIDAY**. The problem set from the previous Wednesday-Friday-Monday will be handed in on the next Friday. This gives ample time to ask questions, correct any mistakes, and make any necessary revisions. Each handed in assignment is expected to be *perfectly completed* (with correct solutions, notation, and answers) or else it will receive a grade of zero. You may redo the problems for reduced credit, with a total of three opportunities to hand in each homework set up to the next exam.

We may also have short, weekly, in-class quizzes, based on the assigned homework problems. The best way to do well on the quizzes is to do all the assigned homework.

There will be no late assignments, no make-up quizzes, and make-up exams are given only in extreme, pre-approved cases.

YOU choose your grading assessment: either commit to turning in perfect weekly homework sets OR commit to not having homework count towards your grade (instead the weight will be distributed to the other factors). You must complete the Homework Contract with your decision by the end of the first week.

If you work with someone else on homework for Math 170
(classmate, tutor, professor, roommate etc.),
PLEASE NOTE THIS at the top of your hand in assignment!

Evaluation, Grading, and Dates of Exams/Tests – Grades will be computed based on the weights below. Tentative dates for exams are listed below, as well.

It is within the purview of the instructor to apply qualitative judgment in determining grades for an assignment or for a course.

Quizzes/Homework (worth 17%)
Culture Points (worth 5%)
Limit Proficiency Test (worth 8%), **Friday, September 20**
.   Retakes may be done through Friday, October 11.
Exam 1 (worth 18%), **Friday, October 4**
Derivative Proficiency Test (worth 12%), **Friday, October 25**
.   Retakes may be done through Friday, November 22.
Exam 2(worth 18%), **Monday, November 11**
Final Exam (worth 22%), **Friday, December 13, 8:30-11:30am**

Course grades will be determined by the following scale:

93-100: A	73-77: C
90-93: A-	70-73: C-
87-90: B+	67-70: D+
83-87: B	63-67: D
80-83: B-	60-63: D-
77-80: C+	<60: F

Syllabus Status – This syllabus and the course contents are subject to change at the discretion of the instructor. Generally changes will be finalized only after discussion of the change with students in the class. Any updates to the syllabus will be announced in class and sent by email. Students are responsible for any announcements made in class and are expected to check email on a daily basis for course updates.

Canceled Classes – Class may be canceled due to weather or for some other reason. In the case of cancellation, the instructor will send an email to inform students of the cancellation. It is the student's responsibility to check email prior to each class period to determine if class is canceled.

e2Campus – In the event of an emergency the system called e2Campus allows Moravian College to send text messages to the cell phones of registered members of the campus community with information about what is happening and/or what precautions should be taken. Up to two cell phone numbers and two email addresses per user may be registered. This service is an integral part of the College's emergency response system. If you are not already registered on the system, please do so as soon as possible. To register for e2Campus, visit http"//intranet.moravian.edu/e2campus/index.asp from a computer on Moravian's campus.

Learning Disability Accommodations – Students who wish to request accommodations in this class for a disability should contact the assistant director of Academic and Disability Support in the Academic Support Center, Monocacy Hall, lower level (extension 7625). Accommodations cannot be provided until authorization is received from the Academic Support Center.

Academic Honesty – For graded assignments, you may use your class notes and any books or library sources except a solutions manual. Any resources you use must be documented at the top of the homework assignment. As an example if you get help from the Tutor Center for problem 4 only, please write "Help with problem 4 from Tutor Center". No points will be deducted for honestly acknowledging help.

However if you do not document any appropriate resource, this is considered cheating. Students are encouraged work on problems together. However, acquiring an entire solution from a classmate in not acceptable. If two or more graded homework sets look similar, no points will be awarded for the entire homework set (with no warning). You are always welcome to come to office hours to see the instructor.

The College academic honesty policy appears in your Student Handbook; you are expected to be familiar with it. The Academic Honesty Policy Guidelines specific to mathematics classes are reiterated at the end of the syllabus. They apply to work done outside of class as well as to in-class quizzes and tests. Please read them carefully. If you are unsure about the propriety of a particular procedure or approach, please consult with your instructor before continuing with the assignment.

Mathematics Department Academic Honesty Policy – The Mathematics Department supports and is governed by the Academic Honesty Policy of Moravian College as stated in the Moravian College Student Handbook. The following statements will help clarify the policies of members of the Mathematics Department faculty.

In all at-home assignments which are to be graded, you may use your class notes and any books or library sources. When you use the ideas or thoughts of others, however, you must acknowledge the source. You also may not use a solution manual or the help (orally or in written form) of any individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources, you will be violating the Academic Honesty Policy of Moravian College. You may work with your fellow students on homework which is not to be graded. You are responsible for understanding and being able to explain the solution of all assigned problems, both graded and un-graded.

All in-class or take-home tests and quizzes are to be completed by you alone without the aid of books, study sheets, or formula sheets unless specifically allowed by your instructor for a particular test.

Culture Points

> The mathematician's patterns, like the painter's or the poet's must be beautiful; the ideas, like the colours or the words must fit together in a harmonious way. Beauty is the first test: there is no permanent place in this world for ugly mathematics.
>
> *G. H. Hardy*

> To those who do not know mathematics it is difficult to get across a real feeling as to the beauty, the deepest beauty, of nature ... If you want to learn about nature, to appreciate nature, it is necessary to understand the language that she speaks in.
>
> *Richard Feynman*

One goal for this class is to provide some perspective of mathematics, and the role it plays in our modern world. Whether you plan to be a mathematician, a scientist, or simply a well-rounded liberal arts graduate, it is important to be aware of the role and nature of mathematics today. To help meet this goal, I am asking you to participate in "mathematical cultural awareness." There are no specific assignments for this portion of the course. Rather, there are many opportunities for you to explore mathematics in our culture. Activities that foster cultural awareness include (but are not limited to): attending talks, discussing a mathematical topic with a fellow student or professor, giving a talk, reading a paper, or solving a problem.

Basic overview of culture points

Culture points activities will account for 5% of your final course grade. **To get full credit for this activity, you must accrue 15 points by the end of the semester**. You gain points by attending seminars, colloquia or other talks; discussing mathematics outside class; reading articles; giving presentations; solving problems.

To get credit for an event, you will need to submit a short write-up for the event. This write-up will have two portions: (1) a short description of the event and (2) a reflection on the impact of that event on your own understanding of mathematics.

Points will be given based both on the quality of the event and the quality of the submission. The following sections provide details on this activity.

Rules for submission

Your culture point write-up must be neat and well-written (complete sentences, paragraph structure, etc.). I prefer your submissions to be typed, but I will accept hand-written submissions – particularly if there is a great deal of mathematical notation. For each submission, keep in mind that there are two portions:

1. **Summary of the event:** This section of the write-up should constitute no more than 50% of your submission. Summarize the talk, conversation, article, or event. If you were working on a problem, discuss *how* you approached the problem and whether you were able to arrive at a satisfactory answer (provide the actual solution or work on the problem on an attached page).

2. **Reflection on the event:** How does the event affect your understanding of mathematics and mathematicians? Do you have a greater appreciation of the role of mathematics in society or the nature of mathematical research? Does the event connect with the mathematics you've learned in this course (or any of your other mathematics courses)? If you worked on a problem, explain how your work on that problem has influenced the way you solve problems or your understanding of the mathematics involved.

Be sure to clearly state what the involved event was. If you watched an episode of a series, be sure to include the name of the episode as well as the name of the series. If you read an article, include a full citation of the article (do NOT include a copy of the article itself). If you attended a talk or seminar, include the name of the talk and of the speaker.

Miscellaneous rules

- You may make at most one culture point submission per week.

- At least one culture point submission needs to based on a talk, colloquium or seminar. At least one culture point submission needs to be based on an article or reading.

- Culture point submissions that do not follow the above rules (particularly regarding neatness and making full citations) will be penalized or rejected.

- Culture points above the required number will be used as "extra credit" – how extra culture points translate to bonus points on the final grade will be determined at the end of the semester.

Culture point activities

This list below is not comprehensive – it is meant to illustrate some possible activities and to provide a calibration for how many culture points different activities might provide. Note that the actual number of culture points you get will vary depending on the quality of your particular write-up.

- Attend an ϵ-talk (3 points). These short (10 to 15 minute) talks are given weekly as part of the Math Society's regular meetings.

- Attend a Math/CS colloquium (4 points).

- Attend a colloquium or conference off-campus (5 to 10 points). There are many opportunities to attend conferences throughout the valley, such as at Lafayette or Lehigh.

- Review an article or book on mathematics (3 to 5 points). See below for suggestions.

- Discuss a mathematical topic with someone outside the class (2 to 4 points) – this could be with roommates, teammates, family members, other professors. You can discuss a mathematical topic from the course or some other mathematical topic.

- Find mathematics in popular culture (2 to 4 points) – movies such as `A Beautiful Mind`, or references in *The Simpsons*. One source is *mathgoespop.com*. Also look for mathematics in the creation of movies by Pixar, LucasFilms or Dreamworks.

- Work on a problem outside the scope of the classroom (4 to 10 points). You might solve an interesting exercise or simply work on it without quite reaching a solution.

Places to go for articles and other writings

Books and Journals

- (3 to 5 points) – mathematical articles from popular journals such as *Popular Science*, *Scientific American*, or *National Geographic*

- (3 to 5 points) – teaching-oriented journals such as *Mathematics Teacher* or *Mathematics Teaching*

- (4 to 5 points) – articles from journals such as *American Mathematical Monthly*, *The College Mathematics Journal*, *Mathematics Magazine*, or *PME Monthly*. Many of these journals can be found in JSTOR and are available both in Reeves and the Mathematics library.

- (3 to 5 points) – many books provide terrific insight to the nature of mathematics. Pick a chapter of almost any of the general mathematics books by Martin Gardner, Ian Stewart, Sherman Stein, or Keith Devlin.

- (3 to 5 points) – read a chapter (or entire book) from a mathematical fiction novel. One good source for titles is `http://kasmana.people.cofc.edu/MATHFICT/`

You can also search `http://scholar.google.com` or `http://www.scholarpedia.org` for articles.

Math in the news

Look through the newspapers, especially the *New York Times*, the *Chicago Tribune*, the *Washington Post*, and other major newspapers for articles on mathematics in modern culture.

You can also find mathematics on the History Channel, the Discovery Channel, or PBS.

Consider almost any topic: the war in Iraq, football, jazz music, security at the airports, global warming, sinkholes, overpopulation, Windows Vista, poker. If you search through the web facilities available in Reeves, you can find an article connecting your favorite activity to mathematics.

Web Resources

Below are just a few links to mathematical articles (and a rough indication of their point value)

- `http://www.maa.org` (2 to 6 points)

  There is a host of columns here – all quite readable. Be sure to look through the archives to find articles of particular interest.

- `http://www.americanscientist.org` (2 to 4 points)

  While most articles are more for the sciences, there are a few mathematics articles that get thrown in. Two of the more recent articles are *Unwed Numbers: The Mathematics of Sudoku, a puzzle that boasts "No math required!"* and *Group Theory in the Bedroom: An insomniac's guide to the curious mathematics of mattress flipping.*

- `http://turnbull.mcs.st-and.ac.uk/history/` (3 to 5 points)

  Look up a mathematician or mathematical topic here for a historical perspective on the mathematics you are learning. Start with those mathematicians that are mentioned in class (so who is that Simpson guy behind Simpson's rule for integration?). OR look up a mathematician who has the same name as you!

- `http://www.cut-the-knot.org` (4 points)

  Lots of interesting mathematical tid-bits, most of which include an interactive applet for you to experiment with.

- `http://plus.maths.org/` (4 to 5 points)

  An on-line magazine devoted almost exclusively to questions in the mathematical sciences.

Below are a few links to blogs hosted by professional mathematicians where interesting mathematical musings can be found (2 to 4 points)

- *What's New* by Terence Tao, `http://terrytao.wordpress.com/`

- *Not Even Wrong* by Peter Woit, `http://www.math.columbia.edu/ woit/wordpress/`