

Math 110
Oxford College of Emory University
Fall 2018

Instructors:	Dr. Benjamin Purkis	Dr. Nicolas Petit
Office:	Pierce 128	Pierce 126
Email:	benjamin.purkis@emory.edu	nicolas.petit@emory.edu
Phone:	4-4657	4-8516
Office Hours:	To be announced	

Course Content: Mathematics 110 provides students with an integrative approach to Calculus I that includes the necessary precalculus topics:

Review of algebra; functions; trigonometric, inverse trigonometric, logarithmic and exponential functions. Calculus topics include limits, continuity, the definition of the derivative, differentiation, extrema, antiderivatives and optimization problems.

Textbook: James Stewart, *Single Variable Calculus: Early transcendentals, 7th or 8th Edition*. Try to read the book before coming to class: believe us, this is a very useful habit.

Course Goals: Upon successful completion of Math 110 students will:

1. Be able to perform complex algebraic manipulations.
2. Be able to graph and compute with algebraic and transcendental functions.
3. Understand conceptually limits and their relationship to the graph of a function.
4. Understand conceptually the derivative and its relationship to the concept of “rate of change”.
5. Be able to calculate derivatives and evaluate limits.
6. Be well-prepared for Math 111.

Classes: The student is expected to attend all classes, *having read the relevant class notes ahead of time!* In the event of an absence, the student is responsible for work covered and/or announcements made in class. An inordinate amount of absences will be handled in accordance with school policies. In addition to the regular class meetings, there will also be some tests scheduled on Thursday mornings.

Classes each day will consist of a short lecture followed by group work on the relevant content. Reading the class notes ahead of time is extremely important for getting the most out of lecture, and subsequently being a valuable contributor to the group work of the day.

Homework: Homework is assigned almost every day of class. Students should expect to spend at least 2 productive hours of study for each class session, or about 6 to 8 hours per week.

Students are encouraged to ask questions of the instructor about any problems with which they struggled in these assignments, usually during the instructor’s office hours and/or at the Math Center. These exercises usually will not be collected, but instead are for the benefit of the student. However, the quizzes that are given may be based on the homework problems.

Quizzes: Some number of in-class quizzes will be given and most of them will be unannounced. The student must be present in class to take each quiz. No make-up quizzes will be given, regardless of the circumstances; however, the lowest two quiz grades will be dropped.

Gateway Exams: In order to pass this course the student must pass an examination in algebra, graphs and transcendental (trigonometric, inverse trig, logarithmic and exponential) functions. The student will be allowed three chances to pass it (see below). While each gateway exam will have different problems, the

format and content of the exams will be identical.

- **First Gateway: 8:00 am, Thursday, October 4**
- **Second Gateway: 8:00 am, Thursday, October 25**
- **Last Gateway: 8:00 am, Thursday, November 15**

Tests: Four major tests will be given. All of the tests will be comprehensive. Calculators will **not** be allowed on tests. Each student is expected to take tests at the scheduled times. Any conflicts should be brought to the instructor's attention as soon as possible. If a legitimate reason exists for missing a test - as determined by the instructor - then the test must be taken prior to the regularly scheduled date. In the unusual circumstance where taking the test early is not possible, **students should be aware that any make-up test given will be designed to be more difficult to offset the additional time given for study.** Students must provide written documentation in advance of any special accommodations required for testing. This includes additional time or other needs. The final exam cannot be rescheduled.

The tests will be given on the following days:

- **8:00 am, Thursday, September 27 - Test 1**
- **8:00 am, Thursday, October 18 - Test 2**
- **8:00 am, Thursday, November 8 - Test 3**
- **In Class, Friday, December 7 - Test 4**

In addition to having four tests, your lowest score on these four tests will be replaced with your final exam score *if and only if* it helps your grade to do so. Thus, while one bad test will not damage your grade, you will need to learn all the material for the final exam!

Final Exam: A cumulative final exam will be given in accordance with the schedule below:

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|--|---------------------------------|
| • Tuesday, December 18th at 2pm-5pm | Section 1 (11:00-11:50, Purkis) |
| • Wednesday, December 19th at 2pm-5pm | Section 2 (10:00-10:50, Purkis) |
| • Thursday, December 13th at 9am-12pm | Section 3 (8:00-8:50, Petit) |
| • Thursday, December 13th at 2pm-5pm | Section 4 (9:00-9:50, Petit) |

Projects: Two projects will be assigned during the semester requiring a more in-depth mathematical investigation. These projects will be group projects, and more information will be available when they are assigned.

Grading: Evaluation will be based on the following written work:

Quizzes	100 points
Gateway Exams	100 points
Projects (2 @ 50 pts)	100 points
Tests (4 @ 100 pts)	400 points
Final	200 points
Total	900 points

In general, letter grades will be determined as follows:

A: 810 points and above; B: 720 – 809; C: 630 – 719; D: 540 – 629; F: less than 540 points

Grades of A–, B+, B–, C+, C–, D+ may be assigned for percentages near the above cut-offs.

Canvas Website: There is a course website on Canvas: <http://canvas.emory.edu>. Homework assignments, extra handouts, announcements, scheduled SI sessions, questions related to problems, and other material can be posted at any time. Students are responsible for checking the site every day and obtaining related information.

Supplemental Instruction/Help Sessions/Tutoring/Study groups: The supplemental instruction (SI) leaders will be announced. They schedule study sessions to review concepts, to help students discover how best to study. The SI is a student who has taken the course (or a similar course) before, has a good understanding of the material (but probably not as complete as the instructor), and knows how to be a successful student. Check the Canvas site for scheduled sessions.

Help Sessions/Tutoring: Help sessions will be scheduled as there is demand for them. Attendance is optional.

Contact Christina Lee, Director of the Mathematics Center, for tutoring hours, most likely Mondays through Thursdays, 3–6 pm. Study groups, organized by students are highly recommended.

Written Style: Expressing complete thoughts and arguments require complete sentences. In mathematics, where clarity of thought is paramount, this is no less true. Granted, with mathematical symbols one can write these sentences very efficiently – but they are sentences nonetheless. Consider “ $1+1 = 2$ ”. This is a complete sentence (it has a subject “ $1+1$ ”, verb “ $=$ ” and predicate “ 2 ”).

To this end, your written work in this class should be in complete sentences. Use mathematical symbols wherever appropriate. Your work also needs to be neat and orderly to be intelligible. See the “Calculus Style Guide” on Canvas.

Tips for Success: Calculus is hard, but it can be made easier by intelligent and efficient study habits. The mathematician Richard Hamming said the purpose of calculation is insight. Insight is an understanding into why things work the way they do. This should be the goal of working out problems. Students should know *why* each step is correct and *why* each step was the right step to take. Note, this is more than knowing *that* each step is correct.

Although the homework exercises are not graded, it is important for the success of the student that they be completed as soon after covering the material as possible. Calculators may be used when appropriate, but the student should keep in mind that they are not permitted on the tests. While collaboration is encouraged, each student should be sure that he or she ultimately can *solve problems unaided by notes, the textbook, a calculator, or other people*.

Practice good style on homework. A clean style helps to clean up messy thinking.

In general the student should expect to study at least six good hours per week in addition to time spent reviewing for tests.

Tests are performances, similar to those by athletes, musicians, and dancers. Prepare for them in similar ways. Begin practicing for them weeks in advance.

The topics we will cover are very useful and fundamental in the sciences, business and engineering, among other fields, and we want you all to succeed. However, success in the course will require your diligence and hard work. Be sure to keep up with the assignments and to attend class. Talk to your instructors as soon as you are having problems - don't wait until the week of a test. In addition to learning quantitative skills, it is important that you develop learning skills and study habits that will help you in calculus, in other courses, and in life beyond Oxford College.

You may always ask the instructors any question about an assignment. They will answer at their discretion.

Good luck and we hope this will be an enjoyable experience for all of you!

A Word on Technology: Please leave all iPods, MP3 players, netbooks, etc. stowed and off for the duration of the class. Cell phones should be silenced or off.

Academic Accommodations: Access, Disability Services and Resources (ADSR) works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, students must contact ADSR and complete the registration process. Faculty may not provide disability accommodations until an accommodation letter has been processed; accommodations are not retroactive. Students registered with ADSR who receive a letter outlining specific academic accommodations are strongly encouraged to coordinate a meeting time with their professor to discuss a protocol to implement the accommodation as needed throughout the semester. This meeting should occur as early in the semester as possible. Contact Access, Disability Services and Resources for more information at (770) 784-4690 or adsroxford@emory.edu. Additional information is available at the ADSR website at <http://equityandinclusion.emory.edu/access/students/index.html>.

Religious Holidays: Instructors are encouraged, not required, to accommodate students' academic needs related to religious holidays. Please make every effort to negotiate your religious holiday needs within the first two weeks of the semester; waiting longer may compromise your instructor's ability to extend satisfactory arrangements. If you need guidance negotiating your needs related to a religious holiday, the College Chaplain, Rev. Lyn Pace, ppace@emory.edu, Candler Hall 202, is willing and available to help.

***Please be aware that Rev. Pace is not tasked with excusing students from classes or writing excuses for students to take to their professors.*

Emory's official list of religious holidays may be found at:
<http://www.religiouslife.emory.edu/faith/traditions/holidays.html>.

THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE. TO RECEIVE CREDIT FOR WORK SUBMITTED YOU MUST PLACE YOUR NAME ON IT. BY PLACING YOUR NAME ON SUCH WORK, YOU PLEDGE THAT THE WORK HAS BEEN DONE IN ACCORDANCE WITH THE GIVEN INSTRUCTIONS AND THAT YOU HAVE WITNESSED NO HONOR CODE VIOLATIONS IN THE CONDUCT OF THE ASSIGNMENT.

Student work submitted as part of this course may be reviewed by Oxford College and Emory College faculty and staff for the purposes of improving instruction and enhancing Emory education.

This syllabus is a guide for effective learning in this class; it is not a legal contract. The instructor reserves the right to modify the syllabus as needed.

Tentative Calendar:

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Aug 27th	Aug 28th	Aug 29th <u>1</u> <u>§ "Handout A"</u> ¹ Algebra Review	Aug 30th	Aug 31st <u>2</u> <u>§ "Handout A"</u> Algebra Review
Sep 3rd <i>No class</i> <i>Labor day holiday</i>	Sep 4th	Sep 5th <u>3</u> <u>§ "Handout A"</u> Algebra Review	Sep 6th	Sep 7th <u>4</u> <u>§1.2</u> Polynomial and Rational Functions
Sep 10th <u>5</u> <u>§1.1</u> Piecewise-defined Functions	Sep 11th	Sep 12th <u>6</u> <u>§1.3</u> Combining Functions	Sep 13th	Sep 14th <u>7</u> <u>§ NTF² A</u> Trigonometric Functions
Sep 17th <u>8</u> <u>§NTF B</u> Trigonometric Identities	Sep 18th	Sep 19th <u>9</u> <u>§NTF C</u> Graphing Trigonometric Functions	Sep 20th	Sep 21st <u>10</u> <u>§NTF D</u> Solving Trigonometric Equations
Sep 24th <u>11</u> <u>§NTF E</u> Inverse Trigonometric Functions	Sep 25th	Sep 26th <u>12</u> REVIEW	Sep 27th Test 1 8am	Sep 28th <u>13</u> <u>§NTF F</u> Exponential & Logarithmic Functions
Oct 1st <u>14</u> <u>§NTF G</u> Exponential & Logarithmic Equations	Oct 2nd	Oct 3rd <u>15</u> <u>§2.2</u> The Limit of a Function	Oct 4th Gateway Exam 1st try, 8am	Oct 5th <u>16</u> <u>§2.3</u> Calculating Limits
Oct 8th <i>Midsemester</i> <i>Break</i>	Oct 9th <i>Midsemester</i> <i>Break</i>	Oct 10th <u>17</u> <u>§2.6</u> Limits at Infinity	Oct 11th	Oct 12th <u>18</u> <u>§2.5</u> Continuity
Oct 15th <u>19</u> <u>§2.5</u> Continuity	Oct 16th	Oct 17th <u>20</u> REVIEW	Oct 18th Test 2 8am	Oct 19th <u>21</u> <u>§2.7</u> Introduction to Derivatives

¹See Handout on Algebra on Canvas

²See "Notes on Transcendental functions" on Canvas.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Oct 22nd <u>22</u> <u>§2.7</u> Using the Definition of Derivatives	Oct 23rd	Oct 24th <u>23</u> <u>§3.1</u> Derivative of Polynomials	Oct 25th Gateway Exam 2nd try, 8am	Oct 26th <u>24</u> <u>§3.2</u> The Product and Quotient Rules
Oct 29th <u>25</u> <u>§3.3</u> Derivatives of Trigonometric Functions	Oct 30th	Oct 31st <u>26</u> <u>§3.4</u> The Chain Rule	Nov 1st	Nov 2nd <u>27</u> <u>§3.6</u> Derivatives of Logarithmic Functions
Nov 5th <u>28</u> <u>§Notes</u> Combining Derivative Rules	Nov 6th	Nov 7th <u>29</u> REVIEW	Nov 8th Test 3 8am	Nov 9th <u>30</u> <u>§4.1</u> Maximum and Minimum Values
Nov 12th <u>31</u> <u>§4.3</u> Increasing, Decreasing, and Concavity	Nov 13th	Nov 14th <u>32</u> <u>§4.3</u> Increasing, Decreasing, and Concavity	Nov 15th Gateway Exam Last try, 8am	Nov 16th <u>33</u> <u>§4.7</u> Optimization
Nov 19th <u>34</u> <u>§4.7</u> Optimization	Nov 20th	Nov 21st <i>Thanksgiving recess</i>	Nov 22nd <i>Thanksgiving recess</i>	Nov 23rd <i>Thanksgiving recess</i>
Nov 26th <u>35</u> <u>§4.9</u> Antiderivatives	Nov 27th	Nov 28th <u>36</u> <u>§5.5</u> <i>u</i> -substitution	Nov 29th	Nov 30th <u>37</u> <u>§5.5</u> <i>u</i> -substitution
Dec 3rd <u>38</u> <u>§Notes</u> Mixed Antiderivatives	Dec 4th	Dec 5th <u>39</u> REVIEW	Dec 6th	Dec 7th Test 4 In Class
Dec 10th <u>40</u> FINAL REVIEW	Dec 11th <i>Last day of classes</i>	Dec 12th <i>Reading Day</i>	Dec 13th	Dec 14th