# Math 119: Integral Calculus

**Dr. Hannah Robbins**  Trexler 270H, x4906, robbins@roanoke.edu (email is the best way to reach me)

**Office Hours**          Monday, Tuesday, Wednesday 9 – 10:30 am, or by appointment.

**Course Description**  This course is the sequel to Math 118.  Together they provide an introduction to calculus, with integrated precalculus review of relevant topics.  Calculus topics include the study of derivatives, beginning integrals and graphing. An additional focus of the course will be the use of technology as a learning aid.

**Learning Outcomes**  By the end of the course, sucessful students will be able to:

- apply techniques of differentiation and integration to model and solve problems
- understand the role of calculus and the infinitesimal in modern mathematics
- calculate, by hand, rudimentary integrals and derivatives
- understand and manipulate the various types of functions
- recognize the role of technology in Calculus, understand when it should be used, and be aware of its limitations

**Course Materials**  Textbook: *Calculus: Early Transcendental Functions* Smith and Minton, 4th edition
Devices: Graphing calculator

**Important Dates**  We will have four in-class tests and a final exam. Each test will focus on the material learned since the last test, but will (necessarily) contain previous material. The final will be comprehensive.
**If you have a conflict with one of these dates please email me ASAP.**

| | |
|---|---|
| Test 1 | Wednesday 2/10, in class |
| Test 2 | Friday 3/4, in class |
| Test 3 | Monday 4/4, in class |
| Test 4 | Friday 4/22, in class |
| Final Exam | Monday 5/2, 8:30 - 11:30 am |

**Course Grades**  The final course grade is determined in the following way:

| | |
|---|---|
| MCSP Conversations & Quizzes | 15% |
| Homework | 10% |
| Mathematica Projects | 15% |
| Tests (10% each) | 40% |
| Final Exam | 20% |

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below.  Attendance and class participation will be considered when determining marginal grades.

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|---|---|---|---|---|---|---|---|---|
| | | B+ | 88-89 | C+ | 78-79 | D+ | 68-69 | |
| A | 92-100 | B | 82-87 | C | 72-77 | D | 62-67 | F | 0-59 |
| A- | 90-91 | B- | 80-81 | C- | 70-71 | D- | 60-61 | |

**MCSP Conversations**  The MCSP Department offers a series of designed to appeal to a broad audience. You are invited be involved with all of these meetings; however participation in at least two of these sessions is mandatory.  After attending, you will submit within one week of the presentation a one page paper reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a personal response to the experience. These reaction papers will be each be counted as a quiz.

**Quizzes**           We will have a short weekly quiz on the calculus material we've learned. There will be no make-up quizzes, but at the end of the semester your lowest quiz score will be dropped.

**Homework**  There will be one homework problem due almost every day. Usually these will not be purely computational, but instead will ask you to think about an idea from the section we're discussing. Homework is due at the beginning of class and **no late homework will be accepted**. These problems must be done alone, which means you may not work on them with anyone except me. You should not show your solution to anyone else or look at anyone else's solution.

**Mathematica Projects**  Throughout the semester, we will explore the applications of technology to the study of calculus via Mathematica projects. These projects will introduce you to the software package Mathematica and allow you to take advantage of its graphical and computational capabilities to reinforce your understanding of calculus.

**Practice Problems**  After each section I will assign some problems from the book for practice. These will not be collected – the answers are in the back and they are your chance to make sure you understand the material and to get help if you realize you need it.

**Attendance Policy**  Class attendance is expected. If you do have to miss class, you are responsible for learning all material covered that day. If you have not discussed your absence with me beforehand, you will be unable to make up any work missed.

**Electronic Devices**  You can use **only** your graphing calculator during class. (This means no cell phones - please set them on silent and leave them in your bag.)

**Extra Resources**  Subject tutoring from other students is available through the Center for Teaching and Learning (in Fintel Library).

**Special Needs**  If you have a disability that may require an accommodation in this course, please let me know and provide your documentation within the first 2 weeks of the semester. I must have your documentation at least 48 hours prior to any accommodation I make. (Check with the Center for Teaching and Learning for their scheduling guidelines.)

**Academic Integrity**  I expect all of you to follow the Academic Integrity policies of Roanoke College. All graded work should be your own work! If you ever have questions about how these policies apply to our class please contact me. Any violations of these policies will automatically be turned over to the Academic Integrity Council.

**Course Schedule**

The following schedule is approximate and subject to change except for the test dates. It should give you an idea of the timing of the topics covered and assignments.

| Day | Date | Topic | Assignments |
|-----|------|-------|-------------|
| M | J 18 | Review of derivatives | |
| W | J 20 | 3.3: Max and Min values | |
| F | J 22 | 3.3 | Project 1 |
| M | J 25 | 3.4: Increasing/Decreasing | |
| W | J 27 | 3.4/3.5 | |
| F | J 29 | 3.5: Concavity | |
| M | F 1 | 3.6: Curve Sketching | Project 2 |
| W | F 3 | 3.7: Optimization | |
| F | F 5 | 3.7 | |
| M | F 8 | Review | |
| W | F 10 | **Test 1** | |
| F | F 12 | 3.8: Related Rates | |
| M | F 15 | 3.8/3.9: Derivatives in Science | Project 3 |
| W | F 17 | 4.1: Antiderivatives | |
| F | F 19 | 4.1/4.2 | Project 4 |
| M | F 22 | 4.2: Sums | |
| W | F 24 | 4.3: Area | Project 5 |
| F | F 26 | 4.3/4.4 | |
| M | F 29 | 4.4: Definite Integrals | |
| W | M 2 | Review | |
| F | M 4 | **Test 2** | |
| | | **Spring Break** | |
| M | M 14 | 4.5: Fundamental Theorem of Calculus | |
| W | M 16 | 4.5 | Project 6 |
| F | M 18 | 4.6: Substitution | |
| M | M 21 | 4.6 | |
| W | M 23 | 4.7: Numerical Integration | Project 7 |
| F | M 25 | **Good Friday** | |
| M | M 28 | 5.1: Area Between Curves | |
| W | M 30 | 5.1 | |
| F | A 1 | Review | |
| M | A 4 | **Test 3** | |
| W | A 6 | 5.2: Volume | |
| F | A 8 | 5.2/5.4: Arc Length and Surface Area | Project 8 |
| M | A 11 | 5.4/6.2 | |
| W | A 13 | 6.2: Integration by Parts | |
| F | A 15 | 6.6: Improper Integrals | |
| M | A 18 | 6.6 | Project 9 |
| W | A 20 | Review | |
| F | A 22 | **Test 4** | |
| M | A 25 | Review | |
| M | May 2 | **Final Exam** 8:30 - 11:30 am | |