Calculus I
56-2720 (MA), Fall 2015

Department of Science & Mathematics
Columbia College Chicago
600 South Michigan Avenue
Chicago, Illinois 60605

Course Title: Calculus I
Document date: Fall 2015
Course Number: 56-2720
Section Number: 01
Credits: 4
Designation: MA
Meeting Days and Times: Monday and Wednesday, 10:30 – 12:20
Meeting Location: 623 S. Wabash, room 503
Instructor Name: Christopher Shaw
Office location: 623 South Wabash, room 500-M
Office phone: 312-369-7732
Email address: cshaw@colum.edu
Mail delivery: Mail may be brought to room 500 of the 623 South Wabash building and given to the student worker for delivery to my mailbox.

Departmental office: 623 South Wabash, room 500
Departmental phone: 312-369-7368
Departmental fax: 312-369-8075
Availability: Tuesday and Thursday, 1 – 3, or by appointment

Required Software: You must purchase a license for MyMathLab (part of MyLab & Mastering) from Pearson. You may also purchase the access code by itself from the bookstore, which comes with access to a searchable PDF copy of the textbook. Access codes can also be bundled with new copies of the textbook. If you already have a MyMathLab account that you used for a previous course using this textbook, do not purchase an access code. The courseID for this class is shaw13833. For instructions and to log on, visit: http://www.pearsonmylabandmastering.com/

Accompanying Text: Thomas’ Calculus: Early Transcendentals

An e-version of this textbook is available within MyMathLab. It is recommended that you wait until after the first class meeting to purchase a textbook.

Instructional Resource Fees: $40.00

Course Description: Course introduces higher mathematics by examining the fundamental principles of calculus—functions, graphs, limits, applications of the derivative, anti-derivatives, area, and the integral. Course presents additional mathematical applications in business, the arts, and the social sciences.
**Course Rationale:** Mathematics is an integral part of a well-rounded liberal arts education. What mathematics entails is critical analysis of quantitative phenomena occurring in the physical world. Calculus deals with the rate of change and its applications are unlimited. Very few systems are devoid of change; almost everything includes the topics of Calculus, from transportation, integrated circuits, photography, electricity, dance motion, multimedia animation, acoustics, money market, pollution, to countless numbers of applications. It is much harder to think of an example that does not include Calculus. Most interesting systems exhibit a rate of change.

This course satisfies the Mathematics requirement of the Liberal Arts and Sciences Core Curriculum.

**Prerequisites:** Precalculus (56-2713) with a minimum grade of C, or ACT math score at least 27, or SAT math score at least 620, or COMPASS math score at least 80.

**Liberal Arts and Sciences Core Objectives:**
This course satisfies the Mathematics requirement of the Liberal Arts and Sciences Core Curriculum. Students will be able to:

- understand and use basic mathematical concepts and skills.
- utilize various tools of analysis to enable critical thinking.

**General Mathematics Learning Outcomes:**
Upon successful completion of mathematics courses:

- students will be competent in a system of symbolic reasoning.
- students will be able to apply symbolic reasoning to analyze and draw meaningful conclusions using information, which may be presented in a variety of ways, including visually, symbolically, or in ordinary language.

**Course Learning Outcomes:** At the conclusion of this course, students will be able to:

- Utilize the concept of instantaneous rate of change to solve problems.
- Differentiate polynomial, rational, trigonometric, exponential and logarithmic functions algebraically.
- Comprehend the proofs behind differentiation techniques.
- Understand the relationship between the algebraic and geometric properties of the derivative.
- Find the equation of the tangent line to the graph of a function at a point by using the derivative of the function.
- Solve related rates problems.
- Solve applied optimization problems.
- Compute the area below the graph of a function by using a limit of a Riemann sum and/or by using a definite integral.
- Compute certain antiderivatives using techniques such as integration by substitution.
Grading and Evaluation: Your final grade will be assigned using the scale below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90 – 93%</td>
</tr>
<tr>
<td>A-</td>
<td>94 – 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 – 82%</td>
</tr>
<tr>
<td>B-</td>
<td>83 – 86%</td>
</tr>
<tr>
<td>B+</td>
<td>87 – 89%</td>
</tr>
<tr>
<td>C</td>
<td>63 – 69%</td>
</tr>
<tr>
<td>C-</td>
<td>70 – 76%</td>
</tr>
<tr>
<td>C+</td>
<td>77 – 79%</td>
</tr>
<tr>
<td>D</td>
<td>56 – 62%</td>
</tr>
<tr>
<td>F</td>
<td>0 – 55%</td>
</tr>
</tbody>
</table>

Your grade will be broken down as follows:

- Homework 25%
- In-class Quizzes 25%
- Midterm 25%
- Comprehensive Final 25%

Attendance Policy: Missing class will have an adverse effect on the learning process and on your course grade.

Late Work and Makeup Policy:
1. Late homework policy: Many homework assignments will be completed online using the Course Compass system outlined above. Online work submitted after the due date will be penalized by 5% per day, and will not be accepted after the last day of classes. Written homework will be accepted in class with a one week grace period followed by a 20% late penalty. Your lowest homework score will be dropped.
2. No makeup quizzes. Your lowest quiz score will be dropped.
3. No makeup exams, unless there is a documented emergency.

Academic Integrity:
Students at Columbia College enjoy significant freedom of artistic expression and are encouraged to stretch their scholarly and artistic boundaries. However, the college prohibits all forms of academic dishonesty. For present purposes, "academic dishonesty" is understood as the appropriation and representation of another's work as one's own, whether such appropriation includes all or part of the other's work or whether it comprises all or part of what is represented as one's own work (plagiarism).

Appropriate citation avoids this form of dishonesty. In addition, "academic dishonesty" includes cheating in any form, the falsification of academic documents, or the falsification of works or references for use in class or other academic circumstances. When such dishonesty is discovered, the consequences to the student can be severe. (Taken from the Columbia College Chicago Student Handbook.)
Services for Students with Disabilities:
623 S Wabash, suite 304
312.369.8296 ssd@colum.edu
Columbia College Chicago seeks to maintain a supportive academic environment for students with disabilities. Students who self-identify as having a disability should present their documentation to the Services for Students with Disabilities (SSD) office. After the documentation has been reviewed by the SSD office, a Columbia College accommodation letter will be provided to the student. Students are encouraged to present their Columbia accommodation letters to each instructor at the beginning of the semester so that accommodations can be arranged in a timely manner by the College, the department, or the faculty member, as appropriate. Accommodations will begin at the time the letter is presented. Students with disabilities who do not have accommodation letters should visit the office of Services for Students with Disabilities, Room 304 of the 623 S. Wabash building (312-369-8296). Please visit the website at www.colum.edu/ssd

Counseling Services:
731 S. Plymouth Court, suite 112
312.369.8700 counselingservices@colum.edu
Services are designed to help students address concerns and increase self-awareness, while empowering to manage challenging areas in their lives. All counseling staff follows professional standards of confidentiality. Information discussed within a counseling relationship will not be disclosed without written permission of the individual. Counseling Services are provided free of charge. Services include individual, couple, and group therapy for students. All currently enrolled students are eligible to receive services. Counseling Service provides students with 10 free individual counseling sessions per academic year.

College Advising:
623 S Wabash, suite 300
312.369.7645 collegeadvising@colum.edu
The College Advising Center provides undergraduate students with information, guidance, and support to create and implement an integrated educational and professional plan in the arts and media fields. College advisors assist students with all transitional issues to help them navigate the entire college experience. The Advising Center helps students clarify and take responsibility for their academic and career goals. First-year students are expected to meet with their college advisor at least once a semester during their first year.

The Learning Studio:
618 S. Michigan, first floor
312.369.8130 www.colum.edu/learningstudio
The Learning Studio is an excellent resource for academic progress and success for all students at any level. The Learning Studio provides tutoring in a number of disciplines including Accounting, the Science and Math Learning Center, the Foreign Languages Lab and the Writing Center. Students are encouraged to go to the Learning Studio and work with the tutors. Students can make an appointment through Oasis (using the “Make Appointments” tab) or call the Learning Studio.
Science Visualization Lab:
623 S. Wabash, 600-P
M-F 9:00 AM - 7:00 PM
The Science and Mathematics Department maintains a computer lab on the 6th floor of 623 S. Wabash, Room 600-P. When not reserved for class sessions, this lab is open to students currently enrolled in Science and Mathematics classes for work on Science and Math related projects.

Course Calendar:

| Week One  9/9  | Course Introduction  
|              | 1.1: Functions and Their Graphs  
|              | 1.2: Combining Functions; Shifting and Scaling Graphs |
| Week Two  9/14 & 9/16 | 1.3: Trigonometric Functions  
|              | 1.5: Exponential Functions  
|              | 1.6: Inverse Functions and Logarithms |
| Week Three  9/21 & 9/23 | 2.1: Rates of Change and Tangents to Curves  
|              | 2.2: Limit of a Function and Limit Laws  
|              | 2.4: One-Sided Limits  
|              | 2.5: Continuity  
|              | Quiz 1: Monday 9/21 |
| Week Four  9/28 & 9/30 | 2.6: Limits Involving Infinity; Asymptotes of Graphs  
|              | 3.1: Tangents and the Derivative at a Point  
|              | 3.2: The Derivative as a Function |
| Week Five 10/5 &10/7 | 3.3: Differentiation Rules  
|              | 3.4: The Derivative as a Rate of Change  
|              | Quiz 2: Monday 10/5 |
| Week Six 10/11 & 10/13 | 3.5: Derivatives of Trigonometric Functions  
|              | 3.6: The Chain Rule  
|              | 3.7: Implicit Differentiation |
| Week Seven 10/18 & 10/20 | 3.8: Derivatives of Inverse Functions and Logarithms  
|              | 3.9: Inverse Trigonometric Functions  
|              | Quiz 3: Monday 10/19 |
| Week Eight 10/26 & 10/28 | Review  
|              | Midterm Exam |
| Week Nine 11/2 & 11/4 | 3.10: Related Rates  
|              | 3.11: Linearization and Differentials |
| Week Ten 11/9 & 11/11 | 4.1: Extreme Values of Functions  
|              | 4.2: The Mean Value Theorem  
|              | 4.3: Monotonic Functions and the First Derivative Test |
| Week Eleven 11/16 & 11/18 | 4.4: Concavity and Curve Sketching  
|              | 4.6: Applied Optimization  
|              | 4.8: Antiderivatives  
|              | Quiz 4: Wednesday 11/18 |
| Week Twelve 11/23 & 11/25 | 5.1: Area and Estimating with Finite Sums  
|              | 5.2: Sigma Notation and Limits of Finite Sums |

- Monday, September 14 is the last day to Add.
- Monday, September 21 is the last day to Drop.
- Friday, October 2 is the last day to declare Pass/Fail.
- Monday, November 2 last day to Withdraw.
| Week Thirteen 11/30 & 12/2 | 5.3: The Definite Integral  
5.4: The Fundamental Theorem of Calculus  
5.5: Indefinite Integrals and the Substitution Method |
|-------------------------------|-------------------------------------------------|
| Week Fourteen 12/7 & 12/9  | 5.6: Definite Integral Substitutions and the Area Between Curves  
**Quiz 5: Monday 12/7** |
| Week Fifteen 12/14 & 12/16 | Review  
**Final Exam** |

**Disclaimer Statement:** This syllabus may be amended as the course proceeds. You will be notified of all changes.