# CALCULUS I
# MATH 1910

**Class Hours: 4.0**                                    **Credit Hours: 4.0**

**Laboratory Hours: 0.0**                               **Date Revised: Fall 2017**


## Catalog Course Description

Single variable calculus for students majoring in science, mathematics, engineering, and computer science. Limits and differentiation of polynomial, rational, trigonometric, exponential and logarithmic functions and applications.

## Prerequisite

High school algebra I and algebra II and geometry and precalculus/trigonometry and an ACT math score of at least 26 and an ACT reading score of at least 19 or equivalent math and reading scores or MATH 1710 and MATH 1720 or MATH 1730

## Textbook(s) and Other Reference Materials Basic to the Course

Textbook
Calculus: Early Transcendentals by Jon Rogawski and Colin Adams, Third Edition,  W.H. Freeman and Company, 2015.

References
Stewart, James.  *Calculus*, Seventh Edition. Cengage Learning, 2012.
Larson, Ron.  *Calculus*, Tenth Edition, Cengage Learning, 2013

Personal Equipment

A graphics calculator is required; the TI-83, Ti-83 Plus, or Ti-84 Plus is recommended. A symbolic manipulator such as the TI-89 or TI-92 is not permitted. LaunchPad software: instructor discretion

**Week/Unit/Topic Basis**

| Week | Topic |
|------|-------|
| 1 | Introduction, Precalculus Review, Limits, Rates of Change and Tangent Lines |
| 2 | Limits (Numerically and Graphically), Limit Laws, Limits and Continuity |
| 3 | Continuity, Evaluating Limits Algebraically, Trigonometric Limits |
| 4 | Intermediate Value Theorem, Formal Definition of a Limit, Derivative Definition, |
| 5 | The Derivative as a Function |
| 6 | Product and Quotient Rules, Rates of Change, Higher Derivatives |
| 7 | Trigonometric Functions, Chain Rule |
| 8 | Implicit Differentiation, Related Rates |
| 9 | Derivatives of Inverse, Exponential, and Logarithmic Functions |
| 10 | Linear Approximation and the Extreme Value Theorem |
| 11 | Mean Value Theorem and Monotonicity |
| 12 | The Shape of a Graph, Graph Sketching and Asymptotes |
| 13 | Applied Optimization, L'Hopital's Rule |
| 14 | Newton's Method, Review, Preview of Integration |
| 15 | Final Exam |

**Course Goals**

NOTE: Roman numerals after course goals reference the General Education Goals of the Mathematics program.

The course will

    A.    Guide students to become familiar with all descriptive aspects of a function.  VI. 1-6

    B.    Develop the concept of a limit of a function. Enhance students' ability to find the limit of a function graphically, algebraically, and through using L'Hospital's Rule.  VI. 1-6Build the skills to compute to evaluate integrals with indeterminate forms.   VI.1-6

    C.    Build skills to calculate derivatives of algebraic and transcendental functions.  VI. 1-6

D.  Pose real and technical problems mathematically.  VI. 1-6

E.  Apply limits and derivatives to solve real and technical problems. VI. 1-6

F.  Guide students to interpret and communicate mathematical problems and their solutions into clearly written English.   VI.1-6

## Expected Learning Outcomes*

NOTE: Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

The student will

1. Determine what a function is and work comfortably with functional notation. A

2. Evaluate limits and derivatives of algebraic and transcendental functions using analytic, numerical and graphing techniques. Evaluate the derivative of a function using the (limit) definition. B, C

3. Graph a function using the concepts of symmetry, domain, shifting and stretching, along with information gathered from limits, the function's derivative and the aid of a graphing calculator and/or computer software. A, E

4. Recognize a continuous function. Classify the different types of discontinuities using analytical and graphical means. B

5. Apply derivatives to solve problems such as distance - velocity - acceleration, related rate and optimization problems. E

6. Read and interpret graphs, limits and derivatives which are used in applied settings and communicate that analysis in writing. F

7. Work with technology and special projects involving real world data which enhances the conceptual understanding and usefulness of mathematics. D, F

## Evaluation

### Testing Procedures

Students are evaluated primarily on the basis of tests, quizzes and homework. A minimum of 4 major tests is recommended.

### Laboratory Expectations

As assigned by instructor

### Field Work

As assigned by instructor

### Other Evaluation Methods

As assigned by instructor

### Grading Scale

93-100     A
88-92      B+

83-87     B
78-82     C+
70-77     C
60-69     D
Below 60   F


## Policies

### Attendance Policy

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

### Academic Dishonesty

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

### Accommodations for Disabilities

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services (http://www.pstcc.edu/sswd/) may be contacted via Disability Services email or by visiting Alexander 130.

**Other Policies**

Make Up Work: Instructor discretion about make-up tests and/or assignments.
Cell Phones: Cell phones are to be either turned off or put on vibration mode while in class. Instructor discretion as to penalty.