Calculus I
MATH 0140
4 credits

Description: The first term of a three-term sequence required of all engineering, mathematics, and chemistry majors, and is the basic course leading to all advanced courses in mathematics and the natural and physical sciences. A study of the limits, continuity, the derivatives of polynomial rational, and trigonometric functions, the integral, and applications of the derivatives and the integrals.

Prerequisite: MATH 0132

Textbook: The recommended text for the course is *Thomas' Calculus* by Thomas, Weir and Hass, 12th edition.
Other textbooks will be considered by the faculty liaison on case-by-case basis.

The following topics should be covered in this course:

1. Rates of Change and Tangents to Curves
2. Limit of a Function and Limit Laws
3. One-Sided Limits
4. Continuity
5. Limits Involving Infinity; Asymptotes of Graphs
6. Tangents and the Derivative at a Point
7. The Derivative as a Function
8. Differentiation Rules
9. The Derivative as a rate of Change
10. Derivatives of Trigonometric Functions
11. The Chain Rule
12. Implicit Differentiation
13. Related Rates
14. Linearization and Differentials
15. Extreme Values of Functions
16. The Mean Value Theorem
17. Monotonic Functions and the First Derivative Test
18. Concavity and Curve Sketching
19. Applied Optimization
20. Antiderivatives
21. Sigma Notation and Limits of Finite Sums
22. The Definite Integral
23. The Fundamental Theorem of Calculus
24. Indefinite Integrals and the Substitution Method

25. Substitution and Area Between Curves
26. Volumes Using Cross-Sections
27. Volumes by Rotation. Disk and Washer Methods
28. Volumes by Using Cylindrical Shells
29. Arc Length

Course objectives: The students will demonstrate an understanding of limits, continuity, differentiation and integration of functions of one variable. The students will also learn to compute areas, volumes and arc lengths using integrals.

Grading: The final grade will be determined using a variety of assessment methods including quizzes and exams.

Pitt Grading System:

All courses required to satisfy associate and baccalaureate degree requirements-including all courses required for a major, a minor, or general education-must be taken for letter grades, with the exception of those courses designated as graded S and NC only. Pitt-Bradford uses 13 earned letter grades. They are listed below with their equivalent quality point values.

A+   4.00

A   4.00 superior achievement

A-   3.75

B+   3.25

B   3.00 meritorious achievement

B-   2.75

C+   2.25

C   2.00 adequate achievement

C-   1.75

D+   1.25

D   1.00 minimal achievement

F   0.00 failure

Academic Integrity and Plagiarism: Members of a university community, both faculty and students, bear a serious responsibility to uphold personal and professional integrity and to maintain complete honesty in all academic work. Violations of the code of academic integrity are not tolerated. Students who cheat or plagiarize or who otherwise take improper advantage of the work of others face harsh penalties, including permanent dismissal. The academic integrity guidelines set forth student and faculty obligations and the means of enforcing regulations and addressing grievances.

Grades: Grade criteria in the high school course may be different from the University standards. A CHS student could receive two course grades, one for high school and one for the University transcript. In most cases, the grades are the same. Grading standards should be explained at the beginning of the course.

Transfer Credits: Grades earned in CHS courses appear on an official University of Pittsburgh transcript and the course credits may be eligible for transfer to other colleges and universities. Students should contact potential colleges and universities in advance to be sure their CHS credits will be accepted. If students will attend any University of Pittsburgh campus, grade earned in the course will count toward the student grade point average at the University. At the University of Pittsburgh, the CHS course supersedes any equivalent AP credit.

Drops and Withdrawals: Students should monitor their progress in a course. A CHS teacher can contact the program administrators to request a drop or withdrawal. Dropping or withdrawing from the CHS course has no effect on enrollment in the high school credits.