Analytic Geometry & Calculus 2
MATH 0230
4 Credits

Description: This course is the standard second course in a basic calculus sequence required for all mathematics, science, engineering, and statistics students.

Prerequisite: The prerequisite is successful completion (a grade of C or higher) of <u>Math 0220: Analytic Geometry & Calculus 1</u> or an equivalent college course. An AP Calculus AB score of a 4 or 5 will also fulfill the prerequisite.

Grading: The student's final grade will not exceed the final exam grade by more than one letter grade.

Textbook: The text used for Calculus 2 is James Stewart, *Essential Calculus: Early Transcendentals*, 2nd edition (Cengage). However, you may use any text as long as the material below is included in the book.

The following topics are covered in the University of Pittsburgh MATH 0230 course:

1. Integration
  – Substitution rule
  – Integration by parts
  – Trig integrals and substitution
  – Partial fractions
  – Approximate integration (including Simpson's Rule)
  – Improper Integrals
  – Areas between curves
  – Volumes by washers and shells
  – Arc length
  – Applications to physics

2. Vectors
  – Vectors in three dimensions
  – Dot product
  – Cross product
  – Equations of lines and planes

3. Parametric & Polar Curves
  – Parametric curves
  – Calculus with parametric curves (1st & 2nd derivatives, tangents, areas, and arc length)
  – Polar curves
  – Calculus with polar curves

4. Sequences and Series
  – Sequences
  – Series
  – Integral Test
  – Comparison Test
  – Alternating Series Test
  – Absolute convergence
  – Ratio Test
  – Root Test
  – Power Series
  – Representing functions as power series
  – Taylor and Maclaurin Series
  – Applications of Taylor Polynomials

5. Differential Equations
  – Separable differential equations
  – First-order linear differential equations*
  – Homogeneous 2nd order linear differential equations*
  – Nonhomogeneous 2nd order linear differential equations (method of undetermined coefficients only)*
  – Applications of 2nd order linear differential equations

*These sections are not in the text but are available at *calculus.math.pitt.edu* under "Math 0230 Schedule" or at the publisher's website *www.stewartcalculus.com/media/6_home.php*.

Academic Integrity: All College in High School teachers, students, and their parents/guardians are required to review and be familiar with the University of Pittsburgh's Academic Integrity Policy located online at www.as.pitt.edu/fac/policies/academic-integrity.

Grades: Grade criteria in the high school course may differ slightly from University of Pittsburgh 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. These grading standards are explained at the beginning of each course.

Transfer Credit: University of Pittsburgh grades earned in CHS courses appear on an official University of Pittsburgh transcript, and the course credits are likely to be eligible for transfer to other colleges and universities. Students are encouraged to contact potential colleges and universities in advance to ensure their CHS credits would be accepted. If students decide to attend any University of Pittsburgh campuses, the University of Pittsburgh 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 progress in a course. CHS teacher can obtain a Course Drop/Withdrawal Request form from the CHS office or Aspire. The form must be completed by the student, teacher and parent/guardian and returned to teacher by deadlines listed. Dropping and withdrawing from the CHS course has no effect on enrollment in the high school credits for the course.