

**PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS**

**CALCULUS III
MATH 2110**

Class Hours: 4
Laboratory Hours: 0

Credit Hours: 4
Revised: Fall 2016

Catalog Course Description

Calculus of functions in two or more dimensions. Topics include solid analytic geometry, partial differentiation, multiple integration, and selected topics in vector calculus

Prerequisites

MATH 1920

Textbook(s) and Other Course Materials

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

References: Calculus: Early Transcendentals by James Stewart, Sixth Edition, Thomson Learning, 2008, Calculus: Early Transcendentals by Larson, Hostetler, and Edwards, Fourth Edition, Houghton Mifflin Company, 2007

Week/Unit/Topic Basis

Week Topic

1. Parametric Equations, arc length, polar coordinates, conic sections; 11.1-11.5
2. Three dimensional coordinate systems and vectors, dot products; 12.1-12.3
3. Cross product and equations of lines and planes; 12.4-12.5
4. Functions and surfaces; cylindrical and spherical coordinates; 12.6-12.7
5. Vector valued functions: space curves, derivatives and integrals, arc length and curvature, motion in space; 13.1-13.5
6. Partial differentiation: functions of several variables, limits and continuity, partial derivatives 14.1-14.3
7. Tangent planes and linear approximations, gradients, directional derivatives, the chain rule; 14.4-14.6
8. Maximum and minimum values, Lagrange multipliers; 14.7-14.8

9. Multiple integrals: double integrals over general regions, triple integrals; 15.1-15.3
10. Integration in polar, cylindrical, and spherical coordinates, applications; 15.4-15.5
11. Vector calculus: vector fields, line integrals, the fundamental theorem for line integrals; 16.1-16.3
12. Parametrized Surfaces, surface integrals, surface integrals of vector fields; 16.4-16.5
13. Green's theorem, Stokes theorem; 17.1-17.2
14. Stokes theorem; 17.2
15. The divergence theorem; 17.3

Course Goals

NOTE: Roman numerals after course objectives reference goals of the general education program.

The course will

- A. Expand the student's knowledge of vectors and solid analytic geometry. VI. 1
- B. Expand the student's knowledge of functions to include vector-valued functions, functions of several variables, and vector fields. VI. 1
- C. Build the skills to calculate partial derivatives and multiple integrals. VI. 1,3,5,6
- D. Enhance the student's knowledge of partial derivatives and multiple integrals to solve applications from engineering, physics, and other sciences. VI. 1-6
- E. Enhance the student's knowledge of vector calculus to solve applications from engineering, physics, and other sciences. VI. 1-6

Expected Student Learning Outcomes

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

The student will

1. Solve real life problems such as: using tangential and normal components of acceleration to justify banking curved roads, analyze the forces placed on beams, poles, etc. used in engineering constructions, calculate flux through semi-permeable membranes. A,B,E
2. Investigate and justify the engineering concepts contained in statics and dynamics courses. A,B,C,D,E

3. Draw vectors, use vector operations, find the magnitude of a vector, and find a unit vector in two-space and three space. A,B,E
4. Determine whether two vectors are orthogonal; determine the angle between two vectors. A,B,E
5. Find the equations of lines and planes in three-space. A
6. Sketch and/or analyze the graph of (rectangular, cylindrical, or spherical) equations in three-space. A,B
7. Sketch and/or analyze the graph of vector-valued functions and find the length of curves. B
8. Differentiate and integrate vector-valued functions.
9. Calculate velocity, acceleration, and speed from a position vector. B,E
10. Calculate unit tangential and unit normal vectors and calculate curvature. B,E
11. Calculate tangential and normal components of acceleration. B,E
12. Find the limit of functions of several variables. C,D
13. Calculate the first and higher order partial derivatives. C,D
14. Apply the chain rule to find partial derivatives and use partials to differentiate implicit functions.C,D

Evaluation

Testing Procedures: 100% of grade or instructor discretion if lab work and/or section projects are utilized. Students are evaluated primarily on the basis of tests, quizzes, homework, and a comprehensive final exam. A minimum of four major tests is recommended.

Laboratory Expectations: 0% of grade or instructor discretion. Instructor discretion on case studies, lab, and/or section projects.

Field Work: N/A

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 in vibration mode while in class.
Instructor discretion as to penalty