PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

APPLIED CALCULUS I-TECHNICAL
MTH 1211

Class Hours: 3.0   **Credit Hours: 3.0**

Laboratory Hours: 0.0   **Date Revised:Spring 99**

Catalog Course Description:

Analytic geometry, limits, derivatives, and integrals of polynomial and rational functions with technical applications. This course is intended for engineering technologies majors.

Entry Level Standards:

A thorough knowledge of algebraic functions is necessary for entrance to this course.

Prerequisites:

MTH 1020 or MTH 1021, or MTH 1010 and MTH 1000.

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

Textbook:
Washington, Allyn J. *Basic Technical Mathematics with Calculus*. 6th ed., Addison- Wesley Publishing Co., 1995.
References:
Carman, Robert A. and Saunders, Hal M. *Modern Technical Mathematics with Calculus*. Wadsworth, Inc., 1995.
Swokowski, Earl W., Olinick, Michael and Cole, Jeffrey A. *Calculus 6th ed*., PWS Kent Publishing Co., 1994.
Personal Equipment:
A graphing calculator is required. A symbolic manipulator such as the TI-89 or TI-92 is not permitted.

I. Week/Unit/Topic Basis:

Week	Topic
1	Plane analytic geometry of conic sections; 21.5, 21.6
2	Limits, continuity, 23.1 - 23.2
3	Derivatives by definition, 23.3, 23.4
4	Differentiation; 23.5 - 23.7
5	Differentiation of implicit functions and higher derivatives; 23.8, 23.9
6	Tangents and normals, Newton's method; 24.1, 24.2

7	Curvilinear motion, related rates; 24.3, 24.4
8	Curve sketching; 24.5
9	Maximum - minimum; 24.7
10	Differentials; 25.1
11	Antiderivatives, indefinite integral; 25.2, 25.3
12	Area under a curve, definite integral; 25.4, 25.5
13	Numerical integration; 25.6, 25.7
14	Applications of indefinite integral, areas of integration; 26.1, 26.2
15	Volumes by integration; 26.3
16	Review; Final Exam

II. Course Objectives*:

A. Demonstrate knowledge of analytic geometry concepts and methods. I, II, III, V

B. Calculate derivatives and integrals of simple algebraic functions.   III, V

C. Apply derivatives and integrals to solving real and technical situations. II, III, IV, V

*Roman numerals after course objectives reference goals of the Mathematics department.

III. Instructional Processes*:

Students will:

1. Use algorithmic processes to solve real world problems related to topics such as   ellipses and hyperbolas and maximum and minimum problems. *Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Active Learning Strategy*

2. Work, either individually or in a group setting, to demonstrate problem solving   from an occupational field using calculus. Solutions must be mathematically   correct in terms of the related occupational field. Examples could include   researching uses of and solving problems from engineering and engineering   graphics using integration methods in computer-assisted design to design various   structures and from laser technology using derivatives and tangent and normal   lines. *Communication Outcome, Problem Solving and Decision Making Outcome,   Numerical Literacy Outcome, Information Literacy Outcome, Transitional   Strategy, Active Learning Strategy*

3. Use a graphing calculator to solve problems and sets of problems that would be   tedious, difficult, or impossible to solve without the technology. This would   apply to topics including finding numerical derivatives for certain functions, using   Newton' s Method to solve equations, and finding or estimating the volume of a   solid of revolution around an axis. *Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome*

*Strategies and outcomes listed after instructional processes reference Pellissippi State' s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Sketch the graph of specific conic sections and write the equations of the conic section if given specific graphical information. A

2. Calculate the limit of an algebraic function. A

3. Recognize a continuous function. A

4. Calculate the derivative of an algebraic function by the delta process. B

5. Find the derivative of polynomials, products, quotients, powers, and implicit   functions using delta derived rules. B

6. Use derivatives to solve application problems such as distance - velocity -   acceleration, related rates, and maximum - minimum problems. C

7. Use curve sketching techniques information derived from calculus. C

8. Integrate polynomial and power functions and use this knowledge to evaluate   definite and indefinite integral. B

9. Integrate other functions using numerical techniques. B

10. Use integration to solve application problems such as acceleration - velocity -   distance, areas under the curves, and volumes of solids of revolution. C

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures:

   Students are evaluated primarily on the basis of test, quizzes, and homework.

B. Laboratory Expectations:

   None

C. Field Work:

   None

D. Other Evaluation Methods:

   None

E. Grading Scale:

93 -	100	A
88 -	92	B+
83 -	87	B
78 -	82	C+
70 -	77	C
60 -	69	D

Below 60   F

VI. Policies:

A. Attendance Policy:

 Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all 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 and Student Affairs, may have requirements that are more stringent.

B. Academic Dishonesty:

 Individual instructors must distribute their policy on academic dishonesty during the first week of class.