PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

TECHNICAL CALCULUS
MATH 1840 (formerly MTH 1211)

Class Hours: 3.0  Credit Hours: 3.0
Laboratory Hours: 0.0  Revised: Fall 04

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:
MATH 1730 or MATH 1731, or MATH 1130 and MATH 1720.

Textbook(s) and Other Course Materials:
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:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Plane analytic geometry of conic sections; 21.5, 21.6</td>
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<tr>
<td>2</td>
<td>Limits, continuity, 23.1 - 23.2</td>
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<td>3</td>
<td>Derivatives by definition, Differentiation; 23.3 - 23.5</td>
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<td>4</td>
<td>Review, Test 1, Differentiation; 23.6 - 23.7</td>
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<td>5</td>
<td>Differentiation of implicit functions and higher derivatives; Tangents and normals 23.8, 23.9, 24.1</td>
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<td>6</td>
<td>Newton’s method; Curvilinear motion, related rates; 24.2 - 24.4</td>
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<td>7</td>
<td>Review, Test 2, Curve sketching; 24.5</td>
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<td>8</td>
<td>Maximum - minimum; 24.7</td>
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<td>9</td>
<td>Differentials; 24.8, Review, Test 3</td>
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10. Antiderivatives, indefinite integral; 25.1, 25.2
11. Area under a curve, definite integral; 25.3, 25.4
12. Numerical integration; 25.5, 25.6
13. Review, Test 4, Applications of Indefinite Integral, 26.1
15. Comprehensive Final Exam

II. Course Objectives*:

A. Demonstrate knowledge of analytic geometry concepts and methods. VI.1,2,3,4,6
B. Calculate derivatives and integrals of simple algebraic functions. VI.1,2,5
C. Apply derivatives and integrals to solving real and technical situations. VI.1,2,3,4,5,6

*Roman numerals after course objectives reference TBR's general education goals.

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. Transitional Strategy, Mathematics 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. Transitional Strategy, Mathematics Outcome, 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. Transitional Strategy, Mathematics Outcome, Technological Literacy Outcome

*Strategies and outcomes listed after instructional processes reference TBR's goals for strengthening general education knowledge and skills, connecting course work 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 tests, quizzes, homework, and/or a comprehensive final exam. A minimum of four major tests (in addition to the final) is recommended.

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:

   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.

   In addition to other possible disciplinary sanctions that may be imposed as a result of academic dishonesty, there may be additional penalties imposed by the college, such as suspension or expulsion.
misconduct, the instructor has the authority to assign either (1) an F or zero for the assignment or (2) an F for the course.

C. Accommodations for disabilities:

If you need accommodation because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Privately after class or in the instructor's office. To request accommodations students must register with Services for Students with Disabilities: Goins 127 or 131, Phone: (865) 539-7153 or (865) 694-6751 Voice/TDD.

D. Other Policies:

Make up work:
Instructor discretion about make-up tests and/or assignments.

Cell Phones:
Cellular telephones and paging devices are to be turned off or put on vibration mode while in class. Instructor discretion as to penalty.