PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MATRIX COMPUTATIONS
MATH 2000

Class Hours: 1.0  Credit Hours: 1.0
Laboratory Hours: 0.0  Revised: Spring 07

Catalog Course Description:
Introduction to matrix computations, including determinants, eigenvalues and eigenvectors. For students in engineering transfer programs.

Entry Level Standards:
A thorough knowledge of algebraic functions is necessary for entrance to this course.

Prerequisites:
MATH 2110 or consent of instructor

Textbook(s) and Other Reference Materials Basic to the Course:
Text:
All required reading material is posted online
Materials:
A graphing calculator with matrix capability
References:

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Matrix Operations and Special Matrices&lt;br&gt;Inverse Matrices and the Transpose</td>
</tr>
<tr>
<td>2</td>
<td>Linear Systems and Elementary Row Operations&lt;br&gt;Rank and Row Reduced Form</td>
</tr>
<tr>
<td>3</td>
<td>Homogeneous Linear Systems and Independence</td>
</tr>
<tr>
<td>4</td>
<td>Geometric Vectors</td>
</tr>
<tr>
<td>5</td>
<td>Rank, Basis and Dimension&lt;br&gt;Vectors and the Null Space</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Become familiar with matrix operations and the n-tuple. VI.5

B. Become familiar with geometric vectors and their operations and orthogonality. VI.1,2

C. Understand the concept of linear independence. VI.2

D. Solve systems of linear equations. VI.1,2

E. Learn how to apply square matrices and determinants. VI.2,3,5

F. Understand and apply the concepts of eigenvalues and eigenvectors. VI.4

G. Use matrices and technology to solve real-life applications. VI.3,4,6

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

III. Instructional Processes*:

Students will:

1. Employ graphing calculators and/or computer software as tools for the field of study. Technological Literacy Outcome

2. Advance their skills in analysis, synthesis, symbol manipulation, graphical conceptualization and technical writing skills using the work and/or projects assigned. Mathematics Outcome, Communication Outcome, Transitional Strategy

3. Actively engage in student-led discussions about the mathematical/physics
based models inherent to the course. Active Learning Strategies, Transitional Strategies

4. Investigate and justify the engineering concepts contained in the fields of engineering and the sciences. Mathematics Outcome, Transitional Strategy

*Strategies and outcomes listed after instructional processes reference TBR’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. Explain what a matrix is and work comfortably with matrices and n-tuples.  A
2. Use technology to perform matrix operations.  G
3. Understand and work with geometric vectors and apply the concept of orthogonality.  B
4. Use row operations on an augmented matrix to find sets of n-tuples that satisfy a linear system.  D
5. Establish conditions under which solutions to linear systems exist.  D
6. Understand the relationships between linear independence, basis, and dimension.  C
7. Work with square matrices, matrix inverses and determinants.  E,G
8. Use a square matrix to find eigenvalues and eigenvectors.  F
9. Use matrices to solve problems in various fields of engineering and the sciences.  G

*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, and homework. A minimum of 2 major tests is recommended. Computer applications or projects may constitute a part of the final grade, also.

B. Laboratory Expectations:

N/A

C. Field Work:

N/A

D. Other Evaluation Methods:
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. In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) an F or a zero for the assignment or (2) an F for the course for all students involved in the misconduct.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, who have emergency medical information to share, or who need special arrangements in case the building must be evacuated, should inform the instructor immediately. The student should speak with the instructor privately after class or in his/her office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. 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/TTY).

Posted: February 15, 2007