Matrix Computations
Math 2000

Class Hours: 1.0 Credit Hours: 1.0
Laboratory Hours: 0.0 Date Revised: Fall 02

Catalog Course Description:

Introduction to matrix calculations, 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

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

Textbook:

Materials:
A graphing calculator

References:
Anton, Howard. Elementary Linear Algebra, John Wiley and Sons, Fifth Edition

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Matrix addition and multiplication; 1.1, 1.2</td>
</tr>
<tr>
<td>2</td>
<td>Special matrices; 1.3</td>
</tr>
<tr>
<td>3</td>
<td>Geometric vectors; 1.4</td>
</tr>
<tr>
<td>4</td>
<td>Orthogonal vectors, planes, and lines; 1.5</td>
</tr>
<tr>
<td>5</td>
<td>(1/2 hour test); Systems of equations; 2.1</td>
</tr>
<tr>
<td>6</td>
<td>Row reduction; 2.2</td>
</tr>
<tr>
<td>7</td>
<td>Homogeneous Systems; 2.3</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Become familiar with the matrix and the n-tuple and algebraic operations. III
B. Solve systems of linear equations and to establish conditions under which solutions exist. III
C. Learn how to use a square matrix. III
D. Understand the concepts of eigenvalues. III

*Roman numerals after course objectives reference goals of the university parallel program.

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. Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Communication Outcome, Transitional Strategy

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

4. Investigate and justify the engineering concepts contained in fields of dynamics and circuit analysis. Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Transitional Strategy

*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. Know what a matrix is and work comfortable with matrices and n-tuples using the algebraic operation. A
2. Use row operations on the augmented matrix to look for sets of n-tuples that satisfy a system. B
3. Establish conditions under which solutions exist. B
4. Understand the important ideas of linear independence, basis, and dimension. B
5. Work with square matrices, defining inverses and determinants. C
6. Use the square matrix to work with eigenvalues and eigenvectors. D

*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 part of the final grade also.

B. Laboratory Expectations:

N/A

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

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.