I. COURSE INFORMATION

Instructor: Dr. Pablo Tarazaga
Office Phone: 825-3187
Office Address: CI 316
E-Mail Address: pablo.tarazaga@tamucc.edu
Office hours: MW 9:00 to 11:30

Meeting Time and Place: Math 3311.001 MWF 8:00-8:50 CI-109

II. COURSE DESCRIPTION

This course will deal with the basic concepts of Linear Algebra. They include linear spaces, solution of linear systems of equations, least square solution for overdetermined systems, orthogonality, projections, orthogonal basis, eigenvalues and eigenvectors. The concept of matrices factorization.

III. PREREQUISITES

MATH 2413 (Calculus I).

IV. TEXT AND OTHER SUPPLIES REQUIRED
The textbook for the course is Introduction to Linear Algebra by Gilbert Strang, Fourth edition, 2009.

V. COURSE LEARNING OUTCOMES

- Students will be able to understand and handled basic concepts of Linear Algebra:
  - Vectors and matrices, operations, properties and Euclidean inner product.
  - Linear systems, computing solutions, LU factorization, inverse of a matrix.
  - Linear spaces and subspaces, column space, null space, etc.
  - Solution of a general linear system.
  - Independent vectors, basis and dimension.
  - Orthogonality and Projections
  - Least square solutions.
  - Orthogonal Basis and Gram-Schmidt process.
  - Eigenvalues and Eigenvectors
  - Spectral theorem

VI. INSTRUCTIONAL METHODS AND ACTIVITIES.

The class uses lecture format encouraging student participation and discussion.

VII. EVALUATIONS AND GRADE ASSIGNMENTS

- All the work done in the class will be part of your final grade (quizzes, labs, tests and final). I will evaluate very carefully the learning objectives.
- The table below shows the weight of each of the items considered to determine your grade.
- Assignments will be given with each section of the book that we cover during the course, but they will not be collected.
All tests and quizzes and the final will contain a part on techniques and a part on understanding and basic proofs.

Final exam will be comprehensive.

Labs will be in groups of 3 to 4 students. Note that you will need to understand the theory to do the labs.

Each group will need to present a report of each Lab within a week of the Lab session.

Quizzes: 30%
Test (2) 40%
Final exam: 30%

Your final grade will be determined using the following scale:

A: 90%-100%  B: 80%-89%  C: 70%-79%  D: 60%-69%  F: 0%-59

VIII. TENTATIVE COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/20</td>
<td>Introduction to vectors.</td>
</tr>
<tr>
<td>8/27</td>
<td>Length and dot product.</td>
</tr>
<tr>
<td>9/3</td>
<td>System of linear equations.</td>
</tr>
<tr>
<td>9/10</td>
<td>The idea of Gauss elimination: elementary operations.</td>
</tr>
<tr>
<td>9/17</td>
<td>Gauss elimination using elementary matrices.</td>
</tr>
<tr>
<td>9/24</td>
<td>Inverse of a matrix. Test #1</td>
</tr>
<tr>
<td>10/1</td>
<td>LU factorization.</td>
</tr>
<tr>
<td>10/8</td>
<td>Space of vectors.</td>
</tr>
<tr>
<td>10/15</td>
<td>Solving systems, Ax=0 and Ax=b.</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>10/22</td>
<td>Generators, independence and basis.</td>
</tr>
<tr>
<td>10/29</td>
<td>The four fundamental subspaces. Test # 2</td>
</tr>
<tr>
<td>11/5</td>
<td>Orthogonality of the four subspaces..</td>
</tr>
<tr>
<td>11/12</td>
<td>Projections</td>
</tr>
<tr>
<td>11/19</td>
<td>Least Squares and the Gram-Schmidt process.</td>
</tr>
<tr>
<td>11/26</td>
<td>Introduction to eigenvalues and diagonalization. Symmetric Matrices</td>
</tr>
<tr>
<td>12/3</td>
<td>Positive Definite Matrices and Similar matrices</td>
</tr>
<tr>
<td>Dec 7</td>
<td>Final Exam (8:00 – 10:30)</td>
</tr>
</tbody>
</table>

### IX. CLASS POLICIES

- **Attendance:** It will not be part of your grade, but it is required. Exceptions are sickness and emergencies.

- I do expect that you come to each class ready to learn and to participate. Also you have to be prepared to do any required work. You are expected to devote for each hour of class a minimum of two or three hours outside the class working in the subject (some people need more time than others).

- If you are missing a deadline, a quiz or a test, you have to tell me beforehand by any mean, examples: e-mail or phone.

- **Grades:** After you receive your grades you have up to a week to dispute it. I am the person you can dispute your grade with.
If at any point during the course you are considering to drop the class, talk to me before you do it. I am here to help you in your learning experience and to help you to succeed in your college career.

PLEASE TURN YOUR CELLULAR PHONES OFF. DO NOT DISTURB THE CLASS WITH THEM.

**Academic Honesty:** University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, forgery or plagiarism.

**Grade Appeal Process:** As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules.

**Dropping a Class:** I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best
course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. November 5, 2010 is the last day to drop a class with an automatic grade of “W” this term.

**Disabilities Accommodations:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.