Linear Algebra – Math3311.001  
Department of Mathematics and Statistics  
Summer II 2015

A. **COURSE INFORMATION**
   
   **Course number/section:** Math3311.001  
   **Class meeting time:** MTWR 2:00 to 3:55  
   **Class location:** CS 114  
   **Course Website:** None

B. **INSTRUCTOR INFORMATION**
   
   **Instructor:** Dr. Pablo Tarazaga  
   **Office location:** CI 316  
   **Office hours:** MTWR 11:00 to 12:00  
   **Telephone:** (361) 825-3187  
   **e-mail:** pablo.tarazaga@tamucc.edu  
   **Appointments:** By e-mail.

C. **COURSE DESCRIPTION**
   
   Fundamentals of linear algebra and matrix theory. Topics include vectors, matrix operations, linear transformations, fundamental properties of vector spaces, systems of linear equations, eigenvalues and eigenvectors. Applications.

D. **PREREQUISITES AND COREQUISITES**
   
   **Prerequisites**  
   Math 2413 (Calculus I)
   
   **Corequisites**  
   N/A

E. **REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES**
   
   **Textbook**  
   
   **Supplies**  
   None

F.  

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G. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

At the end of the course, a student will be able to

1. Make calculations as needed with vectors and matrices using addition, scalar multiplication, matrix multiplication and inner (dot) products.

2. Solve general linear systems of equations, using the Gauss elimination process, compute inverses using the Gauss-Jordan method. Compute and apply factorizations for solving systems of equations.

3. Understand and apply concepts of vector spaces including defining properties, linear independence, spanning, basis, dimension and subspaces (especially null-space and column-space).

4. Understand and apply orthogonality to find projections, least square solutions and orthogonal bases.

5. Find eigenvalues and eigenvectors using determinants or other means as needed. Understand and apply the Spectral Theorem.

6. If time permits, understand and apply linear transformations.

H. **INSTRUCTIONAL METHODS AND ACTIVITIES**

The class uses lecture format encouraging student participation and discussion.

I. **MAJOR COURSE REQUIREMENTS AND GRADING**

- All the work done in the class will be part of your final grade (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 the final will contain a part on techniques, a part on understanding and basic proofs and a part on writing main definitions, properties and theorems.

Final exam will be comprehensive.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>30%</td>
</tr>
<tr>
<td>Midterm</td>
<td>35%</td>
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<tr>
<td>Final Exam</td>
<td>35%</td>
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</tbody>
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### J. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
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<tbody>
<tr>
<td>7/6-7/9</td>
<td>Introduction to vectors. Length and dot product Systems of equations Gauss elimination Operations with matrices Elementary matrices</td>
</tr>
<tr>
<td>7/13-7/16</td>
<td>Inverse of a matrix LU factorization Transposition Space of vectors</td>
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<tr>
<td>7/20-7/23</td>
<td>Solving a homogeneous system Ax=0 Solving a general system Ax=b Independence, basis and dimension Midterm</td>
</tr>
<tr>
<td>7/27-7/30</td>
<td>Projections Least square solutions Gram-Schmidt process Introduction to eigenvalues</td>
</tr>
<tr>
<td>8/3-8/5</td>
<td>Diagonalization Symmetric matrices Positive definite matrices Similarity</td>
</tr>
<tr>
<td>August 8</td>
<td>Final Exam (2:00 – 3:55)</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

K. COURSE POLICIES

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

- **Preparation for class**
  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).

- **Missed Exam**
  If you are missing a test, you have to tell me beforehand by any mean, examples: e-mail or phone. There is not date change for any exam including the Final Exam.

- **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.

- **Class withdraw**
  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.

- **Food in Class**
  No food is *not allowed* in the classroom.

- **Cell Phone Use**
  PLEASE TURN YOUR CELLULAR PHONES OFF. PLACE THEM IN YOR BAG OR POCKET DURING THE CLASS. DO NOT DISTURB THE CLASS WITH THEM.

L. COLLEGE AND UNIVERSITIY POLICIES

- **Academic Integrity (University)**
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals
who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
See Full University Policy at http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity

- **Classroom/Professional Behavior**

- **Deadline for Dropping a Course with a Grade of W (University)**
The grade of W will be assigned to any student officially dropping a course by July 24, 2015. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must submitted. After July 24, 2015 a student will not be allowed to drop a course.

- **Grade Appeals (College of Science and Engineering)**
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, 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 Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
Disability Services (DS) is the hub for coordinating services and accommodations to ensure accessibility and utilization of all programs for all Texas A&M University-Corpus Christi students with disabilities. Our services are designed to meet the unique educational needs of enrolled students with documented permanent or temporary disabilities. DS provides intake and consultation services to students seeking to register with our office. DS reviews an individual’s documentation of disability and assesses eligibility for services and the determination of reasonable accommodations. For more information visit the Disability Services Office at 116 Corpus Christi Hall or go to http://disabilityservices.tamucc.edu/

- **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. (Plagiarism is the presentation of the work of another as one’s own work.) For the complete statement, see http://catalog.tamucc.edu/content.php?catoid=10&navoid=313%23Academic_Integrity#Academic_Honesty

M. OTHER INFORMATION

N/A

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.