MATH 226 Syllabus Spring 2016

Linear Algebra & Prob/Engineers - CRN 42117 - MATH 226 - 70

Department of Mathematical Sciences at CCSU

READ THIS SYLLABUS CAREFULLY. YOU ARE RESPONSIBLE FOR KNOWING THIS INFORMATION!

Instructor: Marian Anton
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Office Hours: TRF 10:30 a.m. - 12:30 p.m. or by appointment.

Prerequisite: MATH 221 with a grade of C- or higher.

Course Description: Introduction to the mathematics required for engineering, including basic linear algebra and topics in probability and statistics. Emphasis on applications.

Class Meetings: 4:30 a.m. - 6:10 a.m.; MW; Emma Hart Willard Hall 310.

Textbook: Linear Algebra and Probability for Engineers by Lay and Haeussler, published by Pearson. ISBN: 1-323-02498-0, 2nd custom edition with My Math Lab access code; register thru your Black Board Learn class: click the Homework tab on the left and then click Pearson’s link.

Coverage: We will cover: Gauss Elimination §1.1; Row-Echelon Form §1.2; Linear Combinations §1.3; Homogeneous Systems §§1.4 & 1.5; Linear Independence §1.7; [Optional:] Linear Transformations §§1.8 & 1.9; Applications: §1.6 Network Flows §1.10 Difference Equations; Matrix Operations §2.1; The Inverse of a Matrix §2.2 and Optional §2.3; Subspaces of $\mathbb{R}^n$ §§2.8; Dimension and Rank §§2.9; [Optional:] Applications to Computer Graphics §2.7; Determinants §3.1; Properties of Determinants §3.2; Volumes §§3.3; Eigenvalues and Eigenvectors §5.1; The Characteristic Equation §5.2; [Optional:] Diagonalization §5.3; [Optional:] Linear Geometry in Linear Algebra by Hefferon, pp. 34-49; http://aimath.org/textbooks/approved-textbooks/hefferon/; Permutations and Combinations §§8.1 & 8.2; Sample Spaces and Probability §§8.3 & 8.4; Conditional Probability and Independent Events §§8.5 & 8.6; [Optional:] Bayes’s Formula §8.7; Discrete Random Variables §9.1; [Optional:] Markov Chains §9.3; Continuous Random Variables and Normal Distribution §§16.1 & 16.2; Binomial Distribution §§9.2 & 16.3; [Optional:] Poisson Distribution in Introduction to Probability by Grinstead and Snell, pp. 187-192; http://aimath.org/textbooks/approved-textbooks/grinstead-snell/

The teaching method. You may struggle with the material from time to time. This is not a bad thing, as very few worthwhile pursuits are ever easy. If you find yourself having trouble with the concepts or the homework, please come talk to me in my office. I will be happy to help you make your way through the material and the problems.

I will briefly lecture at the board to provide an introduction to a certain topic or clarify a particular problem or question. Approximately half the class time will be spent on student presentations of solutions at the board. The rest of the class time will be spent working on problems in groups of 3-4 people, which I will select. Please bring your textbooks and graphing calculators to use for this in-class activity. Note that there will not be enough class time for you to work on every problem together, so many of the problems you will need to work on outside of class, either alone or with classmates (either the assigned group or not). Any problem you turn in or present to the class should be written in your own words.
When you present or turn in a problem, you will be asserting that you have not received any unauthorized help on the work and that you understand the argument you are presenting. If you have worked together with a classmate or group on any problem you must credit that classmate/group. Make sure that you are not parroting someone else’s solutions, because not only will it be obvious when you present, this will NOT prepare you for exams.

**Audience:** As an audience member, you will be expected to follow along with your peers presentations, and it is certainly in your best interests to do so since if I deem a presentation to a particular problem to be a correct solution to that problem, we will not be revisiting it. Also, I expect you to be supportive of your classmates when they are at the board presenting. We are all in this together, and so attempting to boost your own standing by putting others down will not be met with success. However, questions and other constructive contributions are encouraged and included in your participation grade as noted below. Do not feel embarrassed to ask a question: chances are that if you have a particular question, then someone else in the class has a similar or even identical one. Note: questions that reveal the solution to the problem or imply a different approach are not permitted, and will not be met with approval. In other words, once a classmate has begun his or her presentation, we must follow along with the direction in which (s)he is going and not attempt to direct him or her toward alternative solutions. One last important thing to note: you will not be allowed to take notes during others presentations. This is for two reasons: one, so that you can focus on understanding the presentation rather than scribbling it down, and two, so that you can turn in problems post-presentation and they will be in your own words (see below under Hand-in Homework).

**Presentations:** When presenting, keep in mind that your audience is not simply me, your instructor. Your primary audience is your classmates, and so your presentations must be aimed toward your peers, to ensure that they understand and are convinced of any claims you are making. Presentations will be graded on the following 20-pt scale, with weighting of points following each component:

(1) Correctness of ideas (10)
(2) Clarity of presentation of ideas (5)
(3) Responses to audience’s questions (5)

Also taken into account will be your willingness to present; i.e., the more you present, the higher your presentation grade, and the less you present, the lower your presentation grade. I will provide a receipt with my comments from each of your presentations, of which I will also retain a copy for my own records. You are always free to come see me in office hours to discuss any comments I have made on the presentation and/or the grade you received. Note that I will not be grading you on typical public-speaking criteria (eye contact, projecting voice, etc.), although they will certainly help get your ideas across, and improvement of these skills is hopefully inevitable if not deliberate. However, note also that you ARE expected to speak during your presentation and explain aloud what you are doing. It is not simply a problem written on the board in silence, and it is not simply a word-by-word reading of what you have written. The verbal comments should complement what is written. However, what is written should also stand alone and should not require the verbal explanation in order to be a correct and complete solution.
Participation Grade: Your class participation will be graded. The components of this grade are, in weighted order:

1. Oral presentations of problems - this includes the scores you received weighted by the frequency of presentation (50%)
2. Your feedback on other students’ presentations (30%)
3. Your participation in solving problems within your groups (20%)

Clearly, none of the above components can be fulfilled without regular attendance, and absences will adversely affect the class participation portion of the final grade.

MyLab Homework: You must submit in each homework assignment over the course of the semester as scheduled in the Timetable. You will receive 75% credit for those problems submitted no later than seven days after the deadline and a score of zero after this grace period. In particular, during this grace period you may redo some of the homework problems and receive 75% credit. I encourage you to take advantage of the ability to post questions on BBL forum.

Exams: There will be three exams throughout the semester and a final. These will consist of questions spanning a range of difficulty, similar to the range seen on the homework problems. Exams must be taken in pencil, with points taken off for using pen. Exams may only be made up in advance, or afterwards only with the proper documentation justifying your absence. The final exam will be cumulative.

Exam 1: Wednesday, Feb 10.
Exam 2: Monday, Mar 14.
Exam 3: Monday, Apr 18.
Final Exam: Monday, May 9. (4:30-6:30 p.m.)

Grading: Your grade will be calculated by the following distribution:

Participation: 15%
MyLab Homework: 15%
3 Exams - 15% each: 45%
Final Exam: 25%

Letter Grades will still be assigned according to the following standard 100-point scale:

A: 92.5 and above  A-: 89.5-92.4  B+: 86.5-89.4  B: 82.5-86.4  B-: 79.5-82.4
C+: 76.5-79.4  C: 72.5-76.4  C-: 69.5-72.4  D+: 66.5-69.4  D: 62.5-66.4
D-: 59.5 - 62.4  F: 59.4 and below

Expectations: I of course expect you to attend class and participate. I also expect that you will put in the standard expected amount of out-of-class time, which is two hours for every hour in class, or seven hours total per week for this course. Unlike other courses where you may not have needed that full seven hours, you should expect that for this course you will.

What I expect you to gain from this experience:

- Confidence
- Ability to learn independently, and take ownership of that learning
• Ability to work in groups
• Mastery of concepts
• Ability to problem-solve
• Improved presentation and communication skills

**University Policies:** 1. Please contact me privately to discuss your specific needs if you believe you need course accommodations based on the impact of a disability, medical condition, or if you have emergency medical information to share. I will need a copy of the accommodation letter from Student Disability Services at least two days before the accommodation is needed in order to arrange your class accommodations. Contact Student Disability Services, room 101, Willard Hall if you are not already registered with them. Student Disability Services maintains the confidential documentation of your disability and assists you in coordinating reasonable accommodations with your faculty. Note my contact information given on the first page.

2. In the event of a weather emergency which requires curtailment or cancellation of classes, listen to WTIC (1080 AM) or call (860) 832-3333 for the “general message.” You can also check on the main CCSU website under “Cancellations and Delays”.

3. The last day to withdraw from a course is Monday, Apr 18. Approvals for withdrawal are not required; however, it is strongly recommended that students consult with their academic advisors prior to deciding to withdraw. Cessation of attendance, notice to the instructor, or telephone calls to the Enrollment Center are not considered official notice of a students intention to drop the course. After Apr 18 withdrawals are allowed only under extenuating circumstances and require approval of the course instructor, department chair and dean of the School of Engineering, Science & Technology. Poor academic performance is not considered an extenuating circumstance.

4. You are responsible for understanding and abiding by the University’s policy on academic integrity. Please be careful! The internet is a useful place for information, but a dangerous place for risk of plagiarism. Do not tempt it. Not only will you not learn and thus fail the course anyway, you will also get yourself in trouble. Information on the University’s policy may be found at http://www.ccsu.edu/AcademicIntegrity/. This policy is rigorously enforced by your instructor and by the Department of Mathematical Sciences.
## Tentative Timetable

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Monday</th>
<th>Due Mon</th>
<th>Date</th>
<th>Wednesday</th>
<th>Due Wed</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 20</td>
<td>1.1 elimination</td>
<td>Jan 20</td>
<td>Jan 27</td>
<td>1.3 linear</td>
<td>Jan 27</td>
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<td>2</td>
<td>Jan 25</td>
<td>1.2 row-echelon</td>
<td>Hw 1</td>
<td>Jan 30</td>
<td>1.4 &amp; 1.5 homogeneous</td>
<td>Hw 2</td>
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<td>3</td>
<td>Feb 1</td>
<td>1.7 independence</td>
<td>Feb 3</td>
<td>Feb 4</td>
<td>1.6 &amp; 1.10 flows; diff. eq.</td>
<td>Feb 4</td>
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<td>4</td>
<td>Feb 8</td>
<td>Review</td>
<td>Hw 3</td>
<td>Feb 10</td>
<td>Test 1</td>
<td>Feb 10</td>
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<td>5</td>
<td>Feb 15</td>
<td>No class</td>
<td>Feb 17</td>
<td>Hw 4</td>
<td>1.10 flows; diff. eq.</td>
<td>Hw 4</td>
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<td>Feb 22</td>
<td>2.1 operations</td>
<td>Feb 24</td>
<td>Mar 2</td>
<td>2.2 &amp; 2.4 inverse</td>
<td>Mar 2</td>
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<td>7</td>
<td>Feb 29</td>
<td>2.8 subspaces</td>
<td>Mar 9</td>
<td>Mar 16</td>
<td>Review</td>
<td>Mar 16</td>
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<td>Mar 7</td>
<td>2.7 graphics</td>
<td>Mar 18</td>
<td>Mar 23</td>
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<td>Mar 14</td>
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<td>Mar 28</td>
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<td>Apr 6</td>
<td>Apr 6</td>
<td>5.2 characteristic eq.</td>
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<td>5.1 eigenvalues</td>
<td>Apr 13</td>
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<tr>
<td>13</td>
<td>Apr 11</td>
<td>8.1 &amp; 8.2 permutations</td>
<td>Apr 20</td>
<td>Apr 20</td>
<td>8.3 &amp; 8.4 probability</td>
<td>Apr 20</td>
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<td>14</td>
<td>Apr 18</td>
<td>Test 3</td>
<td>Apr 20</td>
<td>Apr 20</td>
<td>8.3 &amp; 8.4 probability</td>
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<td>Apr 25</td>
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<td>Apr 27</td>
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<td>9.1 discrete var.</td>
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<td>9.1 discrete var.</td>
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<td>May 9</td>
<td>Final (4:30-6:30 p.m.)</td>
<td>May 4</td>
<td>May 4</td>
<td>9.2 &amp; 16.3 binomial</td>
<td>May 4</td>
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**ALL COURSE MATERIALS ARE POSTED ON BBL**