Course Information

The Basics

Class Time: M T W Th. 2:00pm – 4:20pm
Room: TBD

Office Hours: M W. 11am – 1pm
Extra office hours on 4 June 2019: 11am – 1pm
Office: Goldsmith 102 (First floor of the math building, in a corner, next to the room with round tables)

Prerequisites: MATH 5a and permission of the instructor, placement by examination, or any mathematics course numbered 10 or above. Students may take MATH 15a or 22a for credit, but not both. If you HAVE NOT taken Math 10a and 10b, please come meet with me at the beginning of the semester.

Motivation: Solving linear systems is a basic component of the mathematical tools used by many sciences, e.g. computer science, physics, biology, chemistry, economics, etc. In this course, students will learn the language and techniques needed to solve such systems, and extend the theory to more sophisticated settings. For example, in Calculus we can understand a lot about a function by studying its tangent line at a point. For multivariable functions, e.g. a function $F : \mathbb{R}^2 \rightarrow \mathbb{R}^3$, we instead have a $3 \times 2$ matrix of partial derivatives, which can be viewed as a linear map that approximates the original function at a point.

Learning Goals: Students in Math 15a will: work with vectors and matrices, solve systems of linear equations, determine linear independence/dependence, find a basis and compute dimension, study linear maps, study change of basis, compute determinants, and find eigenvectors and eigenvalues.

Course Materials

Our course will use a textbook as a reference, but homework problems will not be assigned straight out of the book. Instead, homework will be completed online using WebWork and LATTE. If you need assistance accessing a computer in order to complete homework assignments please let me know so that I can direct you to the relevant people on campus. You will need a scientific calculator (an online calculator is fine) for some homework problems. You may purchase an older edition of the text, if you wish. However, it is your responsibility to make sure that you are reading the correct sections, chapters, etc., in the edition you obtain.

If you are having difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options and/or textbook alternatives.

**Course Policies**

**Class Structure:** Our class is scheduled to meet for 2 hours and 20 minutes. This is too long to expect anyone to focus. Each day we will start at 2pm and meet for a little over an hour. We will then take a 10-15 minute break. You should use this time to move about and get your blood flowing again, use the restroom, quickly grab a snack, etc. Afterwards, we will meet for the remainder of the scheduled time that day. **On exam days, the exam starts at 2pm. See the exam section for more details.** After an exam there will be a 15 minute break and class will resume as usual. **Food:** You may have snacks during class and exams but please do not bring loud snacks (very crunchy, very squishy, etc.) out of respect for your fellow students. If your food/drink are too distracting I will require you to put them away.

**Exams:** During an exam you are **not** permitted to bring/use: a calculator, notes, scratch paper, smartwatch, cell phone, laptop, etc. This list is **not exhaustive**. If you are unsure whether or not you may use something on the exam, ask me before the exam begins. Scratch paper will be provided. One student at a time will be permitted to use the restroom so plan accordingly. Exams **other than the final** are on Mondays and will start promptly at 2pm. They will last for exactly 1 hour, so be sure to arrive a few minutes early. Exams will be returned by the end of the week, usually on Wednesday.

**Students with disabilities:** If you are a student who needs academic accommodations because of a documented disability you should contact me and present your letter of accommodation as soon as possible. If you have questions about documenting a disability or requesting academic accommodations you should contact Beth Rodgers-Kay in the Office of Academic Services at 63470 or at brodgers@brandeis.edu. Letters of accommodations should be presented at the start of the semester to ensure provision of accommodations. Accommodations cannot be granted retroactively.

**Academic Integrity:** You are expected to follow the University’s policy on academic integrity, which is distributed annually as Section 4 of the Rights and Responsibilities Handbook (see http://www.brandeis.edu/studentaffairs/srscs/rr/index.html). Instances of alleged dishonesty will be forwarded to the Department of Student Development and Conduct for possible referral to the Student Judicial System. Potential sanctions include failure in the course and suspension from the University. If you have any questions about how these policies apply to your conduct in this course, please ask.

**Coursework**

**What you need to do**

Your coursework will be 8 homework assignments and 4 exams, including the final exam. Sadly, we do not have time for quizzes also. Homework will be completed online but exams will be completed on paper. As such, **it is important to have self-discipline and perform calculations by hand when working on your homework.** Any homework question that involves calculations too difficult to
perform by hand will clearly state this. You can rest assured those types of questions will not be given on an exam.

When you need to do it

The homework and exam due dates are:

<table>
<thead>
<tr>
<th>Homework</th>
<th>Due Date</th>
<th>Exam</th>
<th>Exam Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework 1</td>
<td>4 June 2019</td>
<td>Exam 1</td>
<td>10 June 2019</td>
</tr>
<tr>
<td>Homework 2</td>
<td>6 June 2019</td>
<td>Exam 2</td>
<td>17 June 2019</td>
</tr>
<tr>
<td>Homework 3</td>
<td>11 June 2019</td>
<td>Exam 3</td>
<td>24 June 2019</td>
</tr>
<tr>
<td>Homework 4</td>
<td>13 June 2019</td>
<td>Final Exam</td>
<td>TBA</td>
</tr>
<tr>
<td>Homework 5</td>
<td>18 June 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homework 6</td>
<td>20 June 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homework 7</td>
<td>25 June 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homework 8</td>
<td>27 June 2019</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Course Grade

Percentage

We don’t have time for late homework or quizzes in the summer. Instead, I will only count the best 6 homework assignments and 2 best exams of the first three. Homeworks will count for one fourth of your total grade. Two of the first exams and the final exam will each count for 25% of your grade. See below for an example computation.

Example. Suppose a student earns 33%, 90%, 88%, 93%, 81%, 74%, 68%, and 82% on homeworks; earns 88%, 91%, and 86% on the first three exams; and earns 84% on the final exam. The 33% and 68% homeworks are dropped and the remaining homework average is 84.6%. The 86% on the third exam will not be used but the 84% on the final exam will be used. The student’s raw percentage at the end of the course will be 86.92%.

Letter Grade

Please note that your percentage is not the only factor used to determine your letter grade. The final letter grade at the end of the semester will be determined by your percentage and the overall difficulty of the material. If a student earns a 90% in the course then they will not receive a letter grade lower than an A-, 80% guarantees a B-, and so on. However, it is possible that the requirement for an A- or some other letter grade is lowered due to the difficulty of the material.

In short, the best way to guarantee the highest possible letter grade you are capable of earning is to learn the material.

Acknowledgements: Thanks to Professor Keith Merrill for allowing me to incorporate some of his syllabus into this syllabus.