MATH 115B - Linear Algebra

Winter 2018

For a detailed course schedule, see page 3 of this document.

Course information

Time and place: MWF 9:00-9:50 am, MS 5137.
Instructor: Marco Marengon (marengon@math.ucla.edu).
Office hours: Wednesday 11:30am-12:30pm and Friday 1:00pm-3:00pm, in my office (MS 6617F).
Course webpage: https://ccle.ucla.edu/course/view/18W-MATH115B-1
Topics: Dual space, linear transformations, Cayley-Hamilton theorem, Spectral theorem, Jordan canonical form, minimal polynomial. Time permitting, bilinear forms, quadratic forms, Sylvester’s law.
Requisite: Math 115A.
Textbook: Either of the following two books is good:


Actually, they are precisely the same book, except for the fact that the UCLA custom edition has some additional material at the end. I am not planning to use the additional material at the end of the book, so the books are equivalent for the purposes of this course. If you do not want to use the UCLA custom edition, make sure that you have the 4th edition of the book!

Teaching Assistant
Grading: Your numerical score will be the maximum of the two scores computed using the two following schemes:

- **Scheme 1**: 10% Homework + 10% Quizzes + 30% Midterm + 50% Final exam;
- **Scheme 2**: 10% Homework + 5% Higher quiz score + 30% Midterm + 55% Final exam.

In both schemes, the lowest score homework will be dropped.

Your letter grade will be computed based on your numerical score. The final letter score will be determined depending on the average score of the class. However:

- A 90% numerical score will guarantee at least an A- grade.
- A 75% numerical score will guarantee at least a B- grade.
- A 60% numerical score will guarantee at least a C- grade.

Requests for re-grading homework/quizzes/midterms will be considered only within **7 days** from the date they are handed back in class.

Exams: There will be one midterm exam in class, on **Friday February 16th 2018**. The final exam will be on **Wednesday March 21st 2018, 11:30am-2:30pm**. Exams must be taken during the scheduled times. There will be NO makeup quizzes/exams with the exception of serious medical emergencies or university approved absences. A grade of ‘F’ will be assigned to any student who misses the final. Incompletes are reserved for those who have completed all of the work for the class, including the midterms, but who, for a legitimate, documented reason, miss the final.

Quizzes: There will be two quizzes in discussion section on the following days: **Thursday February 1st 2018** and **Thursday March 1st 2018**. Each of them will consist in one or two questions to be solved in 15 minutes during discussion section.

Homework: Homework will be posted each Friday at [http://www.math.ucla.edu/~marengon/w18.115b/homework](http://www.math.ucla.edu/~marengon/w18.115b/homework). The starred exercises in each set of homework are to be turned in on the following Friday just before or just after class. Selected exercises from the set of starred exercises will be
graded each week. You can work on the homework problems together, but you should write the solutions on your own, with your own words. When you turn in your homework, please make sure that your name, surname, and UID are written on top of the front page, and that your homework is stapled together. For full credit, please ensure that your homework is clear and legible. The lowest score homework will be dropped when computing the final grade.


Special Needs: Students wanting extra accommodation should contact the Office for Students with Disabilities in Murphy A255, or online at [http://www.osd.ucla.edu](http://www.osd.ucla.edu).

Still have not found the information you are looking for? Try the FAQs at [www.math.ucla.edu/~marengon/w18.115b/FAQs.html](http://www.math.ucla.edu/~marengon/w18.115b/FAQs.html).

Provisional course schedule

- M 01/08: Introduction + Review of Math 115A (Chapters I and II)
- W 01/10: Dual spaces (2.6)
- R 01/11: Discussion section
- F 01/12: Dual spaces (2.6)
- M 01/15: Martin Luther King’s Day
- W 01/17: Review of Math 115A (5.1 and 5.2)
- R 01/18: Discussion section
- F 01/19: Invariant subspaces and Cayley-Hamilton Theorem (5.4)
- M 01/22: Invariant subspaces and Cayley-Hamilton Theorem (5.4)
- W 01/24: Invariant subspaces and Cayley-Hamilton Theorem (5.4)
- R 01/25: Discussion section
- F 01/26: Review of Math 115A (6.1–6.4)
- M 01/29: Review of Math 115A (6.1–6.4)
- W 01/31: Unitary and orthogonal operators (6.5)
- R 02/01: Quiz 1 in discussion section. Examinable material: up to section 6.4 (included).
• F 02/02: Unitary and orthogonal operators (6.5)
• M 02/05: Unitary and orthogonal operators (6.5)
• W 02/07: Orthogonal projections and Spectral Theorem (6.6)
• R 02/08: Discussion section
• F 02/09: Orthogonal projections and Spectral Theorem (6.6)

• M 02/12: Orthogonal projections and Spectral Theorem (6.6)
• W 02/14: Review
• R 02/15: Discussion section
• F 02/16: Midterm. Examinable material: up to section 6.6 (included).

• M 02/19: Presidents’s Day
• W 02/21: Geometry of orthogonal operators (6.11)
• R 02/22: Discussion section
• F 02/23: Geometry of orthogonal operators (6.11)

• M 02/26: Jordan canonical form I (7.1)
• W 02/28: Jordan canonical form I (7.1)
• R 03/01: Quiz 2 in discussion section. Examinable material: up to section 6.11 (included).
• F 03/02: Jordan canonical form I (7.1)

• M 03/05: Minimal polynomial (7.3)
• W 03/07: Minimal polynomial (7.3)
• R 03/08: Discussion section
• F 03/09: Bilinear forms (6.8)

• M 03/12: Bilinear forms (6.8))
• W 03/14: Sylvester’s law (6.8)
• R 03/15: Discussion section
• F 03/16: Review

• W 03/21, 11:30am - 2:30pm: Final. Examinable material: all topics covered in the course, with an emphasis on the last part of the course.