

## Linear Algebra for Applications

**Web page:** <http://calclab.math.tamu.edu/~fulling/m640/>

There will also be a page for this course on the eCampus system.

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**Course description and prerequisites:** This course provides the background in linear algebra needed for courses in

- applied functional analysis,
- advanced differential equations,
- numerical analysis,
- tensor analysis and differential geometry.

Previews of the intended applications will be offered when feasible. Students are assumed to have had an introductory course in linear algebra (such as Math. 304, 309, 311, 323, or 601 at TAMU). However, all the abstract concepts will be reviewed. We will cover

- vector spaces, bases, inner products,
- linear operators,
- finite-dimensional spectral and Fredholm theory and Jordan canonical form,
- dual spaces, multilinear (tensor) algebra,
- applications to differential equations.

### Textbooks:

1. R. M. Bowen and C.-C. Wang, *Introduction to Vectors and Tensors*, 2nd ed., Dover, 2008. (This is “two volumes bound as one”. We will use only the first volume, but “Part II” within it.)
2. S. A. Fulling, Math. 640 lecture notes, made available on the Web as I revise them.
3. For review you may find it helpful to have on hand any of the hundreds of elementary linear algebra textbooks, such as those by Leon and by Kolman. B&W go over most of the abstract things from the beginning, but they won’t drill you on row reduction (Gaussian elimination), for instance.

<b>Grading system:</b> Weekly assignments:	$\geq 250$
“Class” participation (on-line discussions):	$\leq 50$
Midterm exam:	100
Final exam:	<u>200</u>
Total	600

(The division between homework and participation may be adjusted as events play out.)

Tests will be administered through the eCampus system. The test will be available for a certain (small) number of days, but once you open it, you must complete and submit it within a certain (small) number of half-hours. Details will be announced later.

**Test date windows:** Midterm: Oct. 12–14. Final: Dec. 8–10.

Homework due times will be negotiated after we are assigned a grader. Please submit papers in .pdf format (or plain ASCII text, when it is typographically adequate for the purpose). Most mathematical software programs (such as Microsoft Word and Mathematica) have .pdf output as an option.

**Legal and ethical matters:** Communication and cooperation among students is encouraged, but whenever two or more students work together on an assignment, they must all indicate so on their papers (or electronic submissions, in our case). The tests, of course, must be individual work; they cannot be proctored, so you are on your honor to take the test in complete privacy, without using books or notes unless the test instructions specifically allow them. It should go without saying that the sources of all information, be it from books, the Internet, or human contacts, should be properly acknowledged (by footnotes, references, or remarks in the text), and that all copyright restrictions must be complied with.

**Address for paper mail, and FAX number:** (best avoided)

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**Please consult the Web page frequently for more detailed instructions.**