

**CIVE 766**  
**THEORY OF PLATES AND SHELLS**  
Fall 2016

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Text: None. I no longer require an assigned textbook for this class since we rarely use it and they are all expensive. If you want to purchase a supplemental book to help you with the material, *Mechanics of Laminated Composite Plates and Shells*, Reddy, CRC Press, is an outstanding book at a reasonable price. There are other books by the same author that are very similar - I would look for a bargain online. I also ordered an excellent reference on elastic stability that has extensive results for plates/shells. I would suggest you purchase this one.

**COURSE OBJECTIVES**

- Present the foundations of the classical theory of thin elastic plates and shells based on the Kirchhoff-Love assumptions.
- Understand the limitations and differences of plate/shell theories within the context of the theory of elasticity.
- Introduce the nomenclature and theoretical development of plate and shell theory in the context of laminated elastic media.
- Apply plate and shell theory to problems involving various geometries and boundary conditions.
- Introduce numerical and analytic solution techniques.

**GRADING**

Our grading algorithm will be defined by homework (25 percent), 2 exams (50 percent), and a final exam (25 percent).

**COMMENTS**

- This is one of the few classes where I encourage working together on homeworks. The process of working through the concepts is far more important than struggling through on your own. This is especially true for more tedious assignments.
- I grade almost entirely on effort, clarity, and neatness during homework. On exams, I grade on accuracy and correctness.
- I require that you re-copy your notes as part of your class participation. This will greatly aid retention of the material.

- We will start with the simple (plates) and finish with the difficult (shells). Plan accordingly, and do not get behind.

## OTHER REFERENCES

There are several good reference texts on plates, but far fewer on shells. I will list several that might be available (either new or used) that I like.

- The books by Reddy. Probably the best current books on the market today, with a huge amount of valuable material and references to other work. Only purchase it if you have the funds.
- *Stress Analysis of Fiber-Reinforced Composite Materials*, Hyer. Expensive but good. A bit better than the often-used book on composites by Robert Jones.
- *Introduction to the Theory of Shells*, Dym. Short, but has a nice summary of the basic equations of shells. Sadly, only good for isotropic solids, meaning it is of little use for modern applications.
- *Stresses in Shells*, Flugge. THE classic work on thin isotropic shells. Extremely expensive (over \$200 for a trashed used copy most times I check).
- *Theory and Analysis of Plates*, Szilard. Outrageously expensive (\$257 new on Amazon) but massive coverage on plates.
- *Theory of Plates and Shells*, Timoshenko and Woinowsky-Krieger. This book used to dominate the market and is an old-school classic. An excellent, though dated, book.
- *Structural Analysis of Laminated Anisotropic Plates*, Whitney. A superb book for laminated plate mechanics, but somewhat upstaged by our class text.

There are several more modern textbooks that cross my desk every so often, but none has risen to the level that I would recommend them for purchase. I will pass out handouts from many of these during the year so you can get a feel for their content.