Course:	**Math 854—Tensor Analysis with Applications**
Time:	Spring 2015, MW 5:35-6:50 PM, 336 JB
Instructor:	Tom DeLillo, 046 JB 978-5224 (or 348 JB, 978-3974) /(office), 264-7806(home)
Email:	delillo@math.wichita.edu
Office hours:	tbd, most afternoons, or by appointment

Text: Davison E. Soper, *Classical Field Theory*, Dover Books (2008).

Syllabus: Classical tensor analysis will be developed and applied in the context of classical continuum physics and mechanics. We will most likely follow the text which starts with special relativity and covers everything from fluids and elasticity to electromagnetism and general relativity. The Lagrangian formulations of the theories are used to derive the (Euler-Lagrange) equations of motion and conservation laws via Noether's theorem. This basic organizing principle will be good background for future work, e.g., in quantum field theory and particle physics and many areas of mechanics. We may add supplementary material depending on the interests of the class, such as additional material on fluids and elasticity and more on general relativity and gravitation.

Prerequisites: The course is self-contained, however you should have some experience with vector calculus. Some knowledge of basic physics and differential equations will be helpful, along with a willingness to work through any necessary background material.

Grading: Grades will be based on homework problems and an exam or two. I may consider a final team or individual presentation on a related topic of interest in lieu of one of the exams. Regular attendance is required. If you have to be told how hard you will have to work or what plagarism is or at this point what's the difference between and an A and an A- or other basic academic matters, you probably shouldn't be in this course.

Additional possible references

Ta-Pei Cheng, *Relativity, Gravitation and Cosmology - A Basic Introduction*, Oxford U. Press, 2010 (second edition). There are many books on general relativity but this one provides basics.

W. Flügge, *Tensor Analysis and Continuum Mechanics*, Springer-Verlag (1972). This book is a good general supplementary reference. It is now back in print. I will place a copy in the library or make selected material available, if needed.

A. Zee, *Einstein Gravity in a Nutshell*, Princeton U. Press, 2013. A new addition to this Princeton physics series. This is a long book with a good deal of background information and a chatty, humorous style. I just got copy and will eventually order one for our library.