Course:	**Math 829C/Physics 701C–Geometry of Physics**
Time:	Fall 2004, 7:05-8:20 TTh N, 372 JB
Instructor:	Tom DeLillo, 348 JB, 978-3974(office), 264-7806(home)
Email:	delillo@math.twsu.edu
Office hours:	1:30-2:30 MW, or by appointment

Text:
Theodore Frankel, *The Geometry of Physics,* Second Edition (2004) Cambridge University Press, ISBN 0-521-53927-7.

Some additional references if you want to know more about the physics context:

C. F. Stevens, *The Six Core Theories of Modern Physics,* (1995) MIT Press, ISBN 0-262-69188-4 (pb), concise presentation of a number of topics.
W. N. Cottingham and D. A. Greenwood *An Introduction to the Standard Model of Particle Physics,* (1998) Cambridge U. Press, ISBN 0-521-58832-4 (pb).
David Griffiths, *Introduction to Elementary Particles,* (1987) John Wiley & Sons, ISBN 0-471-60386-4. See Chap 11 on Gauge Theories.
Chris Quigg, *Gauge Theories of the Strong, Weak, and Electromagnetic Interactions,* (1983, 1997) Addison Wesley Longman, ISBN 0-201-32832-1.
M. Kaku, *Quantum Field Theory, a Modern Introduction,* (1993) Oxford University Press, gives overview of QFT and the Standard Model; see especially Chapters on Gauge theory and Yang-Mills.

Suggested prerequisites: Calculus of several variables and a willingness to wrestle with ideas from physics and geometry. Otherwise, the course will be self-contained.
Syllabus: Selected topics mainly from Part I, Manifolds, Tensors, and Exterior Forms and Part III, Lie Groups, Bundles, and Chern Forms. (Part II, Geometry and Topology (including General Relativity) and material from appendices on continuum mechanics and elasticity may be studied as needed or as a source of projects.) One purpose of this course is to develop the ideas of Yang-Mills theory in the modern mathematical language of connections on fiber bundles.
Grades will be tentatively based on homework, a class exam, and a final exam or (team) project. Regular attendance is mandatory. I recommend you keep a notebook of solved problems.

Important dates:
- Labor Day (no class): 9/6.
- Fall break: 10/17–10/19.
- Last day to drop with a "W": 11/1.
- Thanksgiving recess: 11/24–11/28.
- Last day of class: 12/9.
- Final exam: Tuesday 12/14, 7:40-9:30 PM, in classroom.