58:295  Advanced Continuum Mechanics

(taught under the Advanced Topics in Mechanical Systems course number)

1:30-2:45 TTh, 3315 SC

Instructors: Jia Lu  and Jeff Marshall

This course will give students a thorough understanding of continuum mechanics concepts necessary for modeling of complex solid and fluid media. The course intends to provide an integrated combination of theory and examples from both solid and fluid mechanics and is targeted at graduate students in both fields. The course consists of two parts. The first part provides a review of advanced continuum mechanics necessary for constitutive modeling. Topics in this part include invariance restrictions; relation between invariance restrictions and balance laws; discontinuity and jump conditions; mechanical and thermal constraints; entropy balances, second law and thermodynamical restriction on constitutive equations. The second part focuses on mechanical theories for generalized media. The course covers mixture theory, Cosserat continua (e.g., directed or orienteable media), and applications of Cosserat theory to various novel materials and fluids.

**Prerequisite:** 58:179 or 58:262 or consent of instructor.

**Prerequisites by Topic:**
1. Vectors and tensors algebra
2. Fundamental continuum mechanics

**Required Reference Material:** Instructor's lecture notes


**Questions or Comments:** Contact Jia Lu, jialu@engineering.uiowa.edu, 5-6405, or Jeffrey Marshall, Jeffrey-marshall@uiowa.edu, 5-5817