ME 3403 - Solid Mechanics and Design II
Outcomes and schedule of topics

1 Minimum outcomes

After successfully completing this course, the student should have attained, at the very least, an ability to:

1. Design structures and the associated mechanical elements under static and fatigue loading conditions.
2. Understand contact and surface wear phenomena.
3. Analyze and design power screws and threaded fasteners for static and fatigue loading.
4. Analyze and design welded joints.
5. Analyze and design systems of gears.

2 Topics and schedule

The following is a tentative list of which topics will be covered, test dates and scheduled project work. These dates are only guidelines and may change.

Week 1: 1/16–1/20 (2 classes): Review of Solid Mechanics and Design I

Week 2: 1/23–1/27 (2 classes): Contact stresses (4-20), surface fatigue wear (7-16)


Week 4: 2/6–2/10 (2 classes): Power screw mechanics, stresses in power screws.

Week 5: 2/13–2/17 (2 classes): Threaded fasteners, tension joints

Week 6: 2/20–2/24 (2 classes): Fatigue loading in fasteners. Shear joints

Week 7: 2/27–3/3 (2 classes): Shear joints cont. Test 1 (Contact, power screws and fasteners)

Week 8: 3/6–3/10 (0 classes, Spring Break):


Week 12: 4/3–4/7 (2 classes): Bending stress in gears. AGMA method for bending gear design. Test 2 (Shear and welded joints)


Week 14: 4/17–4/21 (2 classes): AGMA method for contact design. Helical gear considerations. Class time for design project.

Week 15: 4/24–4/28 (2 classes): Class time for design project. Test 3 (Gears)

Week 16: 5/1–5/5 (1 class, Tuesday 5/2 is a Friday class): Class work on design project.