**TENTATIVE SCHEDULE**

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| **Monday** | **Wednesday** | **Friday** |
| 8/26  Ch 1: Introduction | 8/28  Ch 1: Introduction | 8/30  Review of Beam Theory |
| 9/2  ***LABOR DAY (No Class)*** | 9/4  Ch 5: Energy Methods | 9/6  Ch 5: Energy Methods  **Homework 1 Due** |
| 9/9  Ch 5: Energy Methods | 9/11  Ch 5: Energy Methods | 9/13  Ch 2: Stress and Strain  **Homework 5 Due** |
| 9/16  Ch 2: Stress and Strain | 9/18  Ch 2: Stress and Strain | 9/20  Ch 2: Stress and Strain |
| 9/23  Ch 2: Stress and Strain | 9/25  Ch 3: Hooke’s Law | 9/27  Ch 3: Hooke’s Law  **Homework 2 Due (also proofs)** |
| 9/30  Ch 4: Inelastic Material Behavior | 10/2  Ch 4: Inelastic Material Behavior | 10/4  MIDTERM 1 REVIEW  **Homework 3&4 Due** |
| 10/7  **MIDTERM 1: Ch 1-5**  **Design Problem 1 Due** | 10/9  Ch 6: Torsion | 10/11  Ch 6: Torsion |
| 10/14  Ch 6: Torsion | 10/16  Ch 6: Torsion | 10/18  ***FALL BREAK (No Class)*** |
| 10/21  Ch 6: Torsion | 10/23  Ch 6: Torsion | 10/25  Ch 6: Torsion |
| 10/28  Ch 8: Shear Center for Thin-wall Beams  **Homework 6 Due** | 10/30  Ch 8: Shear Center for Thin-wall Beams | 11/1  Ch 7: Bending of Straight Beams |
| 11/4  Ch 7: Bending of Straight Beams | 11/6  MIDTERM 2 REVIEW  **Homework 7&8 Due** | 11/8  **MIDTERM 2: Ch 6-8**  **Design Problem 2 Due** |
| 11/11  Ch 9 : Curved Beams | 11/13  Ch 9 : Curved Beams | 11/15  Ch 11: Thick-Wall Cylinders |
| 11/18  Ch 12: Stability of Columns  **Homework 9&11 Due** | 11/20  Ch 14: Stress Concentrations | 11/22  Ch 14: Stress Concentrations |
| 11/25  Ch 15: Fracture Mechanics  **Homework 12 & 14 Due** | 11/27  ***THANKSGIVING (No Class)*** | 11/29  ***THANKSGIVING (No Class)*** |
| 12/2  Ch 15: Fracture Mechanics | 12/4  TBD  **Homework 15 Due** | 12/6  FINAL EXAM REVIEW  **Design Problem 3 Due** |
| TBD -- **FINAL EXAM: Comprehensive** | | |

**YELLOW** dates are days that Dr. Berke will be travelling for research:

* On M 10/14,
* On M 10/21 and W 10/23,
* On M 11/11 and W 11/13,

**TENTATIVE HOMEWORK SETS**

Subject to change, so please don’t work ahead by more than one chapter.

**Homework Set 1:**

1) 1.22. Identify which figure you used to get each property and explain how you calculated it. Not every property will be in every figure.

2) 1.26

3) 1.28

4) 1.29-1.30, then use Mohr’s Circle to calculate the maximum normal stress and maximum shear stress at the top surface of the beam. (Use P=18 kN. Also, the cross section in Figure (b) should be 200 mm wide, not 200 m)

5) 1.31-1.32

**Homework Set 5: (use Castigliano’s theorem)**

1) 5.4-5.5

2) 5.11

3) 5.15-5.16

4) 5.34

5) 5.67

**Homework Set 2:**

1) 2.1

2) 2.10.

3) Solve 2.18 and 2.22. Check for invariance by calculating the invariants in the original stress state and each of the rotated stress states, and confirming they are equal.

4) 2.56-2.57

5) 2.75

***EXTRA CREDIT: Ch 2 Proofs***

*Those who complete the following 5 proofs can have them replace their lowest homework score:*

1) Draw a free body diagram of the stresses acting on a differential cube of dimensions dx, dy, and dz. Use this to derive equations (2.45). (NOTE: For readability, it is ok to just draw the forces acting in one direction.)

2) Following the procedure in section 2.4.4, derive the equations for the octahedral stresses in (2.23).

(HINT: Step 1: Follow the opening paragraph to derive (2.22) in terms of σ1, σ2, and σ3.

Step 2: Express (2.22) in terms of the invariants so it can be used for any coordinate system.

Step 3: Plug in the invariants to express (2.23) for any x, y, z coordinate system. )

3) Starting from the mean and deviatoric stresses in equations (2.26), solve for the invariants of TD to derive equations (2.27). (HINT: the invariants of the full stress tensor, T, are given in equation (2.21).)

4) Starting from the small-displacement strains in equations (2.81), derive the compatibility relations in (2.83). (HINT: The first derivation is given in the text.)

5) Derive equations for εxx, εyy, and εxy as functions of εa, εb, and εc for the delta rosette in Figure 2.20(a). (HINT: using tensor shear strains εxy instead of engineering shear strains ɣxy, the 2D transformation equation for εxx has the same form as the transformation for σxx in equation (2.30).)

**Homework Set 3&4:**

1) A point on a body in plane stress is not necessarily in plane strain. Starting from the 3D Hooke’s Law (Eqn 3.30), derive equation (3.32a), then write an expression for ezz in plane stress.

2) 3.7

3) 3.17. Also find the maximum shear stress and the orientation of the volume element on which it acts.

4) 4.5

5) 4.36 (Note: Part c goes onto the next page)

**Homework Set 6:**

1) 6.16

2) 6.17

3) 6.20

4) 6.45 (Note: G is given on the previous page, just before 6.42)

5) 6.57

**Homework Set 7&8:**

1) 7.4

2) 7.20

3) 7.27

4) 8.1

5) 8.11

**Homework Sets 9&11:**

1) 9.7

2) 9.20-9.21. Ignore Bleich factors (section 9.4 is not covered in this course)

3) 11.4

4) 11.11

**Homework Sets 12&14:**

1) 12.6

2) 12.8. Assume that the horizontal members are rigid and weightless.

3) 14.1-14.2

4) 14.4 and 14.12

5) 14.8

**Homework Set 15:**

1) 15.6

2) 15.10

3) 15.14

4) 15.17