

## ME 521 ENGINEERING DESIGN

**Instructor:** Fazıl Önder Sönmez  
**Class hours:** Mondays 11 - 13 (M 2231), Wednesdays 13 - 14 (M 2181)  
**Office hours:** Mondays 10-11, Wednesdays 10-12, or drop by  
**Office:** M 4215  
**Phone:** Office: (212) 359-7196, Mobile: (542) 780 6279  
**E-mail:** [sonmezfa@boun.edu.tr](mailto:sonmezfa@boun.edu.tr)  
**Assistant:** Gülcan Özerim, [gulcan\\_dt@hotmail.com](mailto:gulcan_dt@hotmail.com), Office: M4360  
**Prerequisite:** ME 345, Mechanics of Materials

**Prerequisites by topics:** A sound knowledge of mechanics of materials is required. Knowledge of stress, strain analyses, constitutive relations for isotropic and linearly elastic materials.

**Course Objectives:** Further develop the understanding of the methods for the analysis and design of mechanical parts to obtain desired performance, strength, and durability.

**Textbook:** None. Use your hand-notes.

<b>Grading:</b>	Quizzes	20 %
	Midterms	34 %
	Final	38 %
	Project	8 %
	Attendance	±2 %

In quizzes, questions will be similar to the homework assignments.

Midterm and final are closed book and notes.

<b>Week</b>	<b>Topics</b>
1-3	Introduction engineering design approach, review of structural analysis; stress, strain, and energy methods Material selection for design (reading assignment) <b>Quiz 1</b>
4-7	Design against failure; failure theories for various failure modes (large deflection, large permanent deformation, fracture, fatigue, failure under impact, buckling, resonance) <b>Quiz 2</b> <b>Quiz 3</b> <b>Midterm 1</b>
8-10	Plates and shells <b>Quiz 4</b> <b>Midterm 2</b>
11-13	Probabilistic design <b>Quiz 5</b>
14	Thermal stresses; Residual stresses
14	Advanced topics on beams (design of beams, beams on elastic supports) <b>Final</b>