

MECH 3751 - Stress and Strain Analysis 1

Fall 2026 Syllabus, Section 01, CRN 40785,

Credit hours: 3

Instructor

Ali Alelaiw

Email: ahalelaiw@ysu.edu

Public Instructor Information

Instructor Title: Lecturer

Instructor Professional Qualifications: *Master's, Science, Mechanical Engineering, Youngstown State University*

Bachelor's, Mechanical Engineering, Youngstown State University

Instructor Office Location: Moser Hall 2540

Instructor Office Phone: 330-941-1705

Course Description

3751. Stress and Strain Analysis 1. Analysis of internal forces, stresses, strains, and deflections in three dimensions. Dynamic loading including impact and fatigue. Theories of failure and energy methods. Prereq.: CEEN 2602, MECH 2606. Must be taken concurrently with MECH 3751L. 3 s.h.

Course Readings

Group	Title	Author	ISBN
Optional	Shigley's Mechanical Engineering Design: 2024 Release	Keith Nisbett & Richard Budynas	

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Schedule of Topics and Assignments

Week of	Proposed Topic	Due/To Prepare for Class
8/24	Statics Review Including 3D Mechanical Components	
8/31	Statics Review Including 3D Mechanical Components Internal Forces Including 3D	
9/7	Internal Forces Including 3D	
9/14	Normal and Shear Stress and Strain	
9/21	Normal and Shear Stress and Strain Stress and Strain Transformations	
9/28	Stress and Strain Transformations	
10/5	Experimental Stress and Strain Applications	
10/12	Experimental Stress and Strain Applications	
10/19	Deflection Analysis	
10/26	Deflection Analysis	
11/2	Theories of Failure for Static Loading	
11/9	Theories of Failure for Static Loading	
11/16	Impact Loading	
11/23	Fatigue Loading	
11/30	Fatigue Loading	

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.