Fall 2024

ME 315-001: Stress Analysis

Anthony Glick

ME 315-001 – Stress Analysis

Meeting Times & Location:
T, Th 10:00 – 11:20am
ME 221

Course Description:
ME315 is an introductory course in stress analysis in mechanical design

Prerequisites:
ME215, Mech237, Math222

Textbook Required:
"Mechanics of Materials, 4th Edition", Roy R. Craig, Eric M. Taleff
Wiley, 2020
ISBN: 978-1-119-60375-7

Instructor:
Mr. Anthony Glick
Office hours: T, Th 2:40 – 3:30pm MEC 333CD or via Zoom by appointment
Email: aglick@njit.edu

Course Objectives:
1. To develop skills for conducting stress analysis in mechanical design
2. To provide a foundation for the study of machine design

Class Topics: (*Note: the following list should be considered a general outline of topics and not a definitive, chronological list of topics.)

1. Introduction, stress tensor; equilibrium, transformation of stresses, principal stresses.

2. Mohr's circle for stress, Three-dimensional stresses.

3. Normal and shearing strains, strain tensor, compatibility, transformation of strains.

4. Stress-strain relations.

5. Strain energy, St. Venant's principle.

6. Plane stress, plane strain, Airy stress function.

7. Stress & strain in polar coordinates, Stress concentration.

8. Axisymmetrically loaded members, shrink fit, composite cylinders, rotating disks.

9. Theories of failure.

10. Energy methods, Castigliano's theorem, Virtual work.

11. Elastic stability of columns.

Grading:

Final Exam: 30%
2 Examinations: 20% each
Homework: 25%
Attendance: 5%

Grading Scale:

A: 100.00 – 90.00%
B+: 89.99 – 87.00%
B: 86.99 – 80.00%
C+: 79.99 - 77.00%
C: 76.99 - 70.00%
D: 69.99 – 60.00%
F: 59.99 – 0%

Policies:

Homework submitted after due date will be penalized as follows: ½ credit if one week late and no credit beyond one week.

Statement on Academic Integrity:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.*

Statement on Artificial Intelligence:

This course expects students to work without artificial intelligence (AI) assistance unless explicitly permitted by the instructor. Additionally, if and when students use AI in this course, the AI must be properly cited. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.