

1. EM458 Failure Analysis
2. Credit Hours (3) / Contact Hours (4)
3. Course Director – Joel Schubbe
4. Course Textbook: There is no required textbook for this class.
5. Specific course information
  - a. A course designed to introduce the student to the principles, tools and techniques used in the analysis of materials failures. Laboratory skills in non-destructive testing, optical and electron microscopy, mechanical testing, corrosion and wear testing are developed. Emphasis is placed on actual case histories and the student is required to complete analysis of a failed component.
  - b. Prereq: EM313 or ER313. Coreq: EM371, or Dept Chair approval.
  - c. Senior engineering elective course
6. Educational objectives
  - a. Understand Brittle and ductile fracture, environmental degradation, fatigue and high temperature failures.
  - b. Identify general steps and methods used to plan and complete an accurate analysis of the failure of component parts
  - c. Identify and utilize forensic tools for failure analysis.
7. Specific program outcomes addressed by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced				X			
Mastered	X					X	X

8. Brief list of topics to be covered
  - a. Forensic engineering and failure
  - b. Authenticated sources/ethics
  - c. Mechanics and stress analysis
  - d. Failure modes
  - e. Material properties
  - f. Environmental degradation
  - g. Wear temperature corrosion fatigue
  - h. Fracture mechanics
  - i. Metallurgy/microscopy
  - j. ASTM Standards and testing