

Everything about ES 247 Fracture 2025

Zhigang Suo [@zhigangsuo](#)

You are invited to discuss this course on X: [2020](#), [2023](#), [2025](#)

Monday and Wednesday, 1:30 pm - 2:45 pm

Location: Maxwell Dworkin G135

Zhigang Suo, Instructor

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Office hour: After each lecture

Yu Zhou, Teaching Fellow

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Office hour: 3-5 pm, Tuesday, Pierce 215

Grades

Homework due on Wednesdays (50%)

Final exam (50%)

Final exam

- 3 hours. No notes. No books. No electronics.
- All problems in the final exam will be similar to homework problems.

Readings

- Folder [Readings on fracture](#)

Class Notes, Homework Sets

Jan 27	Toughness	
Jan 29	Inglis (1913)	
Feb 3	Free energy and surface energy	
Feb 5	Griffith (1921)	HW 1-5 Due
Feb 10	Crack grows by small scale irreversible process	

Feb 12	Energy release rate	HW 6-10 Due
Feb 17	Presidents' Day No class	
Feb 19	Measuring and using toughness	HW 11-15 Due
Feb 24	Beams and films	
Feb 26	Resistance curve	HW 16-20 Due
Mar 3	Fatigue	
Mar 5	Fatigue of rubber	HW 21-25 Due
Mar 10	Hydrolytic crack growth	
Mar 12	Large scale plasticity	HW 26-30 Due
Mar 17	Spring break	
Mar 19	Spring break	
Mar 24	Nonlinear field theory of elasticity	
Mar 26	Nonlinear field theory of elasticity	HW 31-35 Due
Mar 31	Crack tip singularity Flaw sensitivity	
Apr 2	J integral	HW 36-40 Due
Apr 7	Plane strain deformation of linear elasticity	
Apr	Crack tip singularity of	HW 41-45

9	linear, homogeneous, isotropic elasticity	Due
Apr 14	Mixed-mode fracture	
Apr 16	Interfacial fracture	HW 46-50 Due
Apr 21	Crack bridging	
Apr 23	Large scale bridging	HW 51-55 Due
Apr 28	Large scale plasticity 2	
Apr 30	Toughness due to hysteresis	
May 13	Final exam 2:00 pm, Emerson Hall 104	

Posts on X

Consider setting up your account. [See this thread for advice.](#)

[One hundred years of toughness](#)

[Fractocohesive length](#)

[Tough composites](#)

[Fatigue-resistant polymer networks](#)

[Cracks in semiconductor devices](#)

[Adhesion](#)

[HDPE bag 2](#)

[HDPE bag 1](#)

[Polypropylene box](#)

[PET box](#)

[War on fatigue](#), video of my lecture for Mechanical Engineering at Purdue

[Topological adhesion](#), video of my EML webinar