Course Syllabus

EML3005 - Mechanical Engineering Design 1

Instructor

Dr. Katerina E. Aifantis

Office hours: Monday, Wednesday, Friday, 10.00-11.00

Zoom Room: https://ufl.zoom.us/j/4855871400

Email: kaifantis@ufl.edu

Textbook: Not required to purchase, but will be using content from Shigley's mechanical engineering design, 10th edition

Prerequisites: COP 2271, EML2322L and EGM 3520 with minimum grade of C.

Teaching Assistants

Gustavo Tersoni

Office hours: TBA and on appointment

Location: https://ufl.zoom.us/j/4855871400

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Course Objective and Goals

This course deals with the design of mechanical components that are found in mechanical systems, e.g. shafts, fasteners, bearings, springs, gears, brakes, clutches, couplings. From catalog: design process, kinetics gear, gear trains, and standard mechanical components.

For academic Policies and student help resources please see

https://go.ufl.edu/syllabuspolicies

Evaluation

4 Exams @ 20% each	80%
Homework	20%

Exam times in the afternoon 6-8pm on day of exam, room TBA.

Important Dates:

Sept 22	Exam 1
Oct 20	Exam 2
Nov 17	Exam 3
Dec 3	Exam 4

Grading scale

95-100	A
90-94.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
67-69.9	D+
63-66.9	D
60-62.9	D-
<60	E

Tentative content

(The instructor may change this schedule to accommodate class needs.)

1. 1/12 Material properties; Stress, Mohr's circle. Section 2.1, 3.4-3.7
2. 1/14 Stress for bending and Torsion; Stress concentration. Section 3.10-3.13
3. 1/16 Deflection, strain energy
4. 1/21 Martin Luther King Jr Holiday
5. 1/23 Failure of ductile material from statics loading. Section 5.1-5.7
6. 1/25 Fatigue and fatigue-life method. Section 6.1-6.6
7. 1/27 Fatigue and fatigue-life method. Section 6.1-6.6
8. 2/2 Fatigue and fluctuating stresses. Section 6.11-6.15
9. 2/4 Fatigue and fluctuating stresses. Section 6.11-6.15
10. 2/9 Fatigue and fluctuating stresses. Section 6.11-6.15
11. 2/11 Review

2/13 Exam 1

11. 2/16 Shaft Materials, layout and design for stress. Section 7.1-7.4
12. 2/18 Shaft design for stress, deflection. Section 7.4-7.6
13. 2/20 Threads; Power screw; Fastener stiffness. Section 8.1-8.4
14. 2/23 Member stiffness; Bolt strength and tensile. Section 8.5-8.8
15. 2/25 Loading Joint. Section 8.9-8.12
16. 2/27 Welding and stresses in welded joints. Section 9.1-9.4
17. 3/2 Fastener stiffness; Member stiffness (chap. 8)
18. 3/4 Tension joints; statically loaded tension joint (chap. 8)
19. 3/6 Fatigue loading of tension joints (chap. 8)
20. 3/9 Review

3/11 Exam 2

21. 3/13 Welding symbols; stress in welded joints in torsion and bending (chap. 9)
22. Spring Break 16-20 March
23. 3/23 Strength of welded joints and static loading (chap. 9)
24. 3/25 Fatigue loading and bonding (chap. 9)
25. 3/27 Fatigue loading and bonding (chap. 9)
26. 3/30 Stresses in spring; curvature effect; deflection (chap. 10)
27. 4/1 Compression springs; stability. (chap. 10)
28. 4/3 Critical frequency; fatigue loading (chap. 10)
29. 4/6Review Exam 3

4/8 Exam 3

30. 4/10 Types of gears; fundamentals (chap. 13)
31. 4/13 Contact ratio; forming of gear teeth. (chap. 13)
32. 4/15 Worm gears; tooth system; gear trains. (chap. 13)
33. 4/17 Force analysis (chap. 13)

34. 4/20 Lewis bending equation; AGMA equations (chap. 14)

4/22 Exam 4