

## **Course Syllabus**

EML3005 - Mechanical Engineering Design 1

### ***Instructor***

Dr. Katerina E. Aifantis

Office hours: Monday, Wednesday, Friday, 15.00-16.00

Office: 135 NEB (New Engineering Building)

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: 158 NEB (New Engineering Building)

Email: ganaiatersoni@ufl.edu

### ***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%
Quizzes	15%
Participation & Attendance	5%

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.)*

- 8/22 Introduction and Worksheet 1 assignment
- 8/25 Forces and Stresses Review, Group formation survey
- 8/27 Forces and Stresses Review, Worksheet 2A
- 8/29 Forces and Stresses in 3D, Worksheet 2B
- 9/1 Labor Day, No class
- 9/3 Stress Concentrations and Dynamic Loading, Lecture
- 9/5 Stress Concentrations and Dynamic Loading, Worksheet 3A
- 9/8 Stress Concentrations and Dynamic Loading, Worksheet 3B
- 9/10 Quiz , Forces and Stresses Review
- 9/12 Yield Criteria for Ductil & Brittle Fracture (Lecture)
- 9/15 Yield Criteria for Ductil & Brittle Fracture, Worksheet 4A
- 9/17 Yield Criteria for Ductil & Brittle Fracture, Worksheet 4B
- 9/19 Review for exam 1
- 9/22 Exam 1
- 9/24 Shaft Materials, layout and design for stress. Ch 7
- 9/26 Shaft design for stress, deflection. Ch 7
- 9/29 Threads; Power screw; Fastener stiffness. Ch 8
- 10/1 Member stiffness; Bolt strength and tensile. Ch 8
- 10/3 Loading Joints, Tension joints. Ch 8
- 10/6 Statically loaded tension joint. Ch 8
- 10/8 Statically loaded tension joint. Ch 8
- 10/10 Fatigue loading of tension joints. Ch 8
- 10/13 Fatigue loading of tension joints. Ch 8

10/15 Review Exam 2

10/17 No class Homecoming

10/20 Exam 2

10/22 Welding symbols; stress in welded joints in torsion and bending. Ch 9

10/24 Stress in welded joints in torsion and bending. Ch 9

10/27 Arc Welding. Ch 9

10/29 Intro into Compression Springs. Ch 10

10/31 Compression Spring analysis and design. Ch 10

11/3 Extension Springs. Ch 10

11/5 Gear fundamentals. Ch 10

11/7 Spur Gears. Ch 13

11/10 Helical Gears. Ch 13

11/12 Gear Trains. Ch 13

11/14 Review Exam 3. Ch 13

11/17 Exam 3. Ch 13

11/19 Worm Gears. Ch 13

11/21 Worm Gear Force Analysis. Ch 13

Happy Thanksgiving!!

12/1 Failure of Gear Teeth

12/3 Exam 4