ME 3180: MECHANICAL DESIGN AND ANALYSIS

Spring 2025

Class Hours:

- Tuesday 8:00 – 10:00 a.m. ENSAM, Building B, room 35
- Thursday 1:00 - 5:00 p.m. ENSAM, Building B, room 25

See the attached schedule to now if you have class on Tuesday and on Thursday.

Professor:

Sandra CHEVRET	sandra.chevret@ensam.eu
Manuel LOPEZ CABRERA	manuel.lopez_cabrera@ensam.eu
Jose David CAICEDO BOHORQUEZ	jose_david.caicedo_bohorquez@ensam.eu
Paul STIEF	paul.stief@ensam.eu

Please contact first the teacher per mail if you have any question. He will answer quickly.

If you have any general question about the lectures, please contact Sandra CHEVRET.

Course Objectives:

- This course acquaints students with the fundamentals of the design and selection of mechanical components. This knowledge will allow the design of better products. The material covered will include power transmission devices and calculation, dimensioning shafts, bearings, analysing a rotating machine and calculating a shrink fit assembly.

- The philosophy of this class is to develop an understanding of the requirements of a design problem, focusing on its mechanics and physics. This understanding is applied to the analysis of the mechanical element. The proper embodiment of the element then is selected from "standard" parts or designed from "scratch." There are many equations in this course, and you will learn to manipulate them correctly.

Homework

Homework will be given to student in order to practice correctly the matter. They may be graded. The correction will also be handed out. The student will have to make them and ask questions to the teacher on the next session or through email. It is to note that most of the exercises will be made in class with the teacher.

Topics covered and requirements

Topic	Teacher	Students
Power Transmission elements	S. CHEVRET	GTL & ENSAM
Permanent Assembly (interference fit assembly)	S. CHEVRET	GTL & ENSAM
Permanent Assembly (screws and fastener)	S. CHEVRET	GTL & ENSAM
Balancing rotating machines	M. LOPEZ CABRERA	GTL & ENSAM
Gears	P. STIEF	GTL & ENSAM
Bearings	S. CHEVRET	GTL only
Shaft and Static failure	J D CAICEDO BOHORQUEZ	GTL only
Machine components & read technical drawing	M. LOPEZ CABRERA	GTL only

Important: ALL materials will be on the platform SAVOIR

Course Requirements:

Tests are assessed with a mark between 0 and 100 (and converted to a grade on 20). The grade distribution is as given:

Topics	**% of final grade**
Power Transmission Elements	**13%**
Joining and Fastening	**17%**
Balancing rotating machines project	**7%**
Gear Trains:	**19%**
- Gear Trains – Homework	4%
- Gear Trains – Test	15%
Bearings	**12%**
Shaft and Static Failure	**16%**
Machine Components & Read Technical Drawing	**16%**
- Machine Components - Test	12%
- Machine Components - Knowledge Test	4%
Total	**100%**

Each test will be done on class period of about 60 minutes except for the final exam.

Grading:

• $85 \leq A \leq 100$ • $65 < B \leq 84$ • $50 < C \leq 65$ • $50 \leq D$	• $16 < A \leq 20$ • $13 < B \leq 16$ • $10 < C \leq 13$ • $10 < D$

Exam Schedule (Will be updated before the start of the semester):

- Bearing test January 2025
- Machine components & read technical drawing, February 2025*(30min knowledge test)*
- Power Transmission Element test, February 2025
- Machine components & read technical drawing test, February 2025
- Gear test, March 2025
- Balancing rotating machines, oral project presentation, April 2025
- Shaft and static Failure test, April 2025
- Joining and fastening ***final exam (2 hours),*** April 2025

Prerequisites: AE 1770 or CEE 1770 or ME 1770 or ME 2110 or COE 3001 Minimum Grade of D for all

Honor Code:

- By participating in this course, you agree to adhere to Georgia Tech's Honor Code. If you have any questions regarding these or any other issues related to the Academic Honor Code, please consult me or www.honor.gatech.edu. In addition, please read and sign the Honor Code form on this website; the completed form must be returned in order for you to receive a grade in this class.
- The use of any materials from previous semesters is permitted; however, I remind you that while they may serve as examples, they are not guidelines for exams, quizzes, homework, projects or any other courses that may be assigned during the semester.
- Use of the homework solutions manual is a direct violation of the GT Academic Honor Code and will be dealt with accordingly.
- Cheating on another person's exam or quiz is unethical and unacceptable. Cheating on someone else's work is a direct violation of the GT Academic Honor Code and will be dealt with accordingly.

Main references:

– *Shigleys Mechanical Engineering Design, 8 ◦ édition* , RG Burdas, Mc GrawHill.

Other references:

– *La démarche de projet industriel,* I. Rak, Foucher
– *Systèmes mécaniques, Théorie et dimensionnement,* M. Aublin, R Boncompain, etc., Dunod
– *Construction mécanique,* M. Aublin, Dunod
– *Guide des sciences et technologies industrielles,* J. Fanchon, Nathan
– *Le Codotec (Compilation de documentation technique),* J. Corbet, CODOTEC