

ME 3180: MECHANICAL DESIGN AND ANALYSIS

Spring 2022

Class Hours:

- Tuesday 8:00 – 10:00 p.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
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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	Student
Power Transmission elements	S. CHEVRET	GTL & ENSAM
Permanent Assembly – interference fit assembly -	S. CHEVRET	GTL & ENSAM
Permanent Assembly – screws and fastener -	S. CHEVRET J. PETRONIJEVIC	GTL & ENSAM
Balancing rotating machines	J.-C. GOMEZ ECHEVERRI	GTL & ENSAM
Gears	P. STIEF	GTL & ENSAM
Bearings	S. CHEVRET	GTL only
Shaft and Static failure	J. PETRONIJEVIC	GTL only
Machine components & read technical drawing	J.-C. GOMEZ ECHEVERRI	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	12%
Joining and Fastening	16%
Balancing rotating machines:	10%
- <i>Balancing rotating machines - Project</i>	7%
- <i>Balancing rotating machines - Homework</i>	3%
Gear Trains :	18%
- <i>Gear Trains - Homework</i>	3%
- <i>Gear Trains - test</i>	14%
Bearings	12%
Shaft and Static failure	16%
Machine components & read technical drawing	16%
- <i>Balancing rotating machines - Test</i>	12%
- <i>Balancing rotating machines - Knowledge test</i>	4%
Total	100%

Each test will be done on class period of about 60 minutes.

Estimation des notes:

• $81 \leq A \leq 100$ • $65 \leq B < 81$ • $50 \leq C < 65$ • $50 < D$	• $16 \leq A \leq 20$ • $13 \leq B < 16$ • $10 \leq C < 13$ • $10 < D$
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Exam Schedule:

- Machine components & read technical drawing, Thursday 25th January 2022 (30min knowledge test)
- Machine components & read technical drawing test, Tuesday 01st February 2022

- Power Transmission Element test, Thursday 24th of February 2022
- Bearing test, Tuesday 01th of March 2022
- Gear test, Thursday 24th of March 2022
- Balancing rotating machines, project oral presentation, Thursday 31th of March 2022
- Shaft and static Failure test, Tuesday 19th of April 2022
- Joining and fastening **final exam (2 hours)** – to be defined by GTL during the exam week

Code d'honneur:

- En participant à ce cours, vous acceptez d'adhérer au [Code d'honneur de Georgia Tech](#) . Pour toute question concernant ces problèmes ou tout autre problème [lié au](#) Code d'honneur académique, veuillez me consulter ou www.honor.gatech.edu . De plus, veuillez lire et signer le [formulaire de code d'honneur](#) sur ce site Web; le formulaire rempli doit être retourné pour que vous puissiez recevoir une note dans cette classe.
- L'utilisation de tout matériel des semestres précédents est autorisée; cependant, je vous rappelle que bien qu'ils puissent servir d'exemples, ils ne constituent pas des lignes directrices pour les examens , les quiz, les devoirs, les projets ou tout autre cours pouvant être assignés au cours du semestre.
- L'utilisation du manuel des solutions de devoirs est une violation directe du code d'honneur GT Academic et sera traitée en conséquence.
- Tromper l' examen ou le quiz d' une autre personne est contraire à l'éthique et inacceptable. Tromper le travail de quelqu'un d'autre est une violation directe du Code d'honneur académique GT et sera traité en conséquence.

Références principales (sur réserve à la bibliothèque):

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

Références secondaires (sur réserve à la bibliothèque):

–*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