ME231: Solid Mechanics-I

Timings	
Tuesday	11:30 to 12:50
Friday	10:00 to 11:20
Tutorial	?

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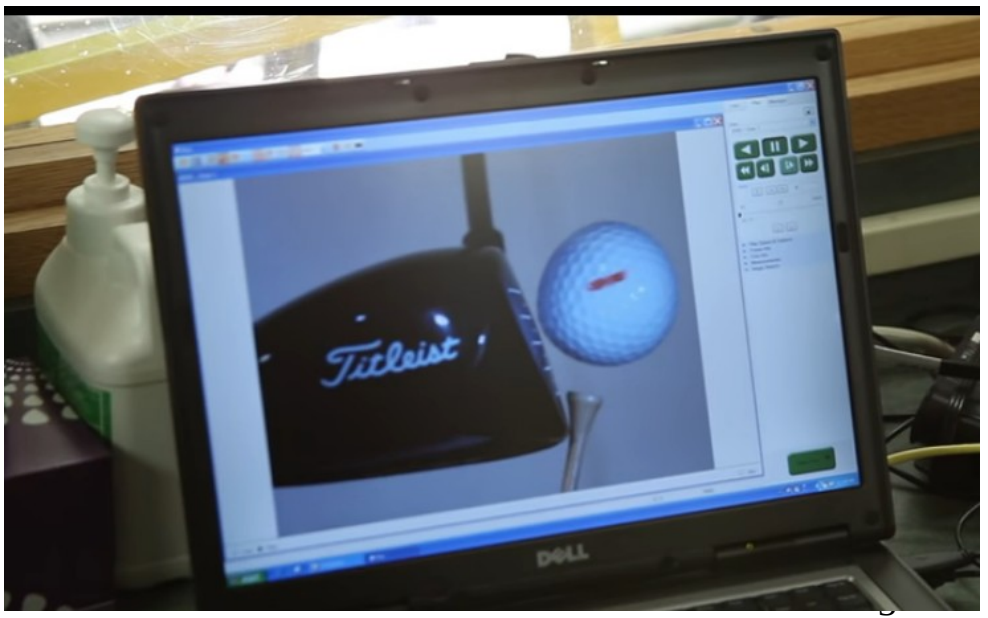
Course Plan

- **Tierce exam: 20% + 20% + 20% = 60%**
  - Tierce exam will be in the form of a viva if it happens online, otherwise written.
- **Assignment: 20%**
  - Every student should solve and submit 20 unsolved questions before every tierce exam (i.e., a total of 60 questions in the semester).
  - Questions will be of students' choice from any book; however the source of the problem should be mentioned.
  - If anyone copies from another student, both the one who has copied and from whom he/she has copied will be given zero marks for the whole assignment part without seeking clarification/justification.
- **Term paper: 20%**
  - A topic/problem will be given to each student (by mid-semester). He/she should prepare a 8-10 minute presentation on the same and present it before the final tierce exam. A 2-3 page report should also be submitted on the same. The report should not be directly copied from the internet or any other source and should be written in your own words. If anyone copies, zero marks will be given for the whole term paper part.

Why Solid Mechanics?

https://www.youtube.com/embed/6TA1s1oNpbk?start=45&end=53

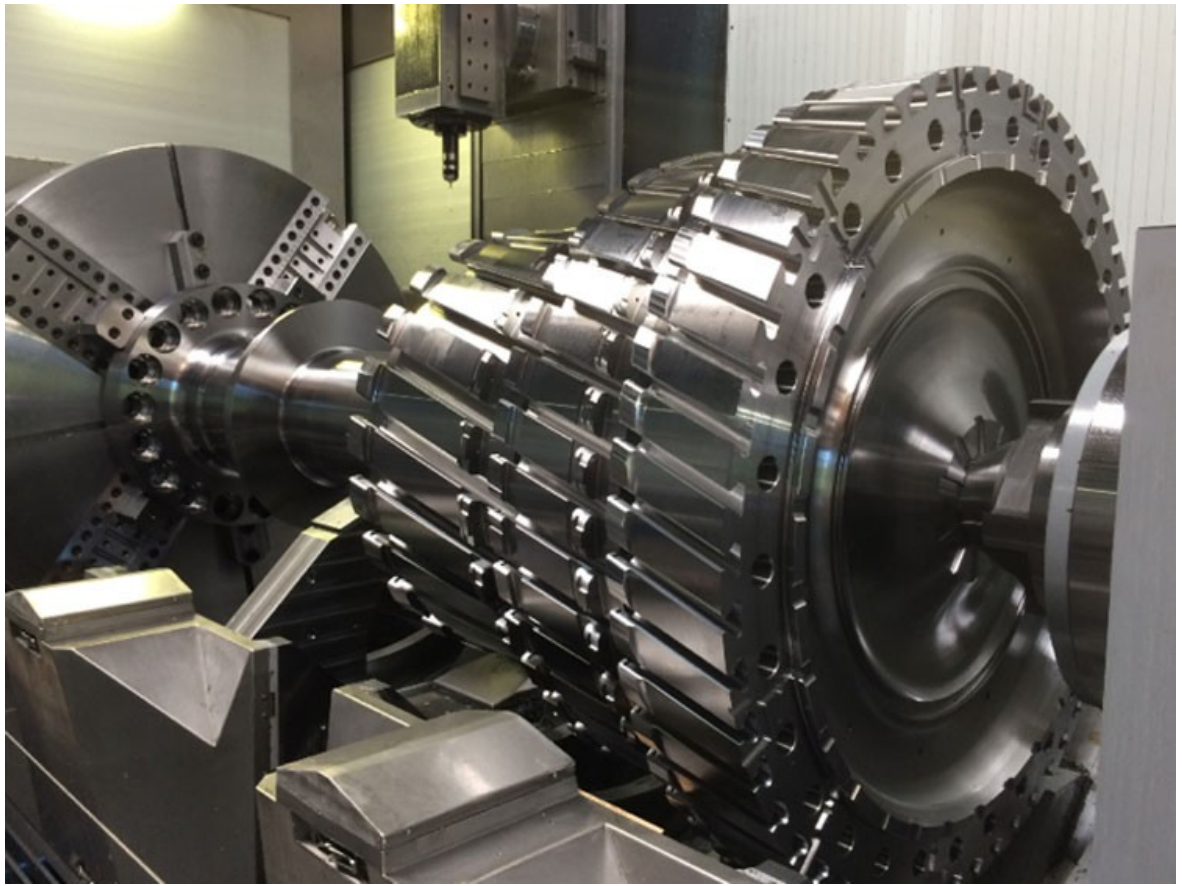
https://www.youtube.com/embed/6TA1s1oNpbk?start=120&end=137



Cylindrical shells

Landing gears

Turbine shaft and blades



Golf club

https://www.youtube.com/embed/l4glDr_Nl3w?start=3&end=36

Leaf spring

Manufacturing operations

Forming/Deep drawing

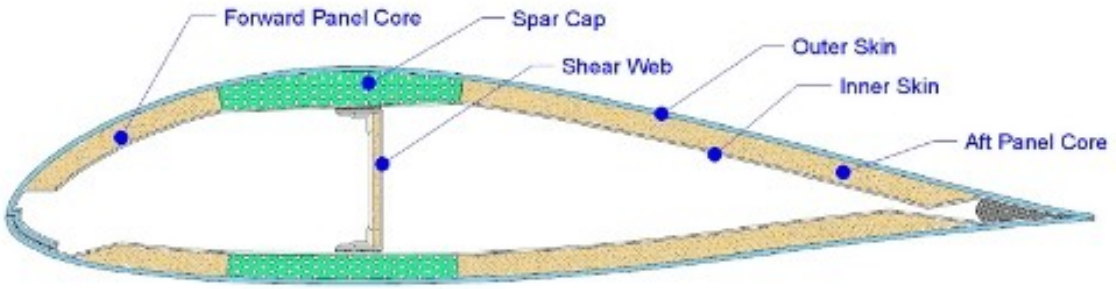
https://www.youtube.com/watch?v=fl06XxNt0WU&feature=youtu.be&t=40

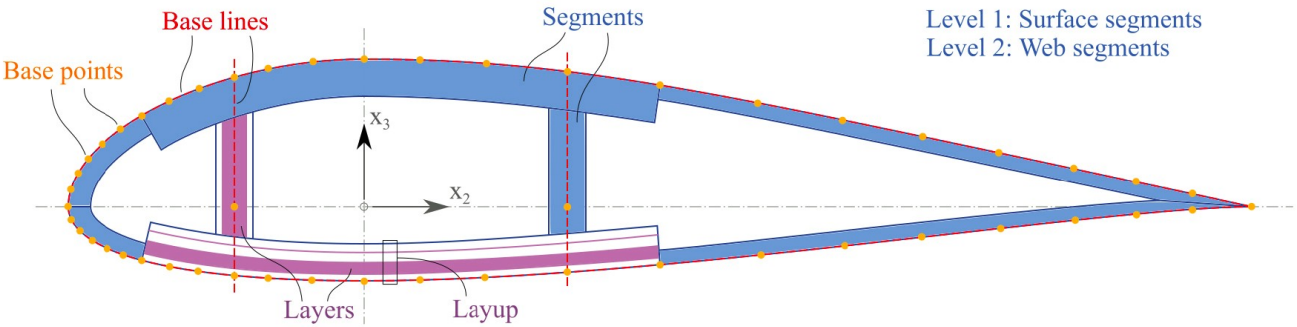
Punching, Sheet Metal Cutting

https://youtu.be/3CPygO2Z0OY

Design of ammunition

Optimized design



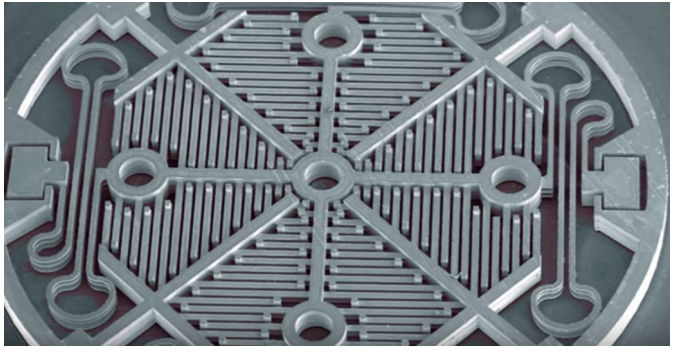


Load cells and Sensors

Load cells:

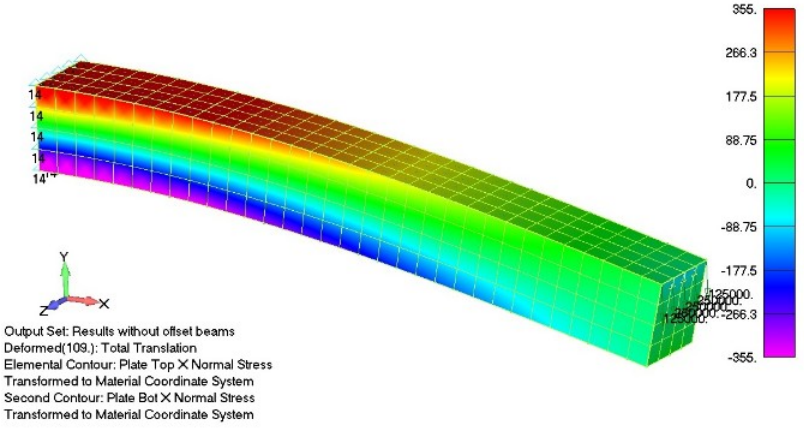
MEMS:

https://www.youtube.com/embed/eqZgxR6eRjo?start=14&end=60



Understanding numerical and experimental results

Numerical simulation of cantilever beam:



Wind turbine blade testing:

https://www.youtube.com/embed/QQR8pZMwbvQ?start=20&end=55

At advance level

https://www.youtube.com/embed/9IqRdEs4_JU?start=54&end=83

Books

- *An Introduction to the Mechanics of Solids* by Crandall, Dahl, and Lardner, and Sivakumar. McGrawHill.
- *Mechanics of Materials* by Beer, Johnston, DeWolf, Mazurek and Sanghi. Tata McGrawHill
- *Elements of Strength of Materials* by Timoshenko and Young
- *Mechanics of Materials* by R. C. Hibbeler