INSA LYON: ERASMUS IN FRANCE

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Institute of Machine and Industrial Design
Faculty of Mechanical Engineering
Brno University of Technology

INSTITUTE OF **MACHINE**
AND **INDUSTRIAL DESIGN**

ERASMUS +

Before the proposal:

- https://www.vutbr.cz/spoluprace/zahranicni/erasmus
- Bc. Michaela Veselá vesela.m@ro.vutbr.cz
- last proposal deadline was 25.4.2019
- firstly you should choose the University and contact the responsible person…but…
- my nomination agreement 7.5.2019

Before the travel:

- discuss and decide what to teach – at least 8 hours/week
- **subsidy is only for the days of teaching + 2** !!!
- Mobility agreement signed by both universities – at least 3 weeks prior -> calculation of subsidy -> travel order in VUT system -> advance payment
- pay the flight ticket, hotel etc. from your personal account (not necessary to wait for the BUT account number)!!!

ERASMUS +

After the travel:

- **original** of signed Confirmation document!!!
- travel Invoices (except public transport), accomodation invoice + bank statement
- all public transport tickets
- final report of teacher + participatïon contract (one page documents to fill in few points)

INSA LYON

INSA Lyon - National Institute of Applied Sciences of Lyon

- 6 300 students
- 2 years prepratory level - general scientific and technical education
- Most of the teachers at the position Lecturer (no R&D)
- 3 years of master's degree - 9 branches
- professor assintants can do R&D or can be fulltime teachers, also lecturers from industry

Prepratory Level:

- “Classical" Preparatory Level,
- (EURINSA), Asia (ASINSA) or Latin America (AMERINSA), and a section taught entirely in English (SCAN)
- An Active Science Training (FAS) section integrates students who did the baccalaureate STI (Industrial Science and Technology) into the engineering curriculum.
- A High Level Sport (SHN) section is dedicated to the Preparatory Level education of athletes

INSA LYON

- 2 years of preparatory level

PREPARATORY LEVEL CLASSICAL PREPARATORY LEVEL High-school	PREPARATORY LEVEL PREPARATORY LEVEL ABROAD High-school	PREPARATORY LEVEL FIMI "CINÉMA-ÉTUDES" High-school	PREPARATORY LEVEL PREPARATORY LEVEL ASINSA High-school	PREPARATORY LEVEL SCAN High-school	PREPARATORY LEVEL ACTIVE SCIENCE TRAINING (FAS) High-school
PREPARATORY LEVEL MUSIC STUDIES High-school	PREPARATORY LEVEL PLASTIC ARTS STUDIES High-school	PREPARATORY LEVEL THEATRE STUDIES High-school	PREPARATORY LEVEL HIGH LEVEL SPORTS SECTION High-school		
PREPARATORY LEVEL DANCE STUDIES High-school	PREPARATORY LEVEL EURINSA High-school	PREPARATORY LEVEL AMERINSA High-school			

EURINSA
The tutorials and practical assignments, which represent the majority of teaching time, are done in small groups (of about 16-24 students), which allows good monitoring of students' progress. The teaching is in French.
Any team work (tutorials, etc.) is done in international groups. Students benefit from a support system with a specific tutor per geographic area of origin, and supervised hours of revision for parts of the programmes. Students must reach a certain level, verified by continuous assessment throughout the year as well as course summary homework at the end of each semester.

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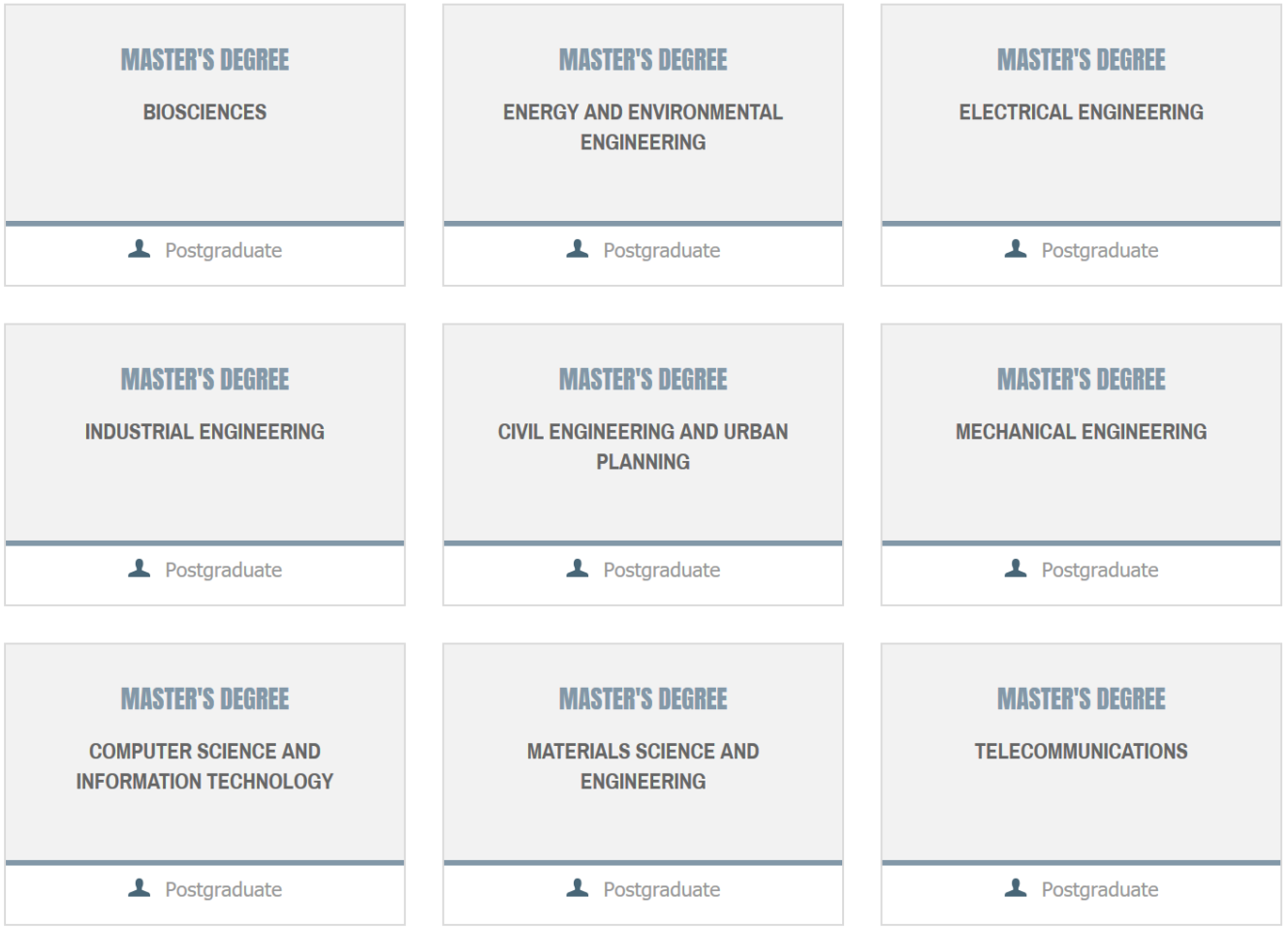
Masters degree:

1. Year: department’s fundamental scientific and technical training
2. Year: long industrial internship (4-6 months) in France or abroad
3. Year: a common core, options accounting for up to one third of the face-to-face teaching to achieve, in specific areas, the scientific and technical level required by companies and an End of Studies Project (ESP) carried out in most cases in a laboratory at INSA Lyon on a topic proposed by a an industrial company.

INSA LYON

- 3 years master‘s level
- 9 departments



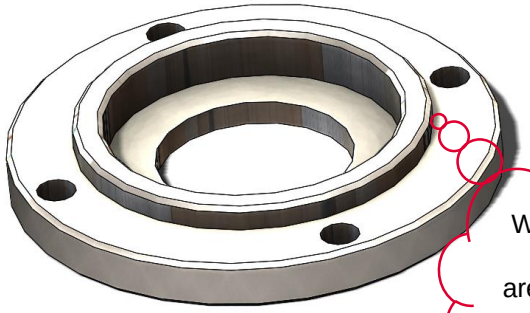
MY ERASMUS +

- 18 hours (6 hours of observation), 7 days of teaching aktivity, 11 days overall
- 1st week - 3. grade
- 2nd week - 1. grade (English classes)

Date	Time	Course	Teacher			Room	Accompanying	
4.11.2019	16-18	CONAN TD5	Lionel Manin	Tolerances	Observation	321-04-08	Michal Ruzek	
5.11.2019	16-18	CONAN TD5	Diana de Argenta	Tolerances	Teaching	321-03-02	Diana de Argenta	
6.11.2019	8-10	CONAN TD5	Nadine Noël	Tolerances	Teaching	321-04-03	Nadine Noël	
8.11.2019	8-10	CONAN TD5	Nadine Noël	Tolerances	Teaching	321-04-05	Nadine Noël	(Michal Ruzek)
12.11.2019	16-18	Mechanical design 1	Michal Ruzek	Cross-section/lubrication	Teaching	Pierre de Fermat 209	Michal Ruzek	
13.11.2019	8-12	CONAN TP	Francois Girardin	Laboratory	Observation	TP CONAN Jacquart 1st	Francois	
14.11.2019	14-18	Mechanical design 1	Michal Ruzek	Threaded elements, projects	Teaching	Jean d'Alembert room 60	Michal Ruzek	

FIRST WEEK – GD&T

- Seminar for 3. grade students: GD&T

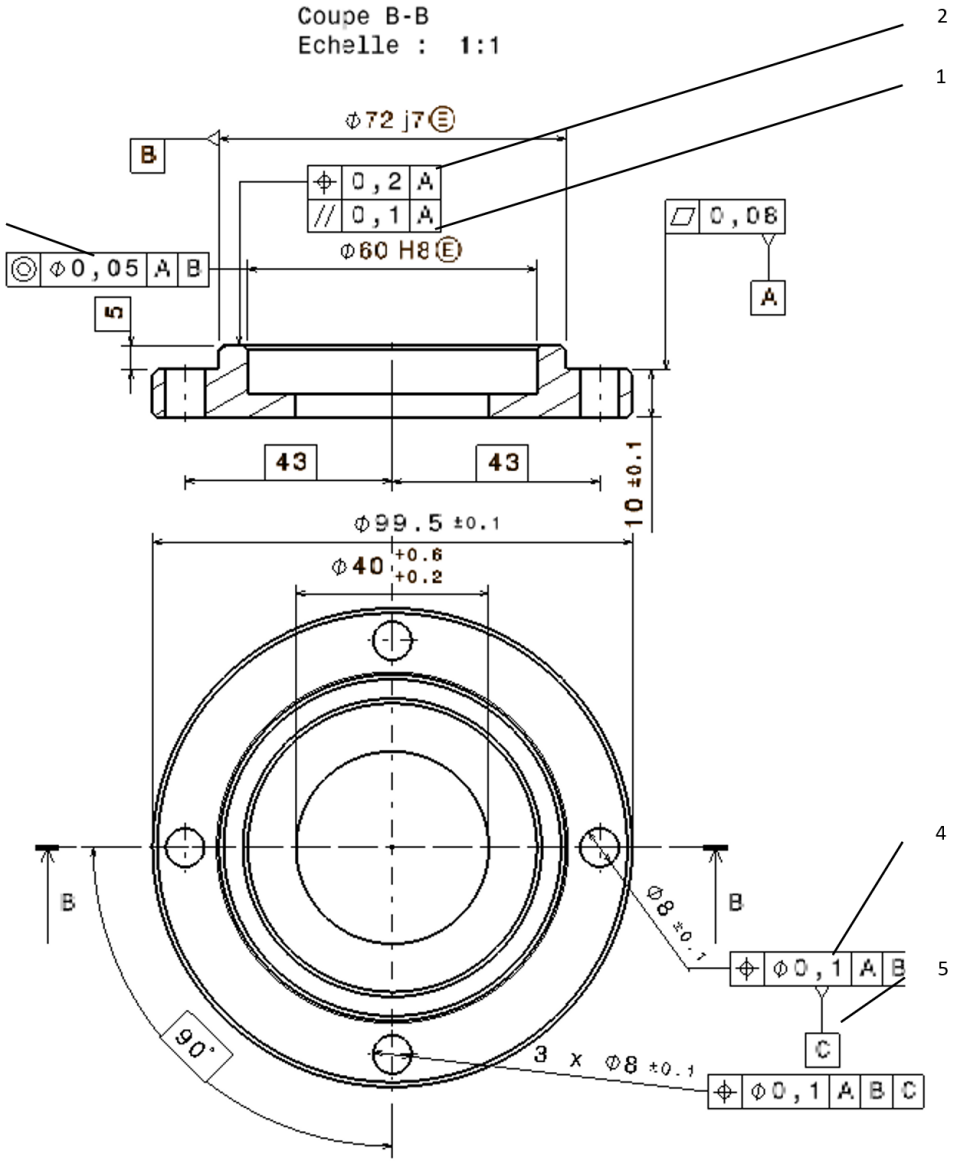


What will the individual areas be used for?

Typical cases of functional specifications

Fonction		Form	Orientation	Position	Runout	E/I/M
Sliding, friction, air cushion	Male to Female	1	2	1	2	E
	Plane to Plane	1				I
Rolling	Bearing	1		1		E
	Rolling guideway	1				I
Sealing with deformable seal	Sliding	1		1		I
	Rolling	1			1	I
Sealing with rigid seal	Sliding	1		1		E
	Rolling	1			1	E
Fixed assembly	Interference fit	1	1	2		E
	Transit fit	1	1			E
	Clearance fit			1		M
Guideway	Translation	1	1			E
	Rotation	1			1	E
Static positioning				1		E
Adherence with bonding, Resistance to matting, Fluid flow, Appearance, Stigma		1				I
Cutting tools		1			1	I
Stability (balancing)					1	I

1: important; 2: if necessary; E: envelope; I: independence; M: maximum of material



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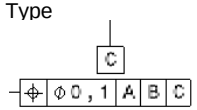
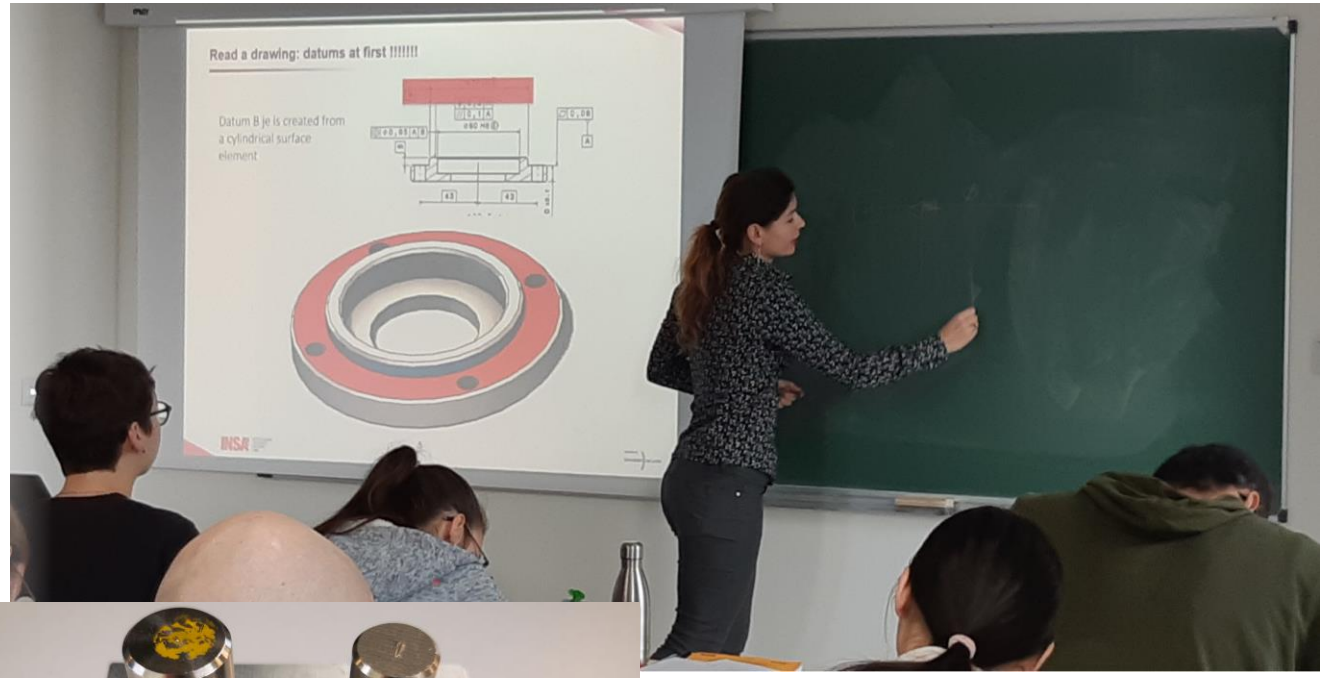
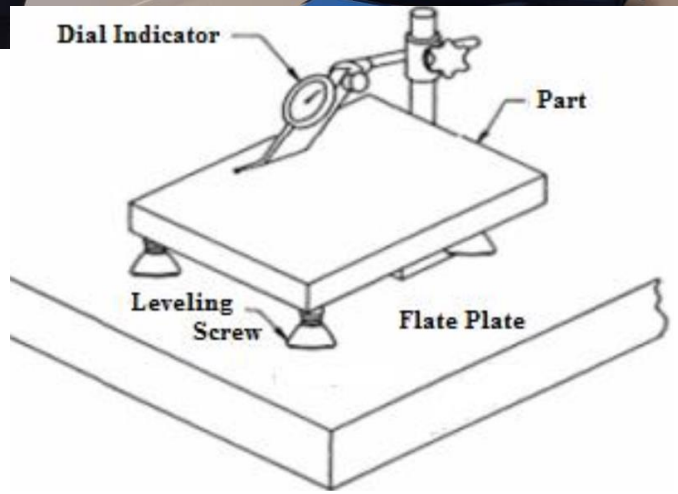
Decoding position tolerance n°5

Symbol	ACTUAL (Nonideal elements)		MODELES (Ideal elements)		
Type	Tolerated element ET	Reference Element ER	Datum Feature RS	Tolerance zone ZT	
	Geometrical affiliation single / multiple	Geometrical affiliation single / multiple	Type, nature simple / composed system	Type, nature simple / composed system	Orientation and/or position constraints/RS
Condition: The specified element must be within the tolerance range	3 curves extracted from 3 surfaces considered cylindrical	A: Planar surface element B: Cylindrical surface element C: Cylindrical surface element	Plane A tangent to the surface (Chebyshev outside), axis of the circumscribed cylinder B perpendicular to A, axis of the inscribed cylinder C perpendicular to A	3 cylindrical areas Ø0.1 perpendicular to A, 43 apart from B and arranged at 90 ° C	The tolerated element must be in the tolerance zone

FIRST WEEK – GD&T





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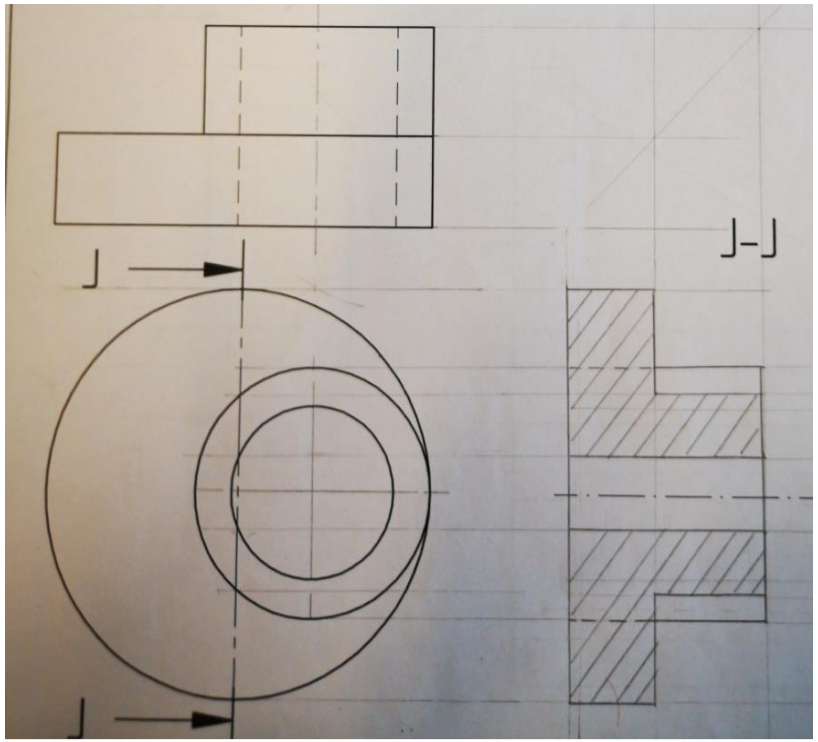
SECOND WEEK – SECTIONS + LUBRICATION

- Seminar for 1. grade students: Main topic: sections + minitopic at the begining: Lubrication



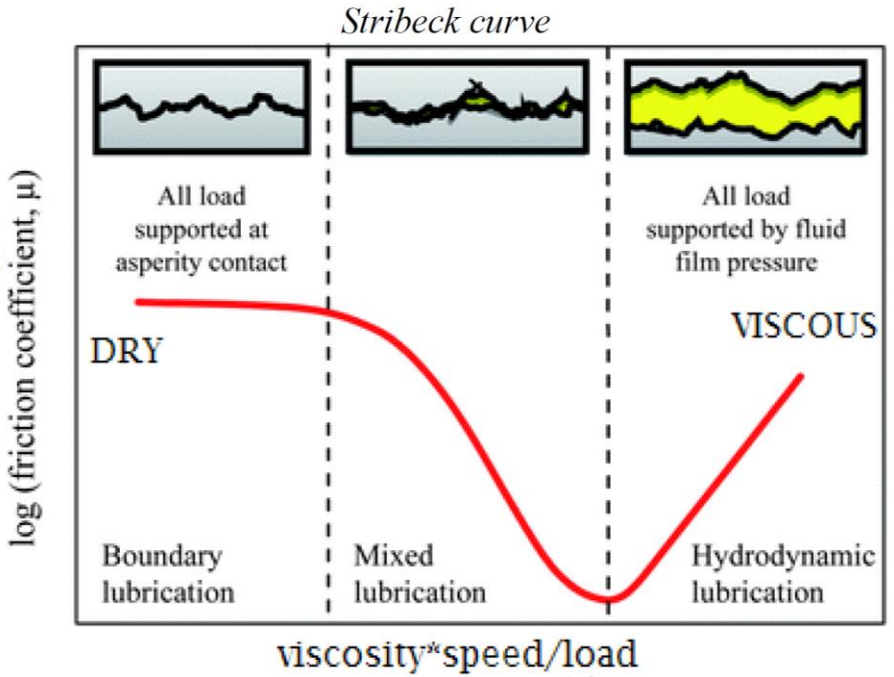
Friction

Very complex physical phenomena.

The simpliest models are:

- **Dry** friction
  constant with speed, non-lubricated surfaces
- **Viscous** friction (damping)
  proportional to speed, typical for lubricated surfaces

Nota bene:
A full hydrodynamic lubrication leads to a **complete separation** of contact surfaces by lubricant (approximately 1 micron)
=> **no wear or damage**



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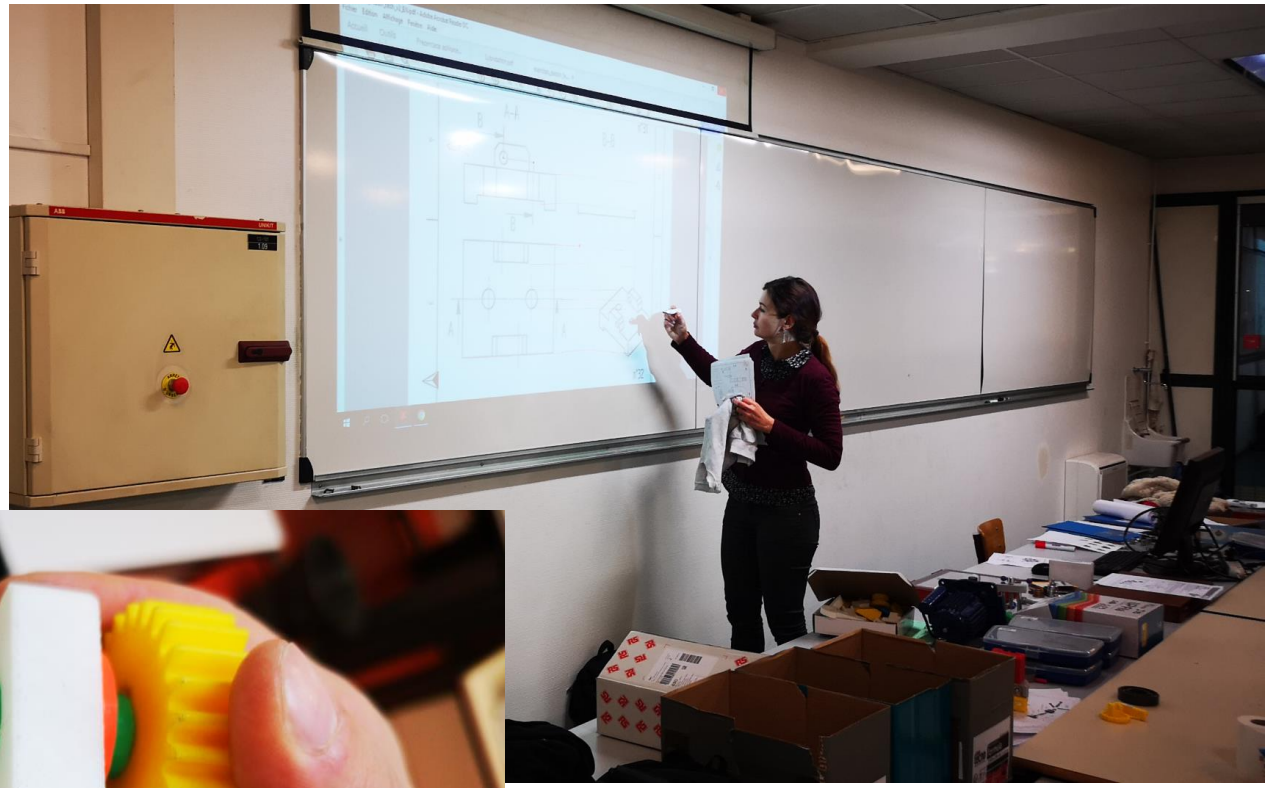

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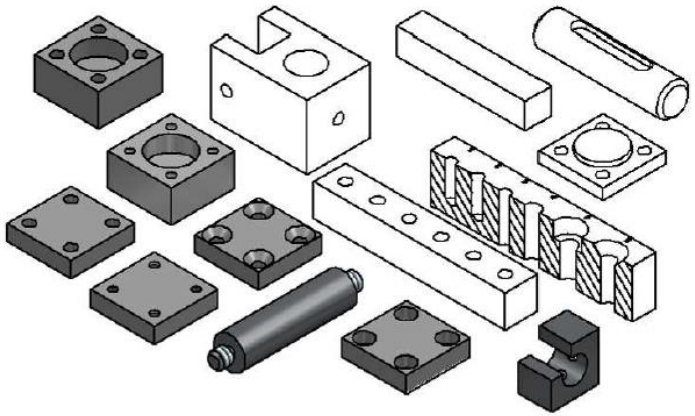
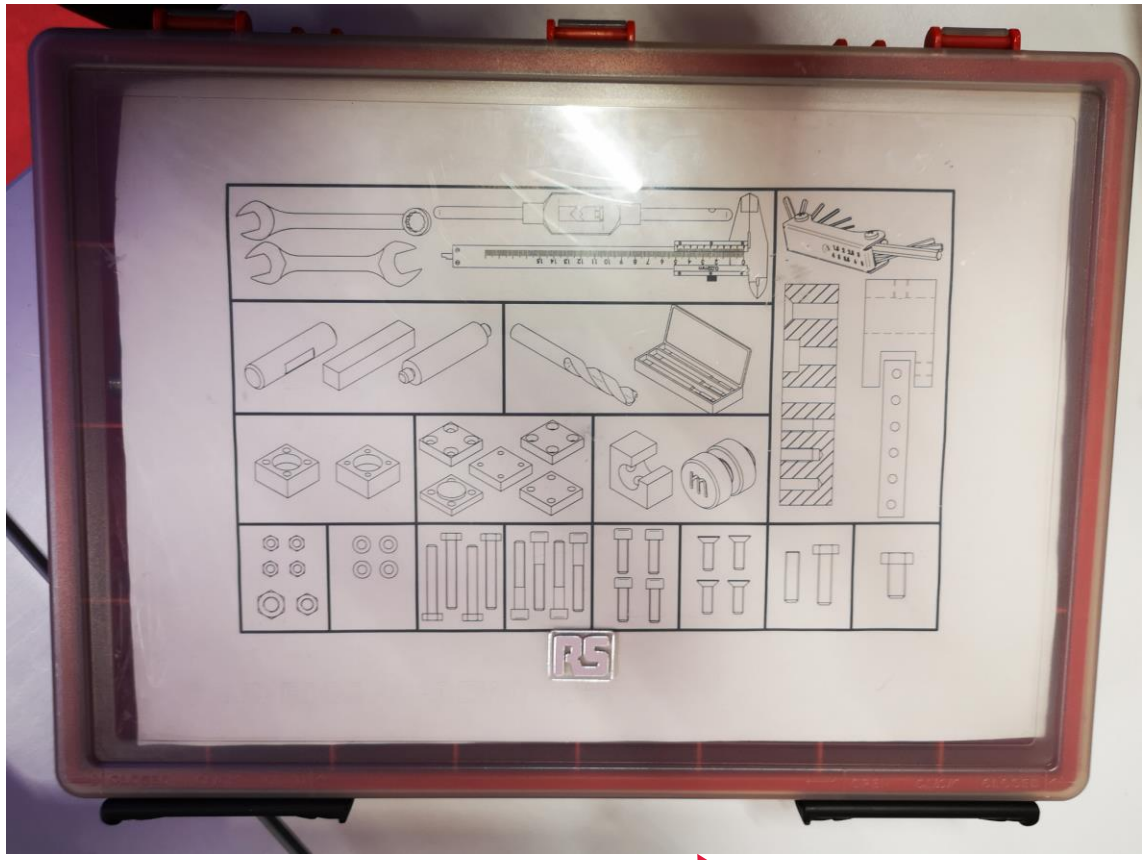
SECOND WEEK – THREADED ASSEBMLY

- Seminar for 1. grade students: Main topic: sections + minitopic at the begining: Lubrication

nd type: mechanical parts

Part with a groove, bore ∅20 and 2 internally threaded holes M8				Axle with a flat and a groove
Part with 4 through holes ∅6.4				Bar 16x16 L=80
Part with 4 threaded holes M6				Part cut by different types of holes
Lid with four holes ∅6.4				
Lid with four threaded holes M6				Lid with four holes ∅6.4 and a shoulder
Lid with 4 countersinking holes	Lid with four spot-facing holes	Axle with a shoulder and a thread	Prismatic part with two threaded holes M10	PVC part with holes ∅6.8 used for the internal thread

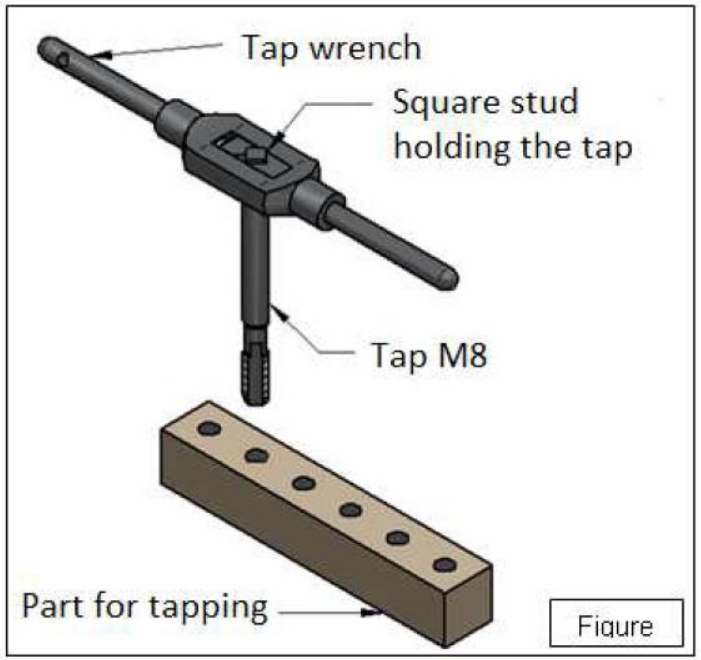


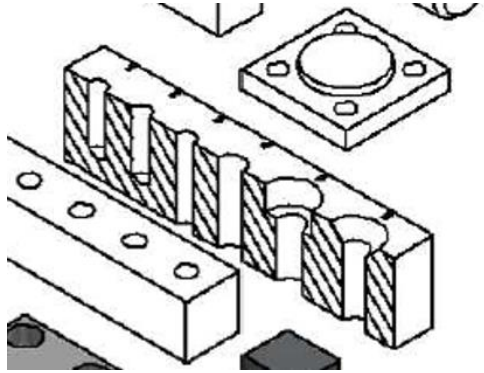
SECOND WEEK – THREADED ASSEBMLY

- Seminar for 1. grade students: Main topic: theraded assembly + project presentation: reverse enginnering

4.2 – Machining of an internal thread:

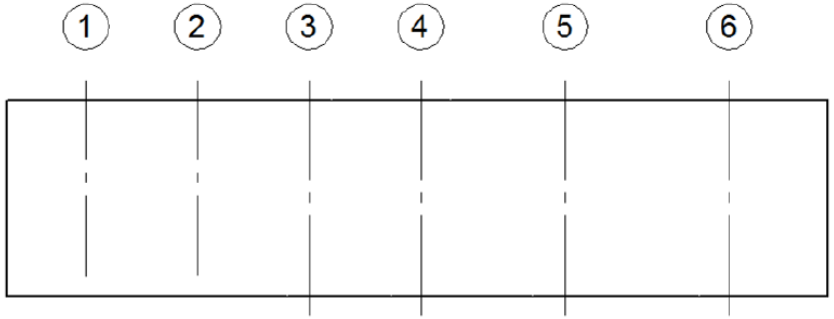
- **I.** Small hole drilled by a center drill for a better precision
- **II.** Drilling with a drill in order to obtain a hole
- **III.** Tapping inside the hole, thus creating an internal





7 – Drawing exercise:

a – Complete this drawing of the part cut by different holes and threads. You can measure the dimensions directly on this part using a caliper.



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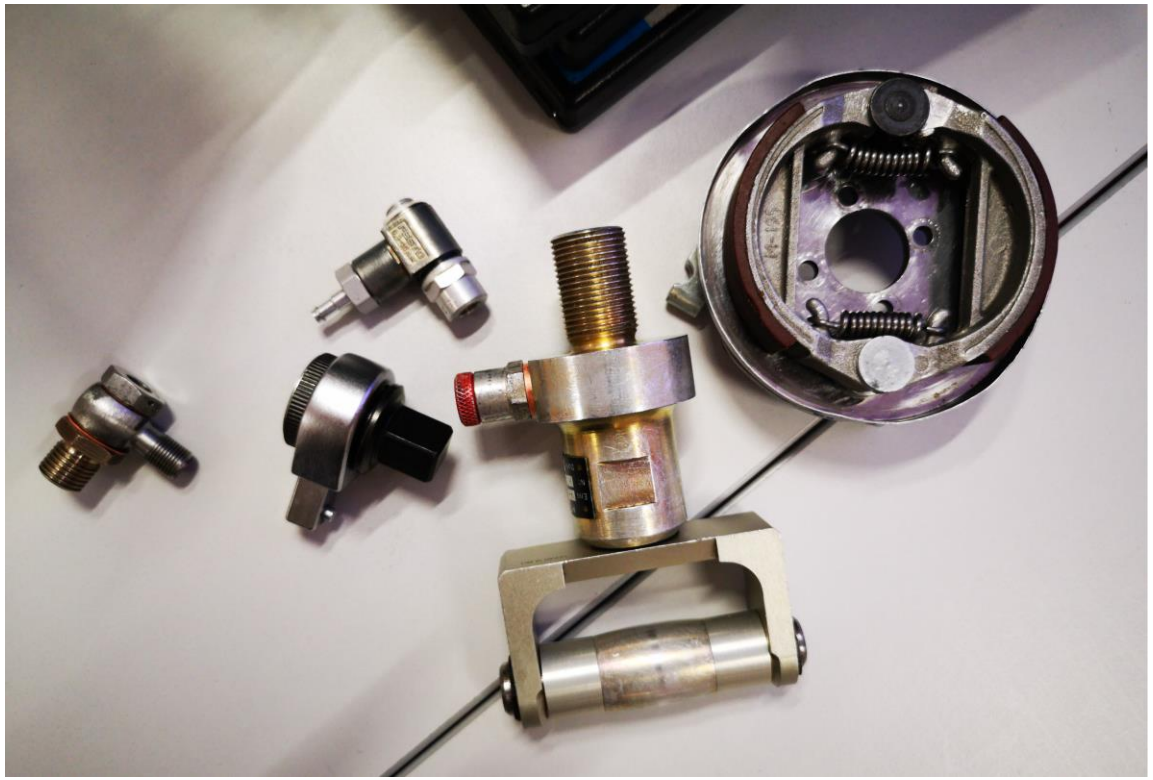
SECOND WEEK – REVERSE ENGINEERING PROJECT

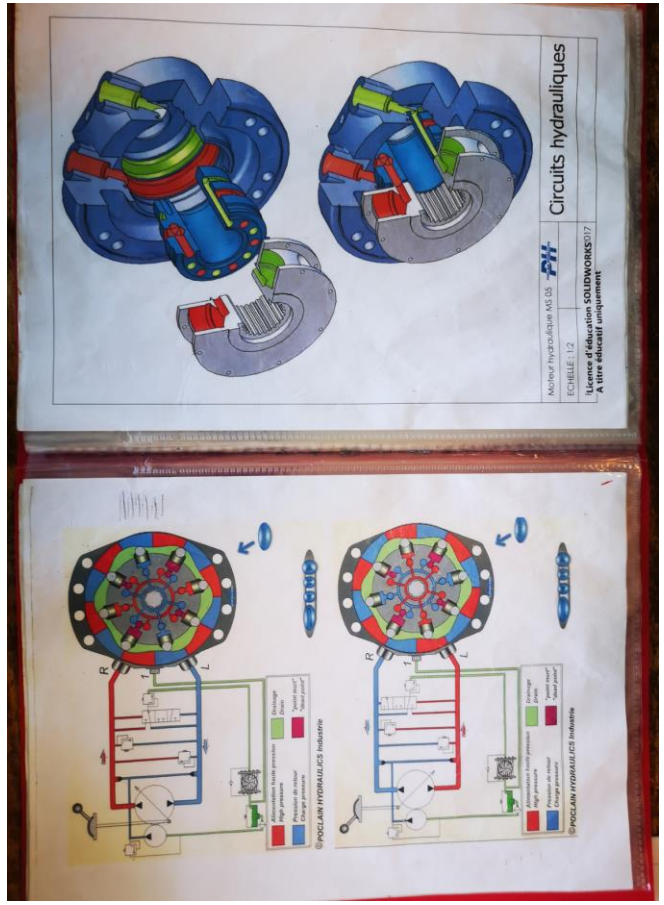
- Project presentation in English: reverse engineering

- Brake drum
- Hydraulic Jack
- Rachet insert
- Oil inlet
- Ball joint
- Expansible Hub
- Festo inlet

- Desribe function, material, manufacrure
- Measure dimensions
- Cerate an assembly in software



LABORATORY - OBESERVATION



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LABORATORY - OBESERVATION

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VISIT OF LABORATORIES AND WORSHOPS

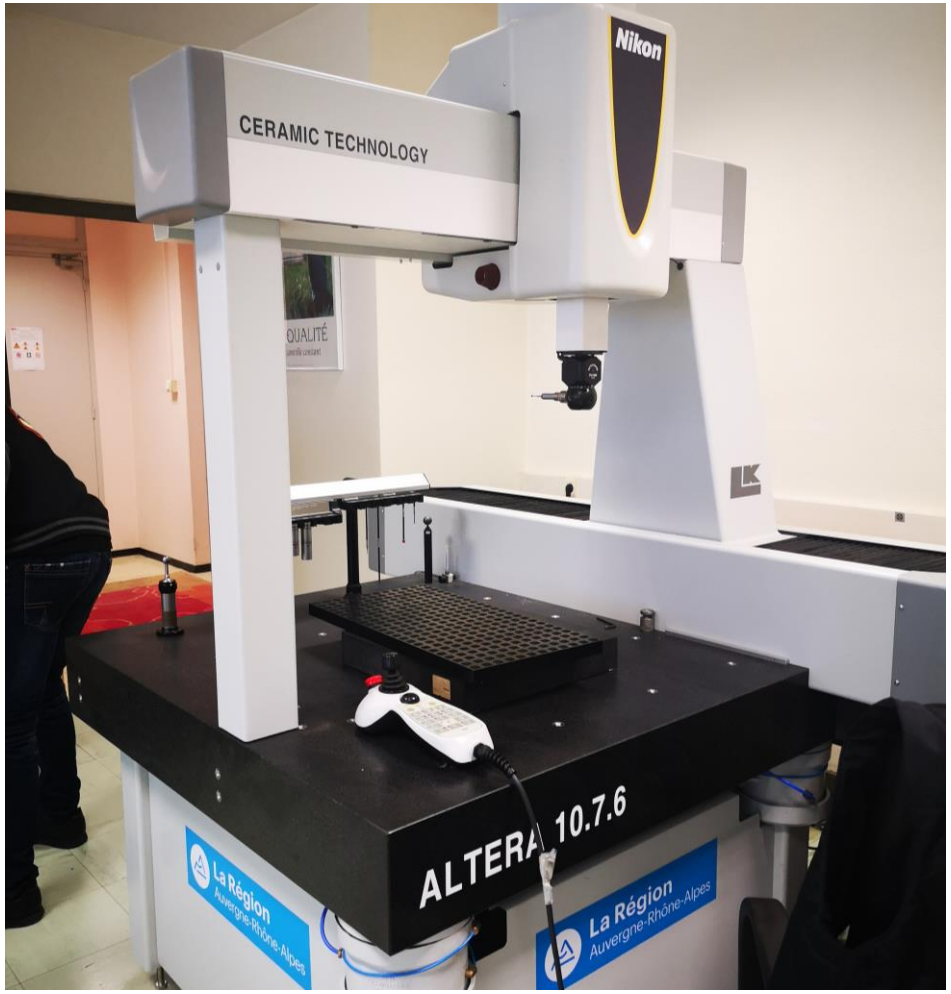
- 3D printing

VISIT OF LABORATORIES AND WORSHOPS

- 3D printing

VISIT OF LABORATORIES AND WORSHOPS

- Metrology
- Faro laser arm, Faro LIDAR, Nicon CMM
- Catia reverse engineering modul



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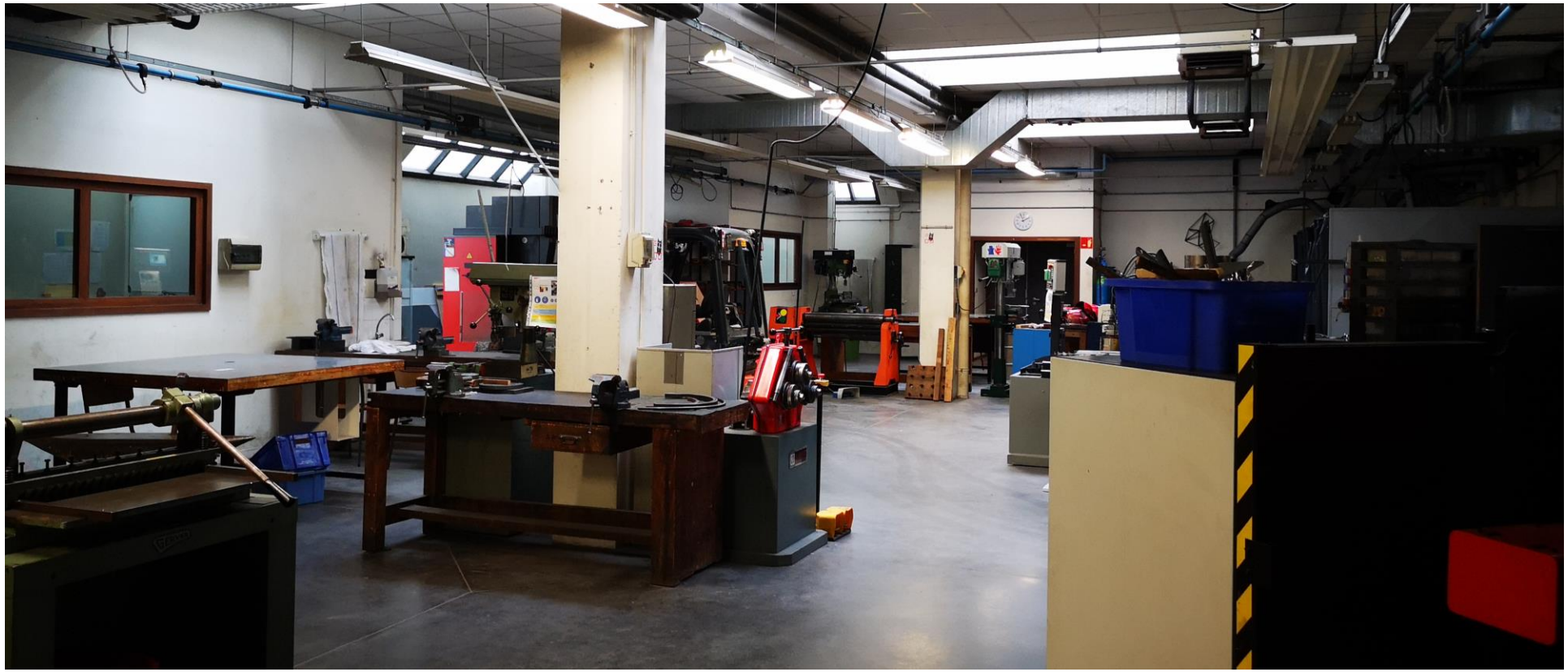
VISIT OF LABORATORIES AND WORSHOPS

- workshop



VISIT OF LABORATORIES AND WORSHOPS

- workshop

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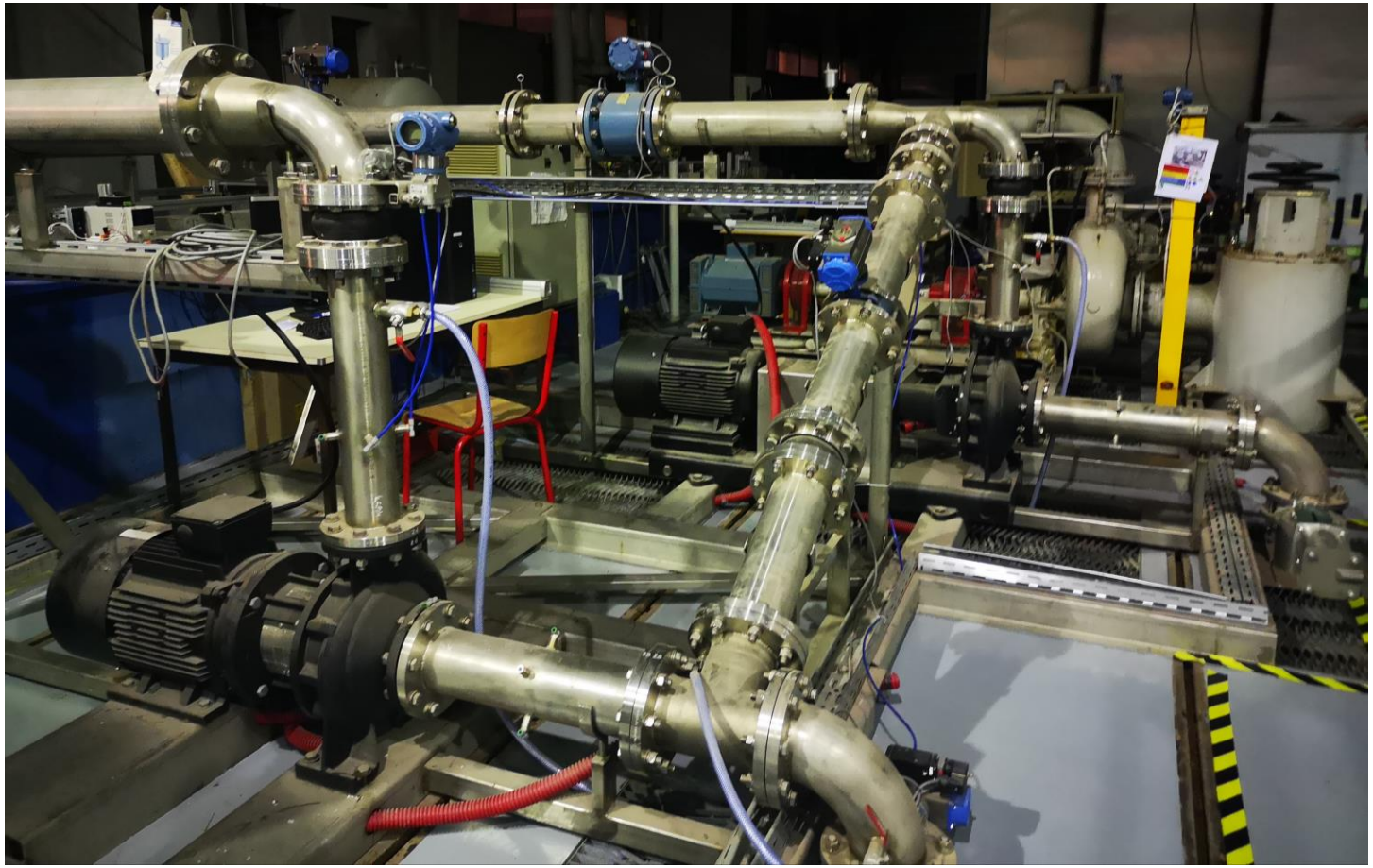
VISIT OF LABORATORIES AND WORSHOPS

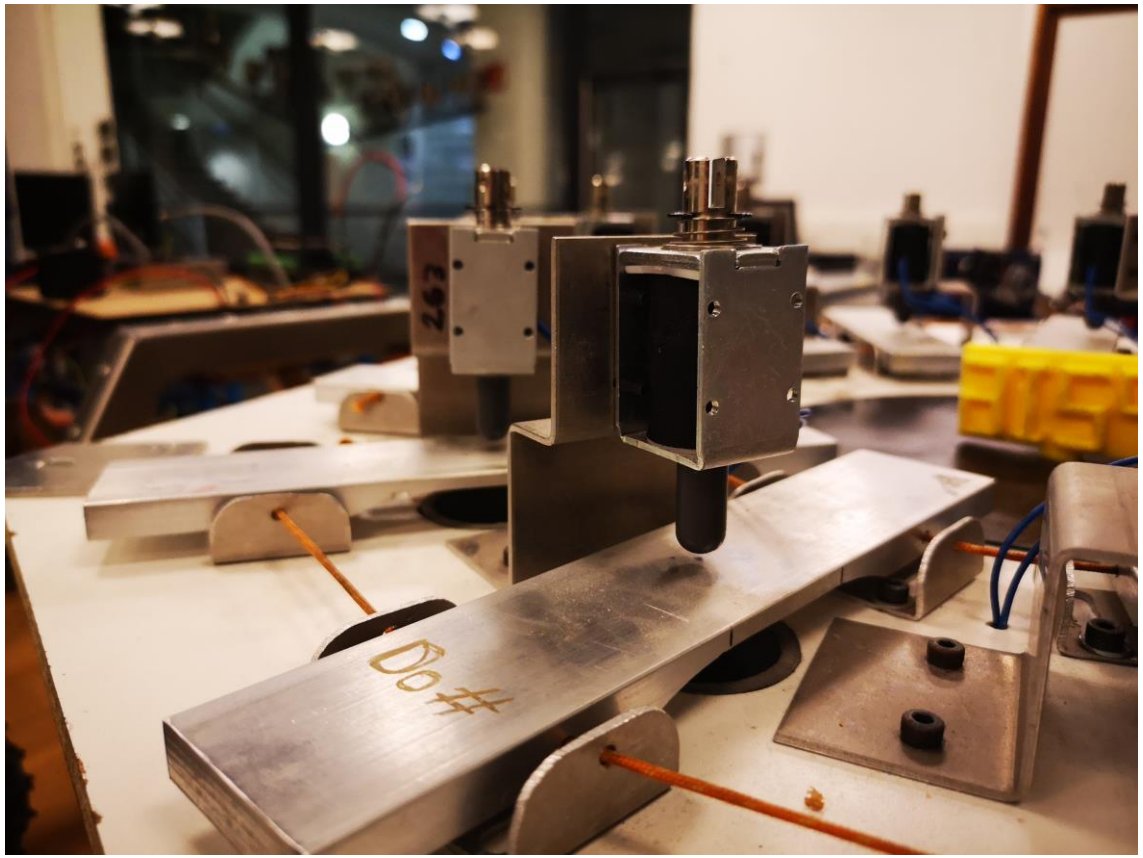
- workshop

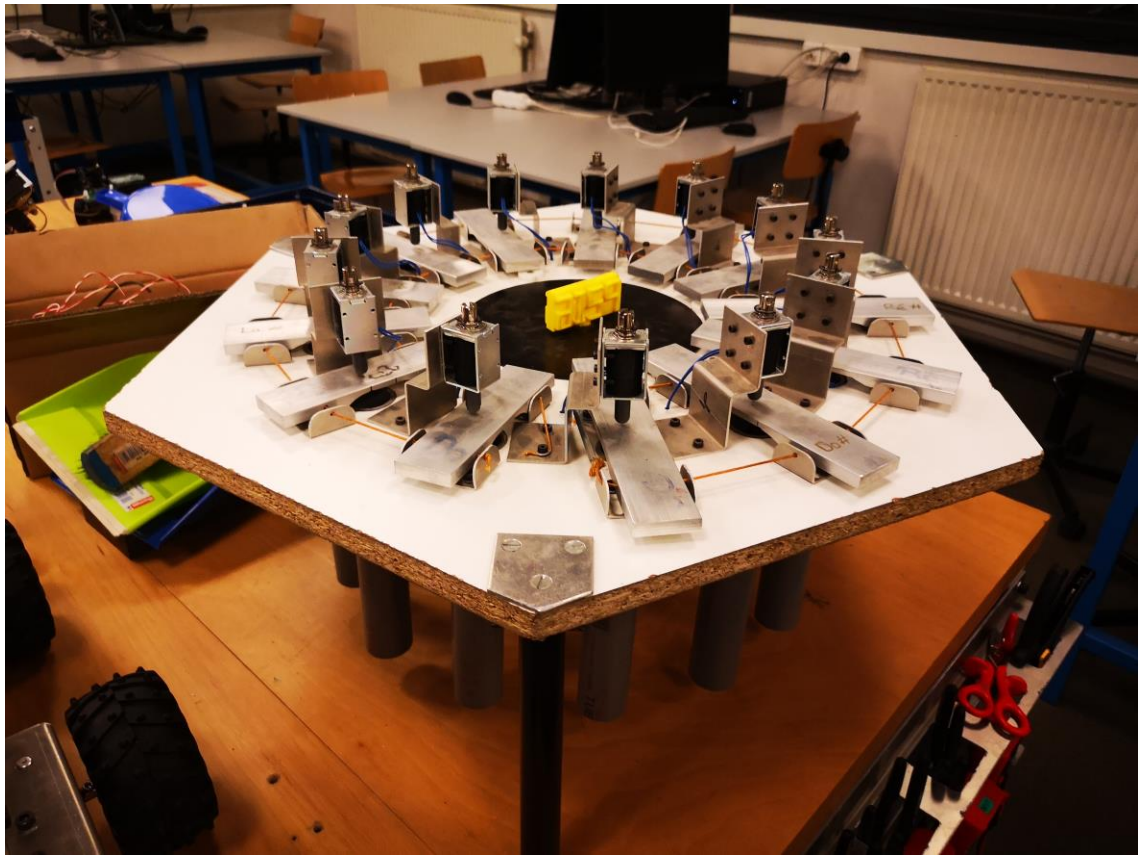
VISIT OF LABORATORIES AND WORSHOPS

- research workshops



PROJECT ORIENTED EDUCATION





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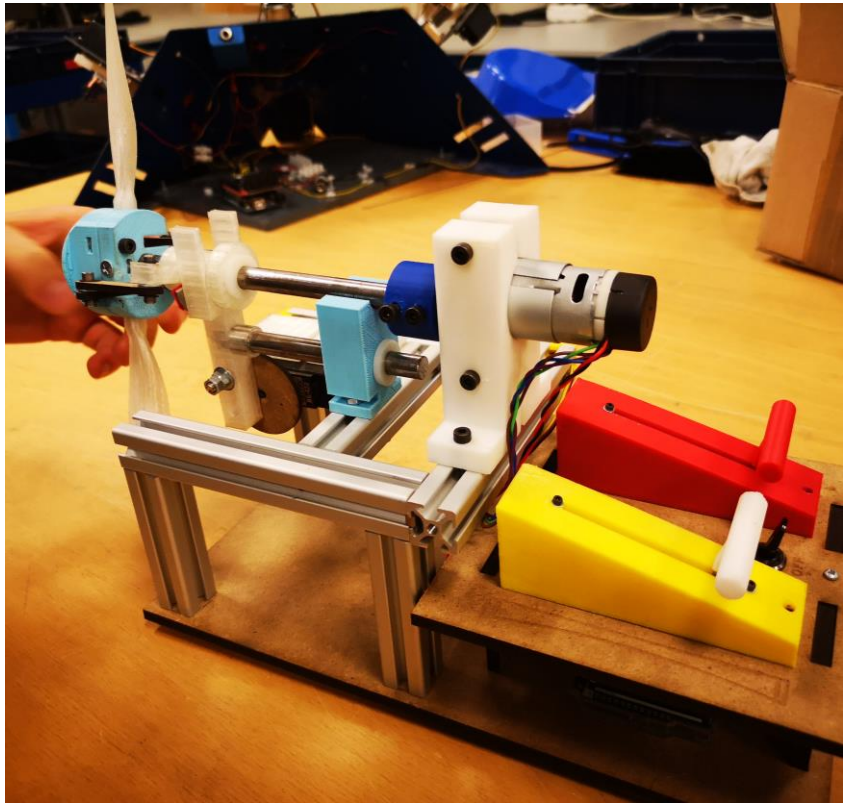
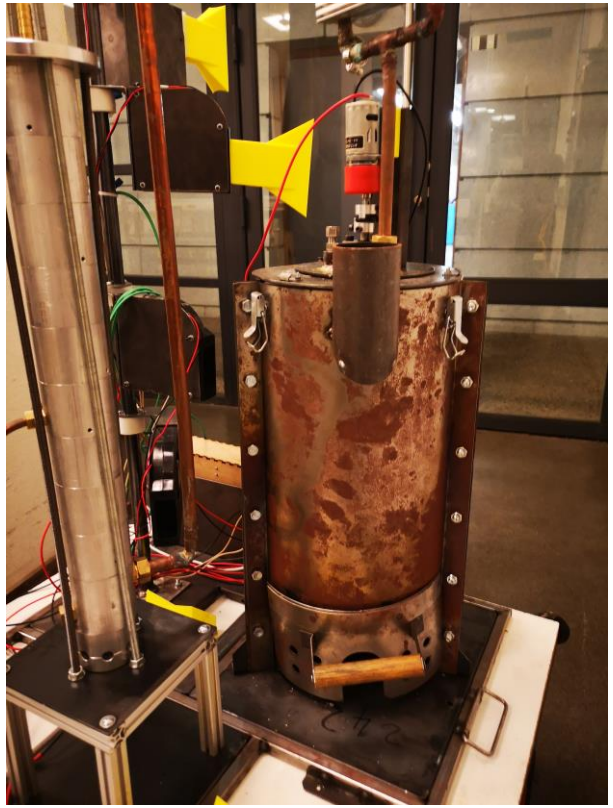
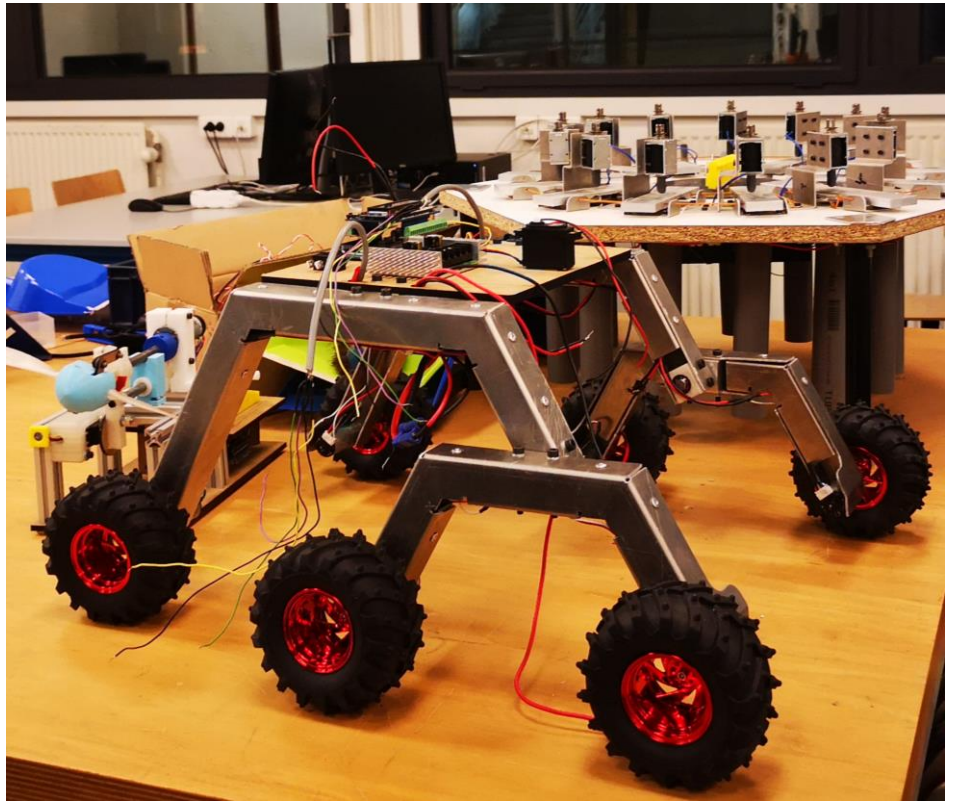
PROJECT ORIENTED EDUCATION







WHAT SUPRISED ME

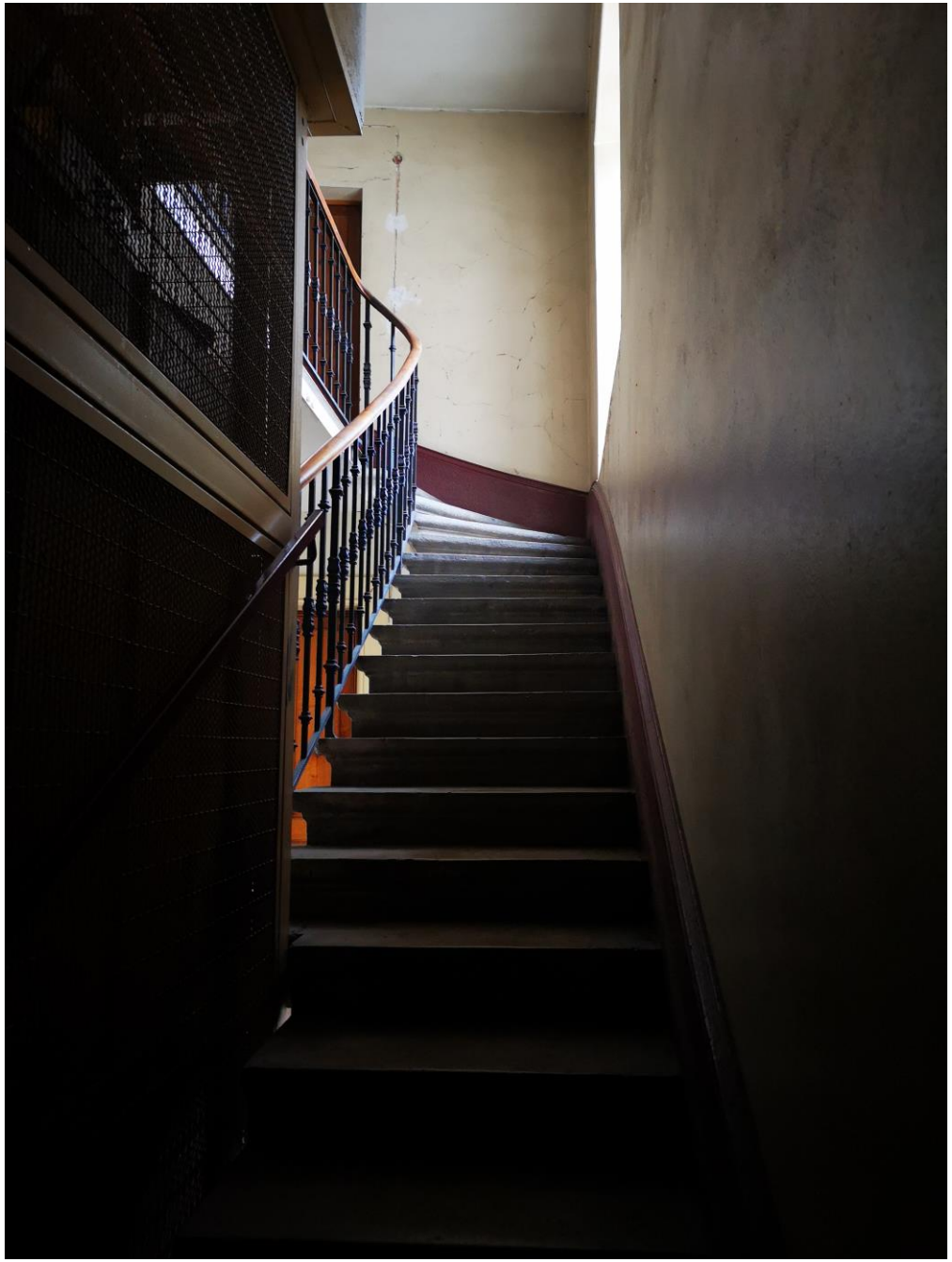
- printed materials for each student for all seminars
- a large percentage of female students
- a large percentage of female lecturers, lot of employs as a lecturers
- orientation on ecology
- old buildings – not very pretty (problem with Eternit)

FOOD

- no buffett in the campus ☹
- students‘ club – e.g. has their own shop in the campus
- mensa food – ca 6 € but not very good
- 2 main courses + 2 side dish, large selection of appetizers and desserts
- free mayo, cekchup, olive oil, balsamico ☺

MY FLAT

- Airbnb – price slightly higher than subsidy…
- Close to Charepen – one of main public transport hubs
- 8 minutes to the INSA by tram
- all shops nearby



PARK

- biggest city park in France
- zoo with free entrance, run for turtles and fallow deers :D
- botanic garden
- trails for jogging, cycling
- lake and lot of more…

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VÉLOV BYKES

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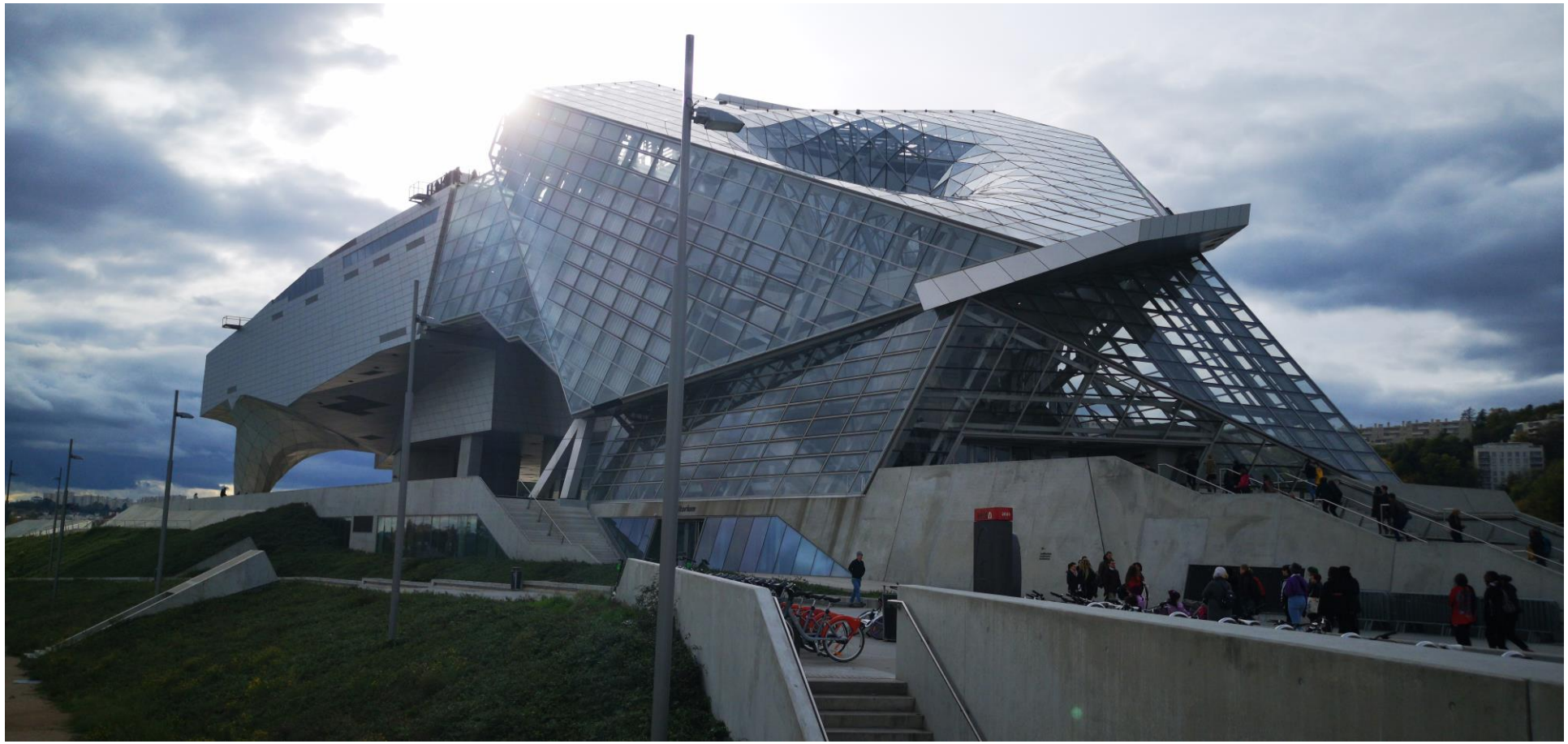
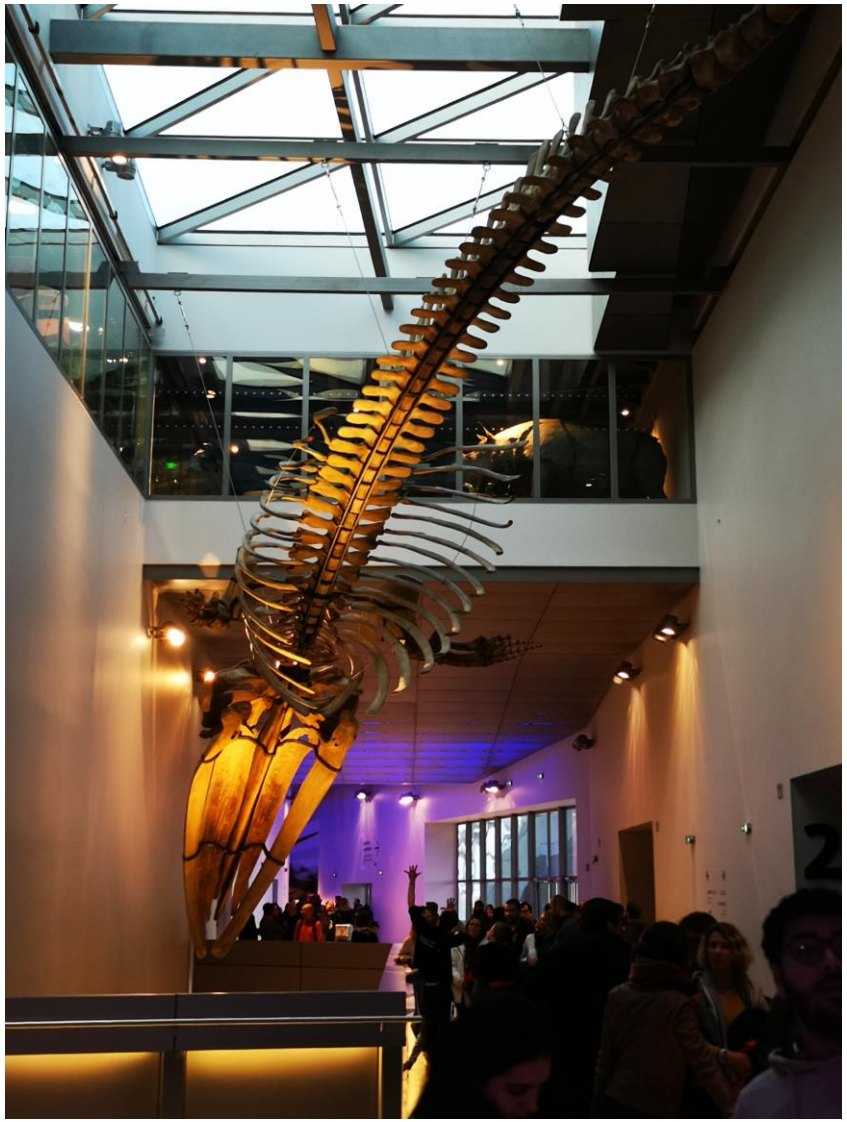
Musée des Confluences



Musée des Confluences



THANK YOU FOR YOUR ATTENTION

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