Materials Selection
(MECA0462-2)
Lectures schedule

Prof. Anne Mertens

Prof. Davide Ruffoni

Academic Year 2018-2019

Montefiore (B28) R3 – 9h-12h

Materials Selection

Duration
26h Th, 26h Pr, 30h Proj., 1d FW
5 Credits

- Master in aerospace engineering, professional focus in turbomachiner aeromechanics (THRUST) (Erasmus mundus)
- Master in aerospace engineering (120 ECTS)
- Master in biomedical engineering (120 ECTS)
- Master in chemical and materials engineering (120 ECTS)
- Master in electro-mechanical engineering (120 ECTS)
- Master in mechanical engineering (120 ECTS)

Schedule available on:
http://www.metaux.ulg.ac.be/metaux/index.php?page=selection_des_materiaux

Materials Selection

- **Course contents**:
  - **Description and use of different types of materials: metals, ceramics, polymers and composites**. Origin and optimization of mechanical and physical properties of materials.
  - **Selection of the optimal material in function of the required mechanical and/or physical properties.** Concept of selection of materials for a typical application (high temperature, optical property,..). Practical cases of materials selection.
- **Learning outcomes of the course**: To choose the best material required by a particular application or for particular properties
- **Prerequisites**: PHYS0904 : Physics of materials

Materials Selection

- **Planned learning activities**:

  1. **Lectures**

  2. **Workshops** : Use of the CES software (Ashby method) to select a material ; groups of 3-4 students

  3. **Team work** on the design of a part (selection and optimization of the required material), in English; groups of 3-4 students

  Check the page Materials Selection in the website for all the news and info

- Website (slides+practical aspects): www.metaux.ulg.ac.be

Materials Selection

- **<u>Lecture notes</u>**:

  Potentially, The slides of every lesson will be available the same day of the lesson

  Course material available on Dropbox

- **<u>Evaluation</u>**

  - Written Exam* $\rightarrow$ 70%

  - Project$\rightarrow$ 30% (Report + Oral Presentation)

  * Mark < 8/20 either for the theoretical exam with one of the teacher, or for the project will not obtain a total mark higher than 9/20.

Materials Selection

Schedule:

18/09 - A. Mertens: Metals (+ Subdivision of the students for the workshops during the coffee break)

25/09 - A. Mertens: Metals

02/10 - A. Mertens: Metals
09/10 - T. Maurizi Enrici : Case study Lesson 1
16/10 - D.Ruffoni: Ceramics

Practical workshop 1

23/10 - D.Ruffoni: Ceramics and Polymers

27/10 - **Delivery of the Topics for the Project**

06/11 - T. Maurizi Enrici : Case study Lesson 2

13/11 - A. Mertens and D. Ruffoni : Composites

Practical workshop 2

20/11 - T. Maurizi Enrici : Case study Lesson 3 + Questions about the project
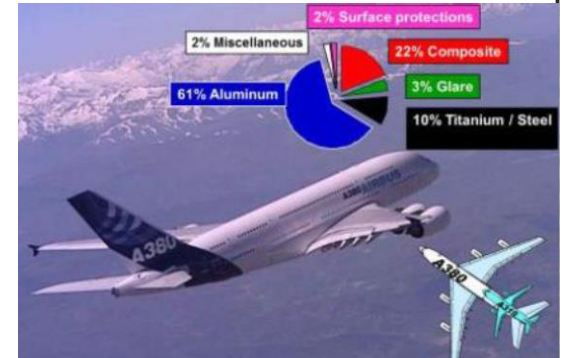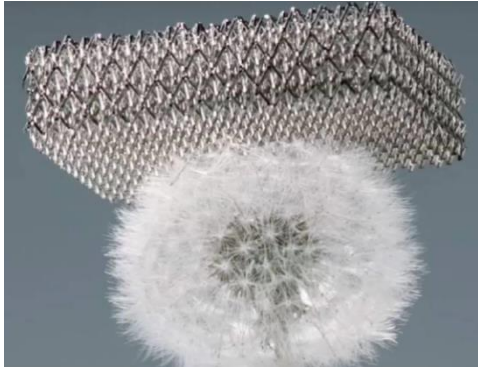27/11 - **Delivery of the Report**

27/11 - **Dimitri GUEUNING (Sonaca)** : Aerospace materials
04/12 - Presentation of students work
11/12 - Presentation of students work

18/12 - Questions session

Materials Selection

- **Particular lesson** 27/11/2018(morning):

  Dimitri Gueuning SONACA: Aeronautical and mechanical materials → **MANDATORY (1h30)**

  +

  Questions sessions

Materials Selection

Project Schedule:

09/10 - T. Maurizi Enrici : Case study Lesson 1

Practical workshop 1

27/10 - **Delivery of the Topics for the Project**

06/11 - T. Maurizi Enrici : Case study Lesson 2

Practical workshop 2

20/11 - T. Maurizi Enrici : Case study Lesson 3 + Questions about the project

27/11 - **Delivery of the Report**

04/12 - Presentation of students work

11/12 - Presentation of students work

Materials Selection : Work (Report+Oral presentation)

- Research work based on CES software, handbooks, bibliography etc….

- Delivery of the Topics for the Project *: **October 27th 2018***

- ***Deadline for asking for help: November 20th 2018***

- Report **Deadline**: **November 27th 2018**

- Oral presentation : **December 4th and 11th 2018**

- Organisation:
  - ❖Organization of the groups on September 18th (NOW): **During break at 10h30**
  - ❖Groups of 3-4 students for the **final report** (same section)

Materials Selection

Please complete the list (except the column G) on YOUR chosen day

Aerospace Engineering

Xday afternoon	*Type **AERO** = Normal Master in Aerospace Engineering **TH** = THRUST **BLOC1** = Program adapted for students holding a bachelor's degree in Physical Sciences

	Surname (Nom)	Name (Prénom)	E-mail	Type	G
1	Smith	John	John.smith@uliege.be	...	1
2	Maurizi Enrici	Tommaso	Tommaso.maurizi-enrici@uliege.be		
3					
4					
5					
6					
7					
8					

Materials Selection :
Workshops during afternoon (PW1 and PW2)

- Practical Workshop (PW) are planned in October and November. **Two sessions per day (13h30-15h and 15h30-17h00)**
  - Possible day for PW1: October **16th or 17th or 18th** (two of them depending on your lessons)
  - Possible day for PW2: November **13th or 14th or 15th** (two of them depending on your lessons)
- Final Schedule: Check the Website Aero-Thrust-Electrom-Meca (September 25th for problems)

Materials Selection :
Workshops during afternoon (PW1 and PW2)

- IMPORTANT!!! <u>Contact</u> → Tommaso Maurizi Enrici

<u>tommaso.maurizi-enrici@uliege.be</u>

<u>email **subject**</u>**: SELECTION1819**

1. Remember the group number (I will communicate you during the break; example: Group 1) and write it in the mail

2. All the members of the group must be in copy

3. Communicate the responsible of the group (**ONLY** he/she will have access to the files and will receive the news)

Materials Selection

- Contact:
  - Professor A. Mertens

    anne.mertens@uliege.be

  - Professor D. Ruffoni

    druffoni@uliege.be

  - Teaching Assistant Tommaso Maurizi Enrici

    tommaso.maurizi-enrici@uliege.be

www.metaux.ulg.ac.be

ERASMUS? → ASK IMMEDIATELY A MEETING TO TOMMASO MAURIZI ENRICI

SURPRISE TEST
does <u>not</u> count for the final marks

University of Liège
Exam: Materials Selection (MECA0462-2)
Prof. A. Mertens and D. Ruffoni

Name: ……………………….
Serial number: ………………………
Monday, September 10, 2018

Level test

- *At first write your name and your serial number at each page*
- *Reply to the questions staying as much as possible on **the given** space.*

What is

20 MINUTES
Keep filling the lists