Science and Society 1/Citizens and Sciences

1. Introduction - ESME Engineering degree: Technical skills focus

Within the framework of the MIR teaching unit (energy efficient engineering), the Sciences and Society 1 module aims to transmit the following skills to engineering students:

- Critical Thinking about innovation: identify the societal and environmental issues related to technical progress, understand how to measure them, suggest solutions to reduce negative impacts and take them into account when developing a project.

- Master the Sustainable Development Goals (SDGs): Know how to determine which ones are compatible/incompatible with each solution, and integrate them in a project.

- Documentary research: Know how to select the most important parts of a document, synthesize them, and present them. Know how to conduct a documentary research independently. Have the reflex to go towards the most reliable information. Verify the information.

- The Art of oral Presentation

- Ethics in Engineering

2. General organization of lessons

o Distribution of Lectures/ Tutorials/ General studies/ Practical exercises/ Projects

All the sessions are tutorials.

o Teaching method

Classes will be taught every other week.

Each class will participate in 7 face-to-face sessions of 1.5 hours per semester.

Between each session, students will have to follow active learning lessons on Moodle.

o Assessments

The evaluation of Science and Society 1 is composed of one teacher grade and 2 MIR project grades:

- **Teacher grade:** application of concepts during class and implication,
- **Mock MIR exam midsemester:** Based on a set of documents, the student will have to apply the elements seen in lectures and, in writing, present the SDGs, the issues, and the possible improvements related to an innovation.

- **MIR final project:** Knowing how to mobilize the notions of Science and Society in a transversal project mobilizing all the skills acquired in UE 2 Responsible Engineering Method (MIR)

3. Program

o Module coordinator

Marie Layoun

o Teachers

Paris: Franck Moringue + Benedict O'Donnell (English section)

Lille: Arnaud Kaminski

Lyon: Clara Perrin

Bordeaux: Olivier Roca

o Syllabus of the module

1. Introduction (presentation of objectives/skills, grading, program...)

The rest of the sessions will address themes related to socio-technical issues that will be debated in class via a dynamic pedagogy (flipped classroom, discussion games...). These themes will be based on an abundance of pedagogical, cultural and/or topical documents in different forms (newspaper or specialized press articles, excerpts from books and novels, films, documentaries, Internet sites...). The following list gives an idea of the possible themes, knowing that the choice is free as long as the students tackle one theme per session:

2. Documentary research on the technical and digital revolution (GAFAM)
3. Documentary research around the technical and digital revolution (pitch?)
4. Sustainable development goals
5. Eco-engineering and its limits (DNA scissors, cloud creation, ...)
6. Biomimicry
7. Low Tech, Limits of the planet, circular economy, overconsumption, product life cycle

o Required skills

- Intellectual curiosity
- Critical thinking
- Cultural knowledge - Scientific culture
- Group work
- Oral presentation
- Correct written expression