Sustainability in the EPFL curriculum

Charlotte Vandenberghe & Jacopo Grazioli
On the menu today...

1. Sustainability: WHAT it is and WHY should you care
2. Opportunities at EPFL to include sustainability in your master
   A. Masters and Specializations/Orientations
   B. Interdisciplinary Minors
   C. Projects and Internships
3. Contact details
4. Q/A
The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015; a universal call to action to end poverty and protect the planet by 2030.

Sustainability improves the quality of our lives, protects our ecosystem and preserves natural resources for future generations.

The 17 SDGs are interconnected: action in one area will affect outcomes in others.

Sustainability includes a time component, and has an ecological, economic, and social dimension.
Sustainability: a rising trend?

The word sustainability emerges in time of CRISIS or SHORTAGES in resources.

- 1713: Hans Carl von Carlowitz
- 1972: Club of Rome
- 1987: Gro Bruntland
- 1992: UN Member States
- 2015: Agenda 21: Programme of Action for Sustainable Development
• EPFL is hosting the 2024 SEFI Conference on “Educating Responsible Engineers” (2 to 5th Sept. 2024, STCC).

• Building a socially and environmentally sustainable society is intrinsically linked to the work of engineers and scientists.

• Each and every one of the SDGs requires solutions which are rooted in science, technology and engineering (UNESCO).

[Archimedes Oath]

Taking into account the life of Archimedes of Syracuse, who illustrated in Antiquity the ambivalent potential of technology,
Taking into account the growing responsibility of engineers and scientists in regards to Nature and Human lives
Taking into account the importance of ethical problems raised by Technology and its applications,

Today, I swear to the following engagements, and promise to strive to attain the ideal they represent:

• I will practice my profession with the good of all people in mind, respecting human rights* and environmental sanctity.
• I will take responsibility for my actions, having informed myself to the fullest extent, and will in no case discharge such responsibility on others.
• I will strive to perfect my professional abilities.
• In choosing and completing my projects, I will pay attention to their context and their consequences, particularly with respects to technical, economic, social, and ecological aspects, and will strive for the respect of the environment.
• I will be especially careful in regards to any military uses that my work could have.
• I will contribute to preserving the environmental and social integrity of our planet.
• I will contribute to the best of my abilities to the promotion of equity for all human beings, and will help construct a just society for all.
• I will rigorously and honestly transmit any information to carefully chosen persons, if such information represents a necessary knowledge or if holding it back puts anyone in danger. In the latter case, I will ensure that such information leads to concrete actions.
• I will not let my personal or professional interests take precedence over what I deem to be just.
• I will, to the best of my ability, strive to encourage those who surround me, in both my personal and professional life, to follow the ideals of the present oath.
• I will practice my profession in a context of intellectual honesty, with conscience and with dignity.

I promise solemnly, freely, and on my honour.

* According to the UN Universal Declaration of Human Rights

[https://www.epfl.ch/education/educational-initiatives/the-center-for-learning-sciences-learn/sefiepfl2024/]
EPFL Alumni about environmental responsibility:

- **30%**: “sustainability is missing in the EPFL curriculum”
- **60%**: “my environmental and sustainability skills are weak”

“We should prepare students for the work of the world not only for the world of work”

(Johnaton Porritt)
Sustainability & the job market

Fastest growing job postings on LinkedIn 2018-2022

1. Talent Acquisition Associate
2. Sustainability Analyst
3. Sales Development Representative
4. Customer Success Analyst
5. Sustainability Specialist
6. Customer Success Associate
7. Growth Marketing Manager
8. Talent Acquisition Partner
9. Sustainability Manager
10. Workplace Coordinator


Jobs.ch

Industry

- Banking / Financial institutions: 79
- Sustainability: 5
- Retail trade / Wholesaling: 90
- Other industries:
  - Agriculture / Forestry / Wood
  - Building trade / Real estate
  - Catering / Hotel
  - Chemicals / Pharmaceuticals
  - Commercial operation / Skilled crafts
  - Consulting various
  - Consumer / Luxury goods Industry
  - Education
  - Health care / Social services
  - Industry various
  - Information technology / Telecom.

633 Sustainability job offers
The climate and sustainability challenges we face are urgent and require interdisciplinary and holistic approaches. EPFL is committed to integrating sustainability into its three core missions of education, research and innovation.
“We aim to provide a sustainability-oriented education to our entire community, instructing scientists, engineers, and architects on the environmental and societal issues they will face, and on their responsibility to help build a sustainable society”

TWO CORE GOALS FOR EDUCATION:
1. Introduce a mandatory sustainability class for all Bachelor’s students by 2024
2. Add field-specific sustainability classes to all our degree programs starting in 2023
# Field-specific sustainability courses at Master level

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Description</th>
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<tbody>
<tr>
<td>AR-496</td>
<td>Behind/Beyond future cities</td>
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<tr>
<td>AR-497</td>
<td>Building design in the circular economy</td>
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<tr>
<td>BIO-413</td>
<td>Planetary Health</td>
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<tr>
<td>CH-407</td>
<td>Sustainable chemistry and chemical engineering in industry</td>
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<tr>
<td>CIVIL-534</td>
<td>Computational systems thinking for sustainable engineering</td>
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<tr>
<td>DH-415</td>
<td>The ethics and law of artificial intelligence</td>
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<tr>
<td>ENG-436</td>
<td>Food biotechnology</td>
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<tr>
<td>ENV-402</td>
<td>Water, sanitation and solid waste for development</td>
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<tr>
<td>ENV-409</td>
<td>Air pollution</td>
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<tr>
<td>ENV-410</td>
<td>Science of climate change</td>
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<td>ENV-471</td>
<td>Environmental economics</td>
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<tr>
<td>ENV-526</td>
<td>Climate and water sensitive urban design</td>
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<tr>
<td>ME-468</td>
<td>Solar energy conversion</td>
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<tr>
<td>ME-516</td>
<td>Lifecycle performance of product systems</td>
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<tr>
<td>MGT-406</td>
<td>Design in Innovation: creation for adoption</td>
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<tr>
<td>MGT-450</td>
<td>Technology, sustainability and public policy</td>
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<tr>
<td>MGT-536</td>
<td>Legal aspect of sustainability &amp; digitalisation</td>
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<tr>
<td>MSE-433</td>
<td>Towards sustainable materials</td>
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Ask your section about specific implementation of the strategy and course availability!

Sustainability curriculum options at EPFL

MASTER + SPECIALIZATIONS & ORIENTATIONS

- Environmental Sciences and Engineering
  - Water resources management
  - Climate change anticipation and adaptation
  - Environmental sensing and computation
  - Biological and chemical processes in env. engineering
- Energy Science and Technology
- Chemistry and Chemical Engineering
  - Catalysis and Sustainable Chemistry/Engineering
- Sustainable Management of Technology
- Civil Engineering
  - Transport and mobility
  - Urban energy
- Architecture
  - Cities and Territories
  - Sauvegarde and Resources

INTERNSHIPS
Sustainable internship label (stage durable)

PROJECTS
Master / Semester projects
MAKE projects

COURSES
SHS offer
Optional courses

INTERDISCIPLINARY MINORS

- Engineering for Sustainability
- Energy
- Territories in Transformation and Climate
- Integrated Design, Architecture and Sustainability

SUSTAINABILITY EDUCATION STRATEGY
Implementation in every section!
Curriculum options at EPFL (1)

MASTER + SPECIALIZATIONS & ORIENTATIONS

- Environmental Sciences and Engineering
  - Water resources management
  - Climate change anticipation and adaptation
  - Environmental sensing and computation
  - Biological and chemical processes in env. engineering

- Energy Science and Technology
  - Energy Conversion Devices
  - Energy Systems
  - Energy Management and Sustainability

- Chemistry and Chemical Engineering
  - Catalysis and Sustainable Chemistry/Engineering

- Sustainable Management of Technology

- Civil Engineering
  - Transport and mobility
  - Urban energy

- Architecture
  - Cities and Territories
  - Sauvegarde and Resources
Environmental Sciences and Engineering

Master and Specializations

- Water resources and management
- Environmental sensing and computation
- Climate change anticipation and adaptation
- Biological and chemical processes in env. engineering
Energy Science and Technology

Specialized master

3 orientations

Energy Conversion Devices
Energy Systems
Energy Management and Sustainability
The chemical industry is Switzerland’s largest manufacturing sector, generating around 5% of the country’s gross domestic product, 45% of exports, and almost half a million jobs globally. It is also the largest consumer of oil and gas and is the second largest industrial emitter of greenhouse gases.

“The goal of the specialization is to educate the future generation of chemists and engineers to be ready to meet these challenges.”

Specialization in Catalysis and Sustainable Chemistry/Chemical Engineering – SCGC - EPFL
Goal: bridge the gap between economy, management, and technology

Multi-institutional: 3 alumni networks, 3 career centers, 3 industrial partners networks

Inter-disciplinary, industry-project-oriented
Civil Engineering

Specializations

Transport and Mobility

Urban Energy

(emerging market needs!)
Cities and Territories
“a concrete potential for the construction of an enduring and innovative urban dimension”

Sauvegarde and Resources
“building within the built and preserving resources”
INTERDISCIPLINARY MINORS

- Engineering for Sustainability
- Energy
- Territories in Transformation and Climate
- Integrated Design, Architecture and Sustainability

Ask your section about your possibilities of minors!

- All interdisciplinary minors correspond to 30 ECTS that must be acquired during the Master’s studies.
- The minor is mentioned in the Diploma Supplement.
- In general, interdisciplinary minors are open to all EPFL Master’s students, provided that their curriculum offers the possibility of taking a minor.

- Engineering for Sustainability – ENAC - STI - EPFL
- Energy – STI - EPFL
- Territories in Transformation and Climate – ENAC - EPFL
- Integrated Design, Architecture and Sustainability – ENAC - EPFL
Curriculum options at EPFL (3)

INTERNSHIPS
with sustainability learning potential

- Sustainable Internships label

PROJECTS

Master / Semester projects
MAKE projects (associative projects)

You can make a master project with professors outside your section

- MAKE Projects – Educational initiatives - EPFL
Sustainability coaching for your projects

Objective: help students make the best use of existing EPFL opportunities to learn sustainability-related skills.

Get in touch with (michka.melo@epfl.ch)
Complementary options: SHS courses

Many SHS courses are an excellent interdisciplinary training for sustainability!

COURSES

- **Design for sustainability**
  - HUM-397 / 3 credits

- **Thinking the nature**
  - HUM-408 / 3 credits

- **Critical thinking**
  - HUM-425 / 3 credits
  - Teacher: Spermerd Zsuzsanna Viktória

- **The ethics of engineering**
  - HUM-412 / 3 crédits

NEW soon: **Teaching Sustainability**
Questions on **sustainability education** at EPFL?
Jacopo Grazioli (jacopo.grazioli@epfl.ch): head of sustainability education (VPT)

Interested in the interdisciplinary minor: **engineering for sustainability**?
Charlotte Vandenberghe (charlotte.vandenberghe@epfl.ch): project manager and minor coordinator (ENAC)

Interested in sustainability coaching, for projects and beyond?
Michka Mélo (michka.melo@epfl.ch): sustainability coach and lecturer (VPT)

Do you want to engage beyond the credited cursus (i.e. associations)?
Guillaume Rueff (guillaume.rueff@epfl.ch): Sustainability community engagement manager (VPT)
WELCOME TO EPFL

Thank you for your interest!

QUESTIONS?