Meeting: 8th December 2023
Pierre-Yves Gilliéron, SIE Deputy Head
Christina Treier, SIE Administrator

EPFL-Section des Sciences et Ingénierie de l'Environnement
Agenda

• Goals
• Skills
• Cycle of the design
• Work Organization
• Agreement, Budget
• Starting the DP
• Report & Presentation
• Important Dates

Source: http://datadrivenaid.org
Context and Goals

• The goal of the Design Project is to put your knowledge in practice within the context of professional work
• A team of students will be working as a consultancy company
  • Customer: company, administration
  • Mandate: context, objectives, problem to be solved, expectations
  • Salary: evaluation of your work (grade); learning outcomes
  • Responsibility: project management (meetings); searching for information/data; communication; deadlines
Overall Skills

• Using your knowledge in basic sciences and engineering within the context of a real project
• Understanding of a problem
• Defining the needs
• Developing a methodology
• Designing scenarios
• Leading a project and assessing solutions
• Working in a team
Specific & Transversal Skills

• To identify, to express and to solve an engineering issue
  • Defining the project and writing a detailed proposal
  • Analyzing the different and potential options
  • Choosing the best option according to technical constraints and several characteristics
  • Solving a practical engineering issue

• To manage the different steps of the projects

• To communicate in an efficient way: proposal, report, oral presentation

• To work in team and with a partner
Cycle of the Design

- Objectives
- Problem
- Methodology
- Simulation Prototyping
- Adequation with respect to the goals
- Tests
- Design
- Performance Evaluation

EPFL-Section des Sciences et Ingénierie de l'Environnement
Main Milestones of DP

• Identification of the topic and clarification of the problem to be solved
• Organization of the DP
  • Meetings, project proposal, definition of the tasks & planning
• The project proposal must be approved by the partner and by EPFL
• Main tasks
  • Work approach, methodology
  • Collect basic data and information
  • Bibliography and references
  • Development of scenarios/options
  • Presentation of selected options
  • Development of a prototype
  • Solutions assessment
• Communication of outcomes

Gantt Chart

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<tr>
<th>Weeks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Problem Definition</td>
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<td>Concept Selection</td>
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<td>Implementation</td>
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<td>Evaluation</td>
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Work Organization

• DP: Master MA2; Bloc 1; 10 ECTS
• Work load ~ 2 days/week
  • 10 ECTS = 250-300 hours x 2 students
• Working in a team
  • Timeline, description of the tasks
  • Sharing the tasks
  • Distributing the work load during the semester
  • Realistic work flow
Week Organization (W#)

- W1: Kick-off meeting; Partner-Academic supervisor-You
- W2: Signature of the agreement and budget
- W3: Project proposal (3 pages, 10% of the grade)
- W9: Mid-term report, technical paper (4-6 pages, 15%)
- W13: Draft final report for review, setup of poster
- W14: Poster session & Final event
- W15: Final report (50%)
- Oral presentation (25%)
Agreement

- Elements of the agreement
- Bilateral responsibilities
- Topic
- Names of parties
- Signatures
- Company representative
- Academic supervisor
- Students
Budget and Financial aspects

• **Budget**
  - Participation of the SIE Section to the costs
    - Travel
    - Some lab analysis
    - Various costs (small equipment)
  - **Week 2: Submission of the Budget** to the SIE Section (e-mail to christina.treier@epfl.ch)

• **Reimbursement of expenses** (at the end of the DP)

• **Financial responsibility** (one student/group)
  - Keeping accurate accounts
  - Record all the receipts, bills (original documents)
  - To inform the SIE Office (Ch. Treier) in case of budget overrun
Travel

• **Use the public transportation:** keep your receipts/tickets for the reimbursement. No reimbursement for students who have a travel pass (ex. abonnement général)

• Possibility to book a car with Mobility car sharing
  • [https://www.epfl.ch/campus/mobility/vehicles/mobility-carsharing/](https://www.epfl.ch/campus/mobility/vehicles/mobility-carsharing/)
  • Contact [christina.treier@epfl.ch](mailto:christina.treier@epfl.ch) for booking
Varia

• Responsibility for equipment
  • In case of loss, theft and damage
  • Replacement is under the responsibility of the students
  • Use of your own insurance (theft, civil liability)

• Phone
  • No reimbursement of telecommunication expenses
    Use the softphone and/or videoconference applications

• Printing
  • Final report: 20.- /printed bound report; add in the budget
  • Number of copies to be defined with external partner
  • Poster: use the ENAC printing service
    More information will follow in due time
## Starting the DP [SIE; students]

<table>
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<tr>
<th>Activity Description</th>
<th>Date(s)</th>
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<tr>
<td>Collect of proposals and evaluation (SIE ad-hoc committee)</td>
<td>~November 2023</td>
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<td>List of topics on SIE web pages</td>
<td>12th December 2023</td>
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<td>Building groups of 2 students (preferably combine international with french speaking students)</td>
<td>From 12th Dec. 23 until 8th January 2024</td>
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<tr>
<td>Choice and repartition of the topics</td>
<td>From 12th Dec. 23 until 8th January 2024</td>
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<td>Under the responsibility of students (one contact person for the Section)</td>
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<td>Final choice and communication to partners &amp; professors</td>
<td>Mid-January 2024</td>
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<td>Preliminary contacts with external partner and academic supervisor</td>
<td>From January and before the beginning of the Spring semester</td>
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<td>Kick-off Meeting</td>
<td>Friday 23rd February 2024 (or another day during the week)</td>
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Report and Presentation

- **Final Report**
  - Draft version for a review by partner and academic supervisor
  - ~15 pages + Annexes
  - Final version: to be submitted one week after the end of the semester

- **Oral Presentation**
  - 12-16 slides
  - Duration: 20 min (incl. discussion)
  - Scheduled by all parties; after the end of the semester
    • Individual organization by project

- **Poster**
  - Directives and templates provided by SIE Section
  - Public poster session on Friday 31st May, afternoon; incl. Apéro
**Poster**

**Design Project SIE 2023**

**EPFL**

**Quantification of Discharges and Mapping of Surface Runoff in the Jura**

**ATB SA**

**Students:** Araceli Poujol, Rahul Tendulkar

**Company:** ATB, John Beather (Supervision: Bence Sopori)

**Context**
- Surface runoff caused significant damage in the Jura and Jura-districts during the winter of 2021.
- The surface runoff was generated by storms occurring on already saturated soils.
- The intensity of such heavy rainfall events is expected to increase due to climate change.

**Objectives**
- Develop a spatial analysis of the amount of surface runoff for each subcatchment using a software (HEC-HMS) and PRO SIM.

**Methodology**

1. **Topography and buildings**
   - Use the 3D model of the study area for accurate mapping of surface runoff.

2. **Precipitation**
   - Use the precipitation data from the meteorological stations to simulate the amount of runoff.

3. **Soil data**
   - Use a database of soil properties to simulate the infiltration capacity of the soil.

4. **Land use and roughness data**
   - Use the land use data from the study area to simulate the roughness of the landscape.

**Results**

- Figures 1 and 2: Maps of surface runoff for different subcatchments.
- Figure 3: Comparison of observed and simulated surface runoff.

**Conclusion**
- The model shows good agreement with the observed data, indicating its suitability for forecasting surface runoff in the Jura region.

**Design Project SIE 2023**

**SYSTEMATIC TERRITORIAL ANALYSIS OF SWISS MUNICIPALITIES**

**Navitas Consortium SA**

**EPFL**

**Objectives**
- Identify and quantify energy demand and energy sources for each Swiss municipality.
- Calculate the potential for renewable energy sources in each municipality.

**Methodology**
- Use a geographic information system (GIS) to analyze territorial energy data.
- Apply a systematic approach to territorial energy analysis.

**Results**

- Figure 1: Map of energy demand and energy sources in Switzerland.
- Figure 2: Heat map showing energy demand and energy sources by municipality.

**Conclusion**
- The analysis shows that there is significant potential for renewable energy sources in many municipalities, with a focus on solar, wind, and hydro power.

**Legend**
- **Color Codes:** Energy demand, energy sources, renewable energy sources, non-renewable energy sources.
- **Data Sources:** Swiss Federal Office for Energy, Swiss Federal Office for Topography, Swiss Federal Office of Statistics.
DP - Important Dates

- **Friday 23rd February 2024**: 1st meeting between the 3 parties (students, partner and SIE Professor)
- **Thursday 29th February 2024 (12h-13h – place TBD)**: permanence office hour on the information sources (Beast, Google Scholar, Web of Science), and literature search, by Miriam Petrilli, Teaching Librarian
- **Friday 1st March 2024**: submission of the signed contract and budget estimation to the Section (scanned version)
- **Friday 8th March 2024**: submission of the goals, expectations and calendar to the SIE Professor and external partner
- **Friday 26th April 2024**: submission of intermediate report to the SIE Professor and external partner
- **Wednesday 22nd May 2024**: deadline for sending the PDF version of report to the SIE Professor and external partner for comments before finalization
- **Thursday 30th May 2024**, between 13h30 and 15h00: printing of A0 poster at SG 0215 office (ENAC-IT – Benoit Hostettler)
- **Friday 31st May 2024**: poster session of the Design Projects, rooms TBD
- **Friday 7th June 2024**: subm. of the final report version (PDF) to the SIE Professor and industrial partner
- **Between 3rd and 14th June 2024**: oral presentation of the Design Projects
- **Monday 15th July 2024**: submission of the grades to the SAC (by SIE Professors)
QUESTIONS

Web Page: Design Project

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