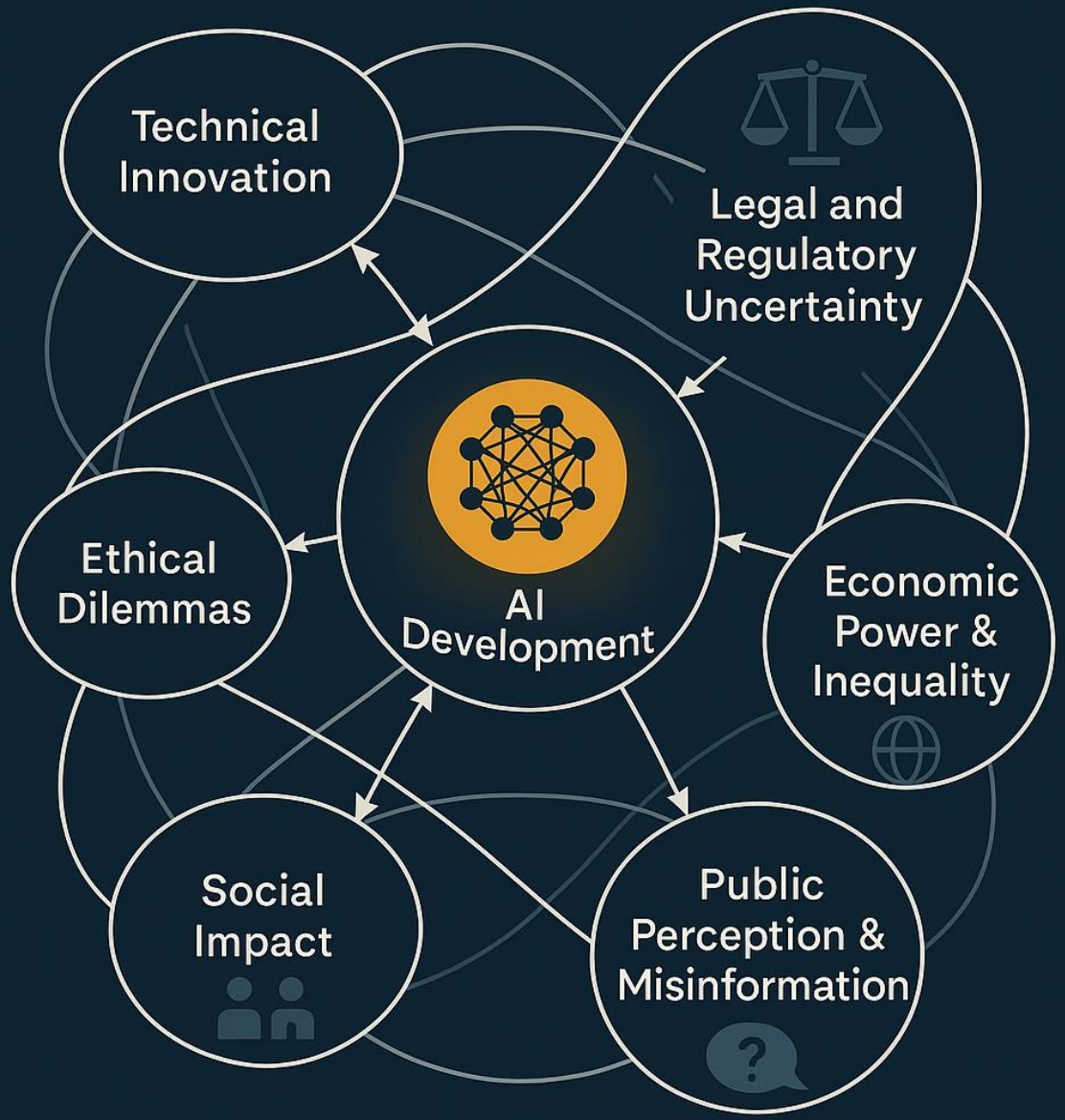


How do we prepare students to deal with this kinds of problem?

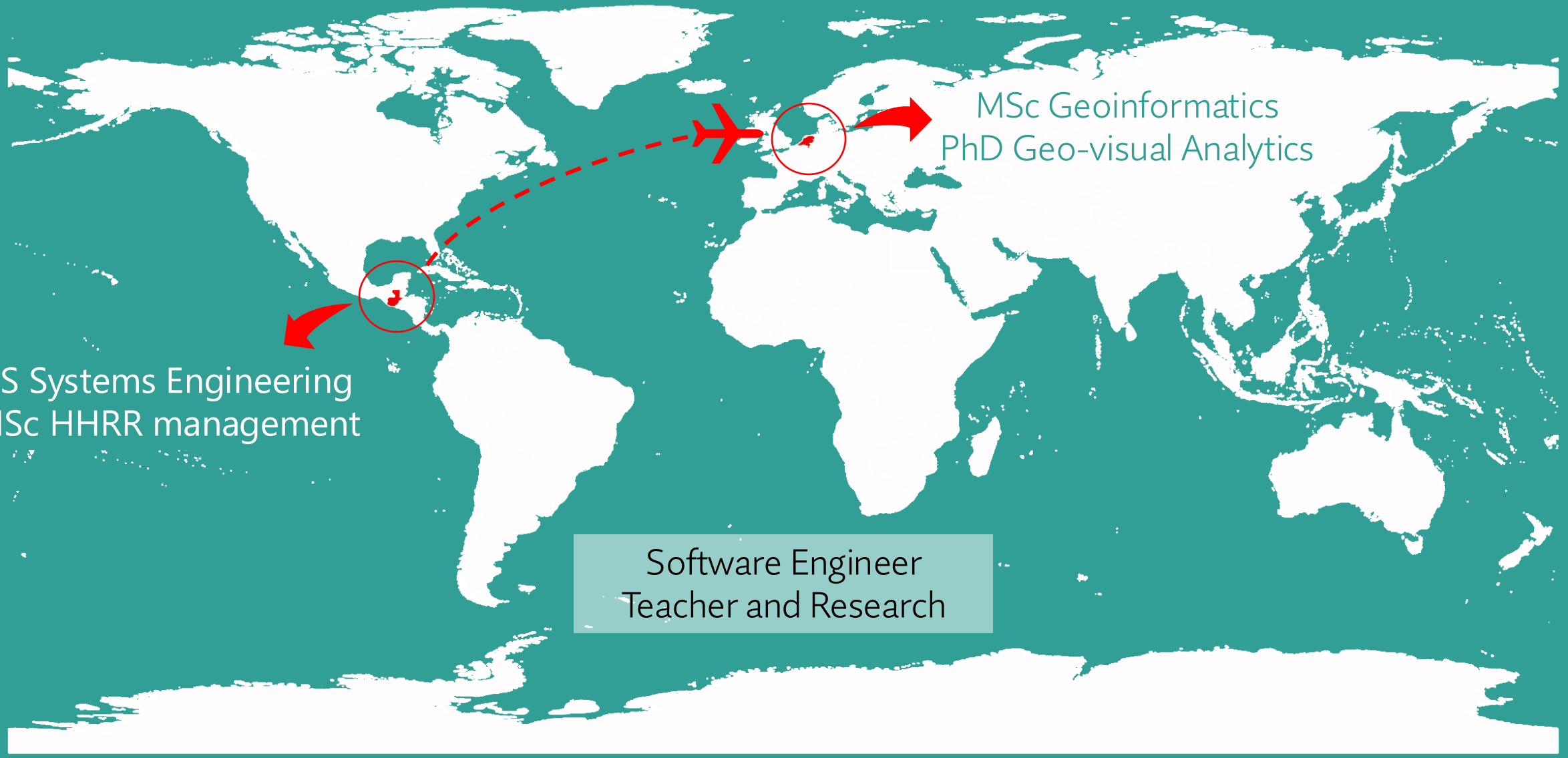
Organized Chaos

Teaching students to navigate wicked problems

Teaching Talk | University of Twente | June 24th, 2025

Gustavo García

UNIVERSITY OF TWENTE. | ITC


MSc Geoinformatics
PhD Geo-visual Analytics
BS Systems Engineering
MSc HHRR management
Software Engineer
Teacher and Research

What is a wicked problem?

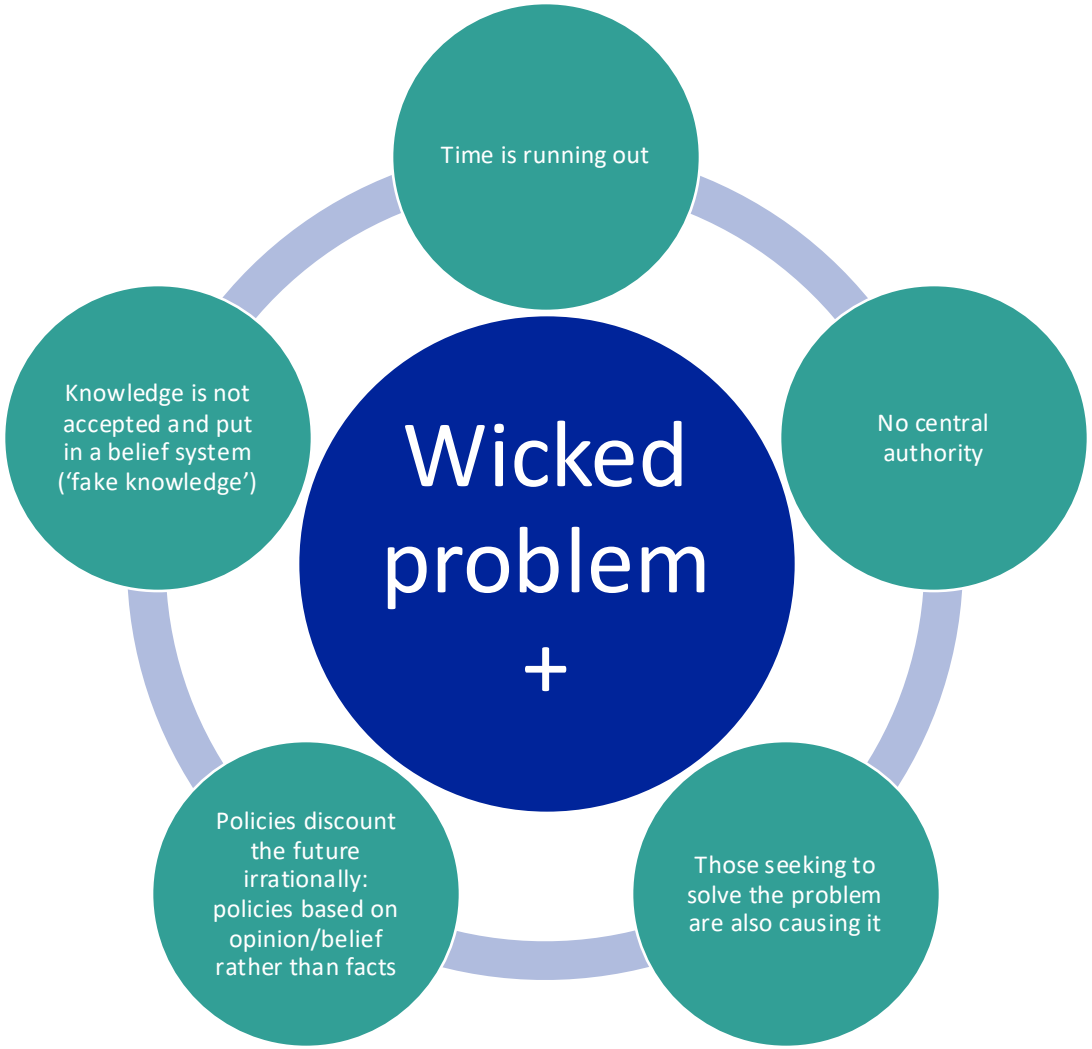
Wicked problems – those that are complex, intractable, open-ended, unpredictable.

Alford, J., & Head, B. W. (2017).

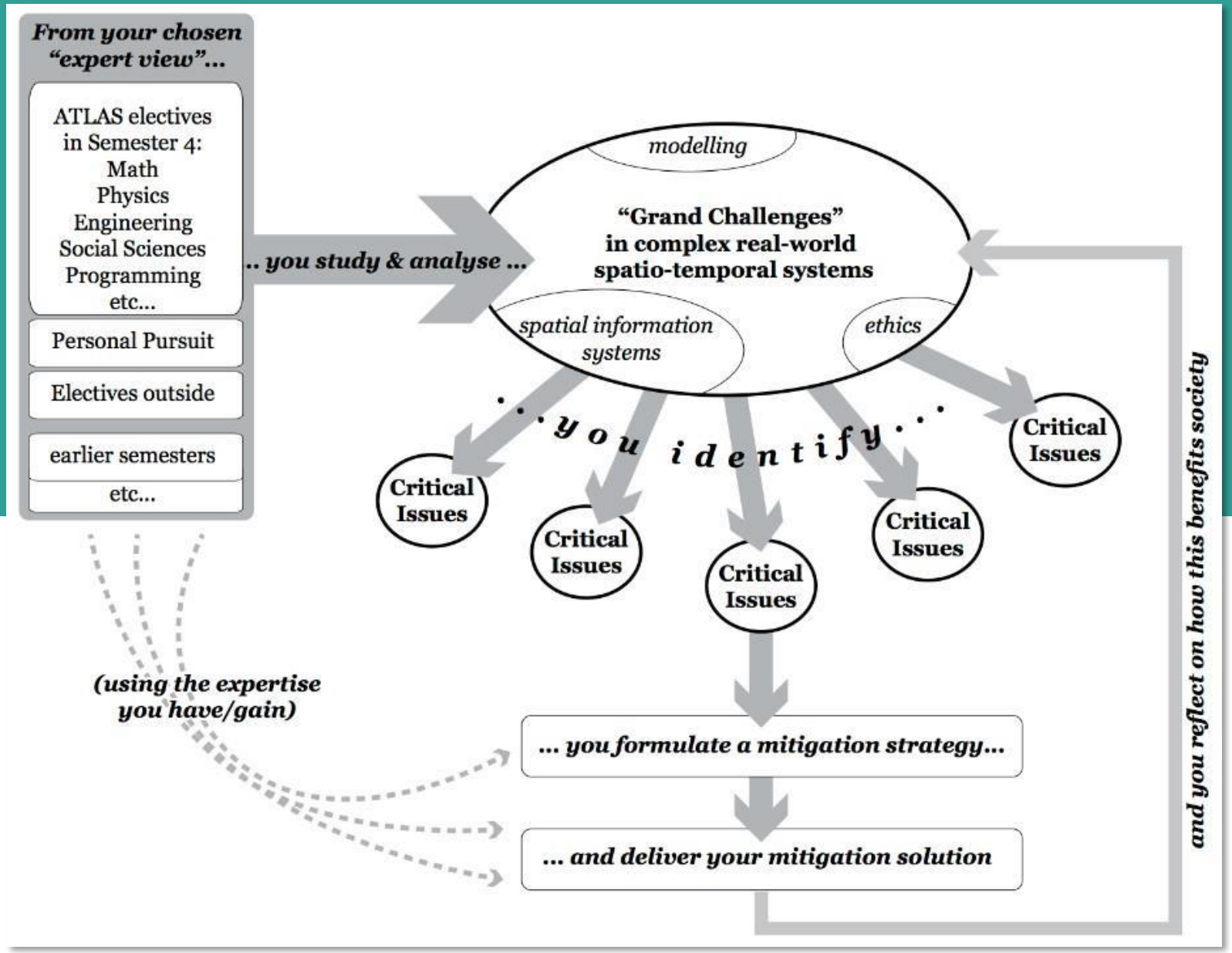
A wicked problem is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize

Unknown source.

What is a wicked problem?



What is a super wicked problem?



How do we prepare students to deal with this kinds of problem?

How does the course look like? What are the challenges?

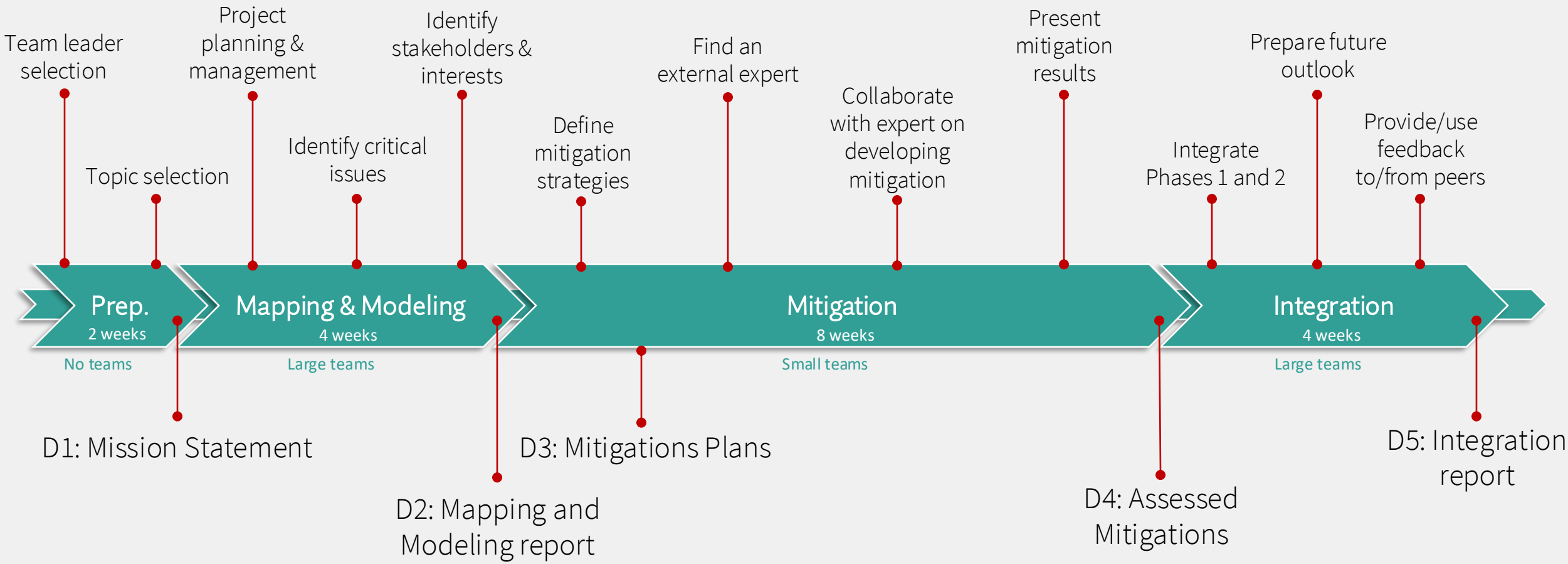
- Advisor/Facilitator
  - *Don't make decisions*
  - *Don't prescribe* challenge/mitigations/formats/(to some extent) deliverables
  - *Don't take action to correct deviations/conflicts… unless risk of team falling apart*
  - *Don't prevent students from making erroneous decisions – express opinion in terms of pros and cons*
- Control mechanisms
  - *Meeting logs*
  - *Deliverables reports*
  - *One-on-one/group/plenary discussions*
  - *Assessment – process + results*
  - *360° assessment*

Teacher's role

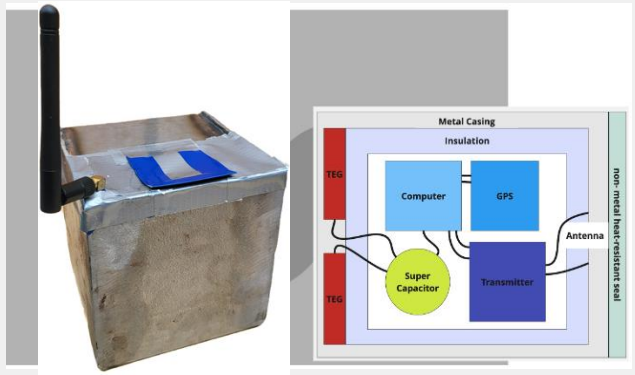
- The course intend to facilitate learning about:
  - *Leadership*
  - *Deal with uncertainty, ambiguity and failure*
  - *Act on the lack of specific knowledge*
  - *Collaborate in multidisciplinary teams → responsibility and conflict management*
  - *Decisions have consequences → positive and negative*
  - *Planning (deadlines matter)*

Real-world problems

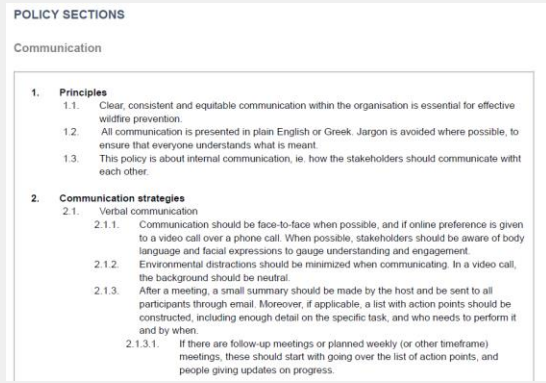
Semester project timeline



Example: Wildfires

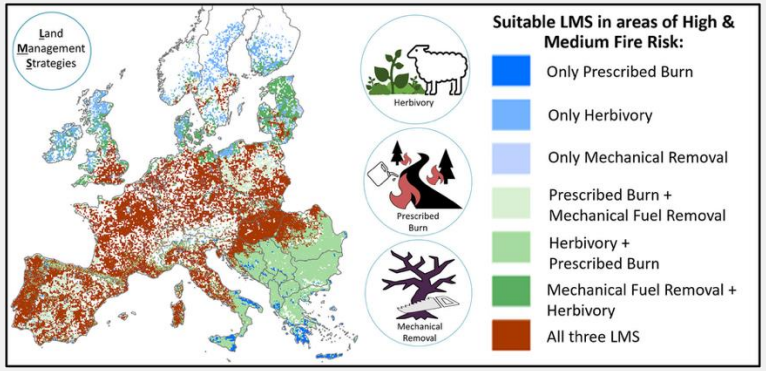


Integrated Fire Emergency Response and Notification Orb



Municipal Communication Policy (MCP)

Evacuation Optimization Plan (EOP)



Forest Resilience Plan (FRP)

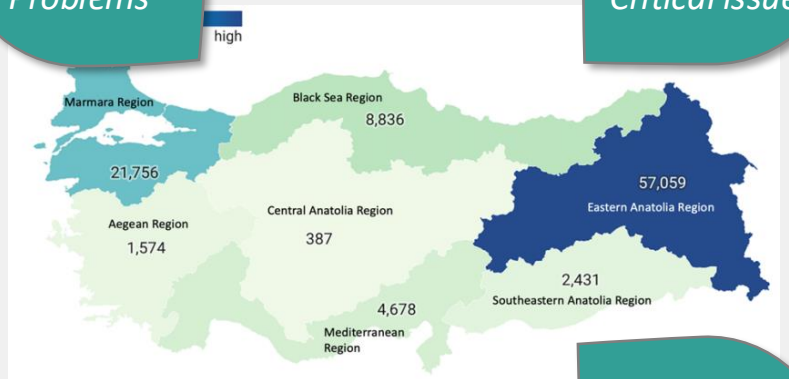
Preparation + Mapping and Modeling

Mitigations

Example: Earthquakes

11 *Problems*

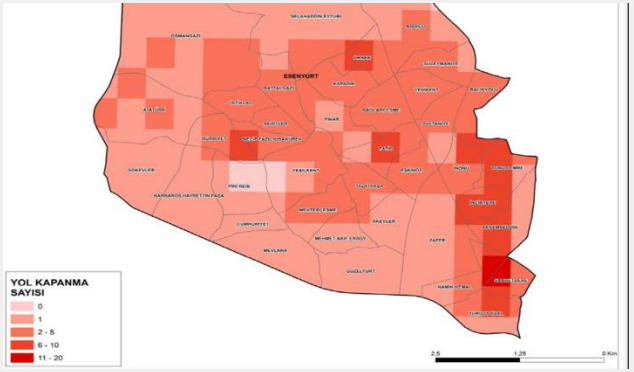
7 *Critical issues*



Earthquakes

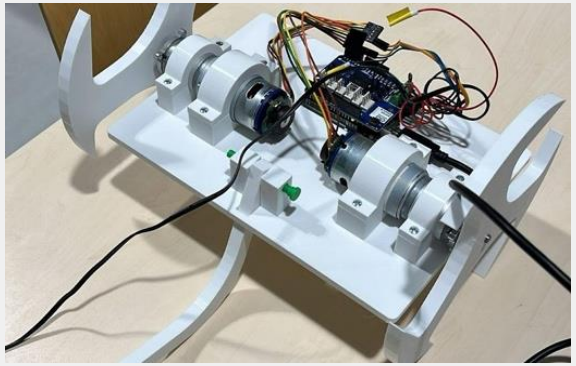
5* *Stakeholders*

* Categories with 44 individual stakeholders



Systematic GIS based evaluation of critical infrastructure and road network connectivity

Recommendation for earthquake-resilient materials in school buildings



The use of robots in earthquake disaster management

Mitigating post-earthquake post-traumatic stress disorder (PTSD)

Preparation + Mapping and Modeling

Mitigations

References

- **Alford, J., & Head, B. W. (2017).** Wicked and less wicked problems: a typology and a contingency framework. *Policy and Society, 36(3), 397-413. https://doi.org/10.1080/14494035.2017.1361634*

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Gustavo García

g.a.garciachapeton-1@utwente.nl

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