CS-458

The GC maker project

Cursus	Sem.	Type
Computer science	MA2, MA4	Opt.
Data Science	MA2, MA4	Opt.
SC master EPFL	MA2, MA4	Opt.

Language of teaching	English
Credits	6
Session	Summer
Semester	Spring
Exam	During the semester
Workload	180h
Weeks	14
Hours	**6 weekly**
TP	6 weekly
Number of positions	

Remark

pas donné en 2021-22

Summary

The GC Maker Project is an interdisciplinary project course where students work in teams towards solving real-world challenges by leveraging geometric computing methods and digital fabrication technologies.

Content

At the beginning of the course we will identify 3-4 interdisciplinary teams with complementary skills and expertise. Each team will work on a specific computational design challenge chosen by the team members in consultation with the teachers. The main focus will be on topics that combine geometry, computing, engineering, and digital fabrication to achieve the project goals. We will follow a design thinking methodology and develop a suitable project plan for each team.
Geometric and algorithmic foundations and implementations will be discussed on demand when identified during project development as necessary to achieve specific project goals.
Students will have access to a variety of digital fabrication machines, such as laser cutters, CNC milling machines, or 3D printers, and will receive appropriate training to explore different prototyping options. This will enable a cycle of ideation, code development, rapid prototyping and evaluation to progressively solve the chosen design challenge. We will define a suitable format to present project outcomes in a public forum in the final week of the course.

Learning Prerequisites

Recommended courses

CS-457 Geometric Computing is highly recommended

Important concepts to start the course

This course is a project course with limited capacity for 20 students. Students will be selected based on a 1-page letter that needs to be submitted before the semester starts describing their background and laying out their motivation for taking the course.

Learning Outcomes

By the end of the course, the student must be able to:

- Apply a design thinking methodology in a computational fabrication project
- Evaluate how to best integrate computational methods and digital fabrication tools to achieve project goals
- Develop and implement geometric computing algorithms relevant for the project goals
- Assess own project progress and devise adaptations of the project plan if necessary

- Provide constructive feedback on other groups' projects
- Communicate effectively with collaborators from different disciplines
- Design a suitable format and material for public presentation of project outcomes

Transversal skills

- Assess progress against the plan, and adapt the plan as appropriate.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Set objectives and design an action plan to reach those objectives.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Give feedback (critique) in an appropriate fashion.

Teaching methods

- Tutoring throughout the design cycle
- Hands-on tutorials on digital fabrication technologies
- Regular project critiques
- Interspersed lectures to deep-dive into specific topics, such as theoretical concepts, algorithmic foundations, engineering background, digital fabrication technologies

Expected student activities

- Coordinate project team and engage in collaborative problem solving
- Implement/adapt geometric computing algorithms
- Fabricate and evaluate prototypes
- Discuss project progress in class
- Provide constructive criticism and feedback to other groups
- Present project outcome in a public forum

Assessment methods

project assement throught the semester, final presentation