BIOENG-390

Bachelor project in Life sciences

Profs divers *

Cursus	Sem.	Type
Life Sciences Engineering	BA6	Obl.

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

It is not allowed to withdraw from this subject after the registration deadline.

Summary

The student will engage in a laboratory-based project in the field of life sciences engineering. Student projects will emphasize acquisition of practical skills in experimentation and data analysis. Students will acquire skills in information literacy.

Content

A typical project will involve "hands-on" wetlab experimentation and data analysis, although theoretical and computationally-oriented projects are also possible. The projects are available on the web sites of SV laboratories (including core facilities) or discussed directly with a potential head of lab.
The bachelor project can be done in:

- SV labs
- other EPFL labs (the project needs to be approved by the section, and students will need to fill the corresponding bahelor project form)
- outside EPFL in academia or industry (the project needs to be approved by the section, and students will need to fill the corresponding bahelor project form). The student will have to find an EPFL mentor (Profs, MER) to supervise and evaluate her/his project.

The students are confronted with the realization of a laboratory-based project integrating specific aspects in the field of live sciences. This project will allow them to apply, to concrete problems, skills of domain and transversal skills acquired during their studies.

The students are required to attend two **mandatory** information literacy modules at the beginning of the semester (2-3 hours each). The aim of these modules is to train students to search for scientific information (e.g. information and database typologies, search methodology, presentation of citation databases), to manage the information they have found (e.g. use of Zotero - reference manager), and to (re)use the information they have found (e.g. how to cite to avoid plagiarism).

Learning Outcomes

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

- Manage an individual research project
- Develop expertise in a specific area of research
- Implement appropriate technologies to address thecientific or engineering problem being studied

- Conduct experiments appropriate the specific problem being studied
- Assess / Evaluate data obtained in wetlab and computational experiments
- Optimize experimental protocols and data presentation
- Plan experiments to test hypotheses based on obtained results

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.
- Use a work methodology appropriate to the task.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Keep appropriate documentation for group meetings.
- Demonstrate the capacity for critical thinking
- Demonstrate a capacity for creativity.
- Collect data.
- Write a scientific or technical report.

Expected student activities

Students will focus on hands-on experimentation, which may be wetlab-based or computer-based, depending on the project. Students will read and discuss assigned papers from the original scientific literature. As part of the evaluation process, students are required to submit a written report or to give an oral presentation that summarizes and interprets their results.

Total workload: 12h/week during 14 weeks (spring semester BA6) or 3-4 weeks full time (42h/week) during the summer preceding BA5.

Assessment methods

Continuous control
The mode of evaluation must be clearly defined and agreed between the student and the project mentor in advance. Typically the mode of evaluation will include a written report and /or an oral presentation prepared and delivered by the student.
Evaluation criteria normally include as main components:
-Cross-curricular competencies
-Technical contribution
-Oral/Written reports
In case the bachelor project is made out of EPFL, project evaluation should be discussed between the EPFL mentor and the director/supervisor of the host laboratory.

Supervision

Others	Typically, the student will be matched with a secondary mentor (this will usually be a senior PhD student or a Postdoctoral Fellow) who will take responsibility for the day-to-day supervision and training of the student.

Resources

Bibliography

Appropriate reading materials will be assigned by the student's mentor depending on the nature of the research project. The assigned reading material will usually comprise original research papers, review articles, and secondary sources (e.g., books).