Scientific literature analysis in bioengineering

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<table>
<thead>
<tr>
<th>Cursus</th>
<th>Sem.</th>
<th>Type</th>
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<tbody>
<tr>
<td>Bioingénierie</td>
<td>MA1, MA3</td>
<td>Opt.</td>
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<td>Ingénierie des sciences du vivant</td>
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<tr>
<th>Language</th>
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<tr>
<td>Credits</td>
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<td>Withdrawal</td>
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<td>Semester</td>
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<td>Exam</td>
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<td>Workload</td>
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<td>Weeks</td>
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<td>Hours</td>
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<td>Exercises</td>
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**Remarque**
only one registration per student to a scientific thinking course

**Summary**
Students are given the means to dig effectively into modern scientific literature in the multidisciplinary field of bioengineering. The method relies on granting sufficient time to become familiar with the background and hypotheses, on effective support during the analysis and on oral assessment.

**Content**
The scientific literature proposed includes traditional subjects as well as topics of recent interest in the bioengineering field and more specifically on (i) cell and molecular engineering, (ii) analytics and (iii) neuroprosthetics. The course is also supported by the EPFL librarian team to discuss principles and tools related to scientific databases and literature search.

**Keywords**
literature-analysis, bioengineering, bioanalytics, immunoengineering, cellular engineering, molecular engineering, biosensors, lab-on-a-chip, neuroprosthetics, DNA nanotechnology, biomaterials

**Learning Prerequisites**
Required courses
none

**Learning Outcomes**
By the end of the course, the student must be able to:
- Analyze scientific papers in a selection of bioengineering fields
- Interpret the results reported in the scientific literature
- Compare results with claims
- Compare among different papers the respective approaches chosen to a similar aim
- Synthesize the main messages of a scientific work
- Differentiate review and original works and other paper types
- Search scientific literature effectively
Transversal skills

• Plan and carry out activities in a way which makes optimal use of available time and other resources.
• Communicate effectively, being understood, including across different languages and cultures.
• Demonstrate the capacity for critical thinking
• Make an oral presentation.
• Summarize an article or a technical report.
• Write a literature review which assesses the state of the art.

Teaching methods

(i) Supervised work on 5 sets of scientific papers.
For each set, students will have one first week to consult, understand, do additional literature search on the papers. At the end of the week the student participate in a working session with one assistant per group of students (group composed of three students). A second week is given for the preparation of a presentation and question and answer session on the papers.

(ii) Literature search and reporting
Each student independently performs a literature search on a theme of choice on which he/she will work for approx two weeks. Specific guidelines are given to report on this activity and the work is supervised by the assistants and by the teacher as well.

Expected student activities

Study 5 sets of papers through the semester. Carry on additional literature search for critical assessment of the papers and for deeper understanding of the field, application, scientific questions addressed by the papers. Work in groups of 3 students and prepare group presentations (one per set of papers).
Participate actively to the discussion on the work performed by the other groups.
Perform a literature search on a topic of choice and prepare a report according to a template.

Assessment methods

Evaluation of preparation of the papers and related material.
Evaluation of group presentations (5 through the semester)
Evaluation of participation to the discussions related to the work reported by the other groups.
Evaluation of the report on individual literature search.

Supervision

Office hours Yes
Assistants Yes
Forum No
Others Office Hours on appointment

Resources

Notes/Handbook
Slides and papers will be made available on the moodle