BIM6070 - Pratique Professionnelle de la Recherche
Fall 2014

Course syllabus

Description:

BIM 6070 introduces students to the scientific method in research and to the experimental approach. Furthermore, this course initiates them to: the process of scientific critical review; writing a scientific article; writing a research project; and preparation of a grant proposal. This course also encourages students to reflect on ethical issues in biomedical research and they are asked to identify and discuss ethical questions and situations that can arise. Finally, invited speakers present to students career possibilities in the field of biomedical research.

Objectives:

Allow the students to acquire necessary competencies for practice in biomedical research, that is to say:

- To design a research plan, from concept to implementation.
- To exercise critical thinking.
- To write a scientific article.
- To write a research project.
- To become acquainted with the rules of conduct, duties and obligations of students and professionals in scientific research.
- To be informed about the possibilities of careers in biomedical research.

Methodology:

The course is split into 6 modules. The first 5 modules correspond to 3 hours of theoretical courses each. The 6th module consists of a series of 7 conferences relating to numerous types of professional research activities.

Plagiarism:

«Plagiarism at Université de Montréal is sanctioned by the *Disciplinary regulation on fraud and plagiarism related to students*. For more information, consult the website <http://www.integrite.umontreal.ca/> .» (Free translation)

Organization and content of the modules:

Module 1) Introduction to research

Professor: Jennifer Estall
Date: September 5

Topics:

a. Role of students in research activities
b. Scientific method and the importance of the hypotheses
c. Experimental approach
d. Keeping a Lab notebook
e. Planning a simple experiment

Assignment: To elaborate a hypothesis and a simple research plan from scientific data (assignment to be done in class).

Module 2) Elaboration of a research project and preparation of grant proposals

Professor: El Bachir Affar
Date: September 12

Topics:

a. Overview on funding agencies and programs
b. General considerations on writing a research proposal
c. Literature review
d. Writing a project (abstract, hypothesis(es), objectives, parts of the study, experimental design, conclusion)
e. Evaluation criteria and mechanisms
f. Classic pitfalls

Assignment: To prepare a research project (refer to the section "Value, evaluation and schedule" below).

Module 3) Scientific Critical Review

Professor: Michel Bouvier
Date: September 19

Topics:

a. Elements of scientific critical review
b. Critical evaluation of your own results
c. Critical evaluation of scientific articles
d. Critical evaluation of grants proposals

Assignment: Participate in an evaluation committee of research projects written by students in the context of the course (refer to the section "Value, evaluation and schedule" below).

Module 4) Writing a scientific article

Professor: Jean-François Côté
Date: September 26

Topics:

a. Wording of the main question
b. Identification of readership
c. Making a plan (« the story to tell »)
c. Choice of the specialized journal to submit your article
d. Format of the scientific article: Some important elements
e. Importance of good illustrations
f. Elaboration of conclusions and a pertinent discussion

Assignment: Write an abstract of a scientific article (refer to the section "Value, evaluation and schedule" below).

Module 5) Ethics in Research

Professors: El Bachir Affar
Date: October 03

Topics:

a. Relevance and role of ethics in contemporary research
b. Principle of ethics in research
c. Cases analysis
d. Communication of data to the scientific press and the public

Module 6) Careers in research

(7 conferences)

- Valorization and Intellectual Property
- Clinical Biochemistry
- A career in the Academic Research Sector
- A career in the Clinical Research Sector
- Granting Agency
- Interface between Industry and Academia
- Scientific Editor

Value, evaluation and schedule

Writing a research project (Module 2)

Preparation of a research project (10 pages with double spacing) relating to the student's project within the context of his/her Master or Doctorate. For the structure, students must follow Module 2 recommendations.

Value: 40% of the course grade

Evaluation:
Correction of the research projects will be made on **20 points,** distributed as follows:

- Scientific abstract (**2 points**)
- Literature review (**4 points**)
- Hypotheses (**2 points**)
- Objectives (general and specific) of the research project (**2 points**)
- Parts of the study and experimental design (**8 points**)
- Conclusion (**2 points**)

A grade (reached by consensus) during the evaluation session (refer below) will also count for **20 points**.

Schedule:
October 27: Delivery of the "Literature Review" section to the student's research supervisor for validation. An approval form for "Literature Review" section must be completed by the supervisor and sent to Pascale Le Thérizien by **November 3**.
November 17: Delivery of the completed project to Pascale Le Thérizien (Academic Affairs, 3rd floor, office 3306-2, IRIC – pavilion Marcelle-Coutu).

Evaluation of the research projects (Module 3)

Value: 25% of the course grade

Evaluation:
For the research project evaluation, each student will receive research projects to evaluate and write a 2 to 3-page report. Projects will be assessed in committees composed of students and professors.

The critical review will count for **15 points** distributed as follows:

- The individual review **(3 points)**
- The project evaluation. The reviewer gives details on his/her assessment by justifying on the following topics:
    - ❖ How important and/or original are the hypotheses or the questions to be addressed? How clearly are they formulated? **(3 points)**
    - ❖ Is the Rationale based on pertinent literature review? **(3 points)**
    - ❖ How well do the proposed experiments address the hypotheses and the questions?
    - ❖ How suited are the methods and the proposed data analysis to the hypothesis? To what point will the applicant implement new methods that are introduced and/or explored? How well has the applicant anticipated difficulties in their approach and considered alternative solutions? **(3 points)**

- ❖ Is the rationale for the proposal well-grounded in the critical review of pertinent literature? **(3 points)**

The participation in evaluation committees will count for **10 points.**

Schedule:
December 19: Delivery of the research projects' critical review evaluations and meeting of the projects' evaluation committees.

Writing a scientific article's abstract (Module 4)

Value: 20% of the course grade

Evaluation:
In this module, students will have an exam that consists of writing an abstract for a scientific article. In class, students will have 3 hours to read one article from which the abstract is eliminated and to write an abstract of ~300 words relating to this article.

Schedule:
October 10: IRCM, room 255

Participation at the conferences (Module 6)

Value: 15% of the course grade

Evaluation:
Attendance is compulsory at Module 6 conferences. Only one absence at a single conference will be tolerated without penalty.

Schedule :
The conferences will take place from 10:30 am to 12:00 pm, in October, November and December. The names of the speakers and the dates will be announced later.