

**BIM6070 - Pratique Professionnelle de la Recherche  
Fall 2016**

**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 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 6<sup>th</sup> 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 2**

**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) scientific critical review**

**Professor: Sébastien Carréno**

**Date: September 9**

**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 3) Writing a scientific article**

**Professor: David Hipfner**

**Date: September 16**

**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 4) Elaboration of a research project and preparation of grant proposals**

**Professor: El Bachir Affar**

**Date: September 23**

### **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 5) Ethics and good practices in research**

**Professors: El Bachir Affar**

**Date: September 30**

### **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)**

- A career in the academic research Sector
- Business creation
- Bringing technology to end-users : Scientific Sales and Marketing
- Granting agency
- Interface between Industry and Academia
- Non-profit organizations : patient advocacy and research funding
- Translational Science and Clinical Trials

**Value, evaluation and schedule:**

**A) Writing a scientific article: Writing a scientific article's abstract (Module 3)**

**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 7:** IRCM, room 255

**B) Elaboration of a research project and preparation of grant proposals (Module 4)**

Prepare a research project (10 pages with double spacing) related to the student's project, within the context of his/her Master or Doctorate. For structure, students must follow Module 4 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 26:** 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 2**.

**November 14:** Delivery of the completed project on Studium and to Pascale Le Thérizien (Academic Affairs, 3<sup>rd</sup> floor, office 3306-2, IRIC – pavilion Marcelle-Coutu). 2 points of your grade will be docked *per day* for late assignments.

### **C) Scientific Critical Review: Evaluation of the research projects (Module 2)**

**Value: 30% of the course grade**

#### **Evaluation:**

Each student will research projects to evaluate and write a 2 to 3-page report. Projects will be assessed in committees composed of students and professors during the last class of the course.

Critical review will count for **20 points**, distributed as follows:

- ⇒ How important and/or original are the hypotheses or the questions to be addressed? How clearly are they formulated? **(5 points)**
- ⇒ Is the Rationale based on pertinent literature review? **(5 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? **(5 points)**
- ⇒ How important and original are the contributions expected from the research proposed? What is the potential for important new observations or knowledge? **(5 points)**

Participation in evaluation committees will count for **10 points**.

#### **Schedule:**

**December 16:** Delivery of the research projects' critical review evaluations and meeting of the projects' evaluation committees.

### **D) Careers in research: Participation at the conferences (Module 6)**

**Value: 10% of the course grade**

#### **Evaluation:**

Attendance is compulsory at Module 6 conferences. Only one absence at a single conference will be tolerated without penalty. For two missed conferences, the student will receive 50% of the grade and for more than two missed conference, the grade will be "zero".

#### **Schedule:**

The conferences will take place on Friday 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.