

Syllabus: PSYO 7712.03 Innovating Neurotechnology II — Commercialization and Entrepreneurship

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Rationale

This course is a component of the Rehabilitative and Diagnostic Innovation in Applied Neurotechnology (RADIANT) program at Dalhousie University. This program departs from traditional science training by placing a heavy emphasis on the process of *innovation* — identifying problems that represent real needs in society, and developing neurotechnology-based solutions that not only work, but that can actually reach the people who can benefit from them, in a form they can use. The goal tenet of RADIANT is to *produce HQP who have proven skills in both neuroscience/neurotechnology, and the professional skills needed to work in clinical and industrial settings to design solutions that meet a real need and have the potential to be commercialized or otherwise make it into the hands of people who can benefit from the solutions.*

This course is designed to give trainees the skills needed so that their great ideas and scientific discoveries can have the most positive impact on the world. Along with its partner course, Translational Neuroscience I, this course will train students in the process of innovation. Translational Neuroscience I focused on the early stages of innovation: needs finding, needs screening, and concept generation. Students developed a solution applying some aspect(s) of neurotechnology to a real-world problem. Translational Neuroscience II picks up from this and focuses on the later stages of innovation and commercialization, while continuing the project-based, applied model of training. Students will work in small teams (of 2–3 students) over the course of the term to develop a solution to a problem provided by the instructor.

Successfully taking complex scientific discoveries and making them understandable and/or usable by the general public critically depends on the ability to communicate in many circumstances. It requires the ability to see the world from others' perspectives, and to communicate ideas and design products in the most effective ways. These communication skills will also be emphasized in this course.

Learning Objectives

PRIMARY OBJECTIVES: This course will build your skills in innovation and communication. At the end of this course, you should be able to:

- Evaluate, refine, and select product concepts that are feasible to move to market, according to criteria including appropriateness to need, technical feasibility, financial feasibility, market feasibility, intellectual property constraints, and regulatory constraints;
- Engage in prototyping of product ideas and designs, including being able to articulate what sorts of expertise and channels are available and appropriate for prototyping;
- Write a business plan that addresses the following:
 - The quality and process management of a product;
 - Different sources of capital to finance a venture, and the benefits and risks of each;
 - The potential market(s) for the product, including size, demographics, accessibility, and demand;
 - The distribution and sales channels that are available for the product to reach its target market(s);
 - A marketing plan;
 - The financial resources necessary to successfully execute the business plan, including supply costs and pricing;
 - The human resources necessary to successfully execute the business plan;
 - A timeline for bringing the product to market;

SECONDARY OBJECTIVE: Beyond innovation and communication skills, students will develop a number of other professional skills:

- Time management
- Project management
- Resource management
- Team-building
- Decision making
- Communication

Textbook

Zenios, S., Makower, J., & Brinton, T. (2009). *BioDesign: The Process of Innovating Medical Technologies*. Cambridge University Press.

- Other assigned readings will be made available through BLS or the Harvard Business School on-line library

Prerequisite

PSYO 7711.03: Innovating Neurotechnology I. Instructor's permission is also required to register. While part of the RADIANT program curriculum, this course is open to graduate students in any discipline subject to instructor's approval.

Evaluation Components

Students will develop and be evaluated on their innovation and communication skills through practical application in developing a solution to the problem posed to them. While the solutions must be feasible and scientifically and technically meritorious, the emphasis of the evaluations will be on the process of innovation, and the effectiveness of the communication skills evidenced in the course of the project.

For all work prepared and submitted by groups of students, peer evaluations will be included as a component of this assignment (20%) in order to assess individuals' contributions. It will thus be important for members of the team to communicate amongst themselves and divide up the work and assign jobs. This should be done such that all team members get experience in all areas that are being developed. The percentage of the final grade that each component is worth is indicated in the margin aligned with the headings. Detailed instructions for each assignment will be provided during the course; they are merely summarized here.

Case Studies

30%

Individuals will complete case studies assigned and discussed in class, on the topics of market analysis and project financing (2 @ 15%).

Business Plan

50%

- Project teams will prepare a concise business plan detailing their solution to the problem. This should include the following:

- An outline of the problem and proposed solution, written in a form suitable for a business audience;
- Intellectual property considerations of the solution;
- The potential market(s) for the product, including size, demographics, accessibility, and demand;
- The distribution and sales channels that are available for the product to reach its target market(s);
- The financial resources necessary to successfully execute the business plan, including supply costs and pricing;
- A marketing plan;
- Projected expenses and proposed sources of funding;
- A detailed work plan and timeline for developing and commercializing the solution;
- The quality and process management of the product;
- The human resources necessary to successfully execute the business plan;
- A timeline for bringing the product to market;

Final Project Presentation

20%

Each team will pitch their business plan publicly in a 10–20 minute oral presentation. Grading will be based primarily on the quality of the presentation and communication, with 20% of the grade assigned by the audience (anonymously) and the other 80% by the instructor.

Outline and Schedule

The class will meet once per week for 13 weeks. The topic of each class is described below.

1. Overview of the class
2. Concept selection
3. Intellectual property
4. Regulatory environments
5. Prototyping
6. Quality and process management
7. Introduction to financial accounting
8. Raising capital

9. Personnel management
10. Marketing
11. Sales and distribution
12. Business development and strategy
13. Final project presentations

Academic Honesty & Plagiarism

Dalhousie University defines plagiarism as the presentation of the work of another author in such a way as to give one's reader reason to think it to be one's own. Plagiarism is a form of academic fraud. Plagiarism is considered a serious academic offense which may lead to the assignment of a failing grade, suspension or expulsion from the University, or even the withdrawal of a degree previously awarded. Some examples of plagiarism are:

- The use of a paper purchased from a commercial research corporation or prepared by any person other than the individual claiming to be the author;
- Copying another student's work. You are free and indeed, encouraged, to work in groups on course assignments. However, each student will be graded individually (unless you are explicitly told otherwise, as in group assignments) and therefore each student is expected to write his or her own answers;
- Copying, without giving credit to the author, from another's published or non-published works, another's computer codes/programs, another's artistic or architectural works, another's scientific project, including material found on the internet;
- Copying a direct quotation from another source without indicating that it is a direct quote through the use of quotation marks and source page numbers;
- Submitting a piece of work for credit in more than one course without written permission of both course instructors;
- Submitting the same piece of work more than once in the same class, including in different years.

Dalhousie University's policy on intellectual honesty can be viewed at: www.registrar.dal.ca/calendar/ug/UREG.htm#12. As well, the Faculty of Graduate Studies has regulations concerning intellectual property,

which may be accessed at dalgrad.dal.ca/regulations/v. As per Dalhousie policy, any suspected cases of academic dishonesty will be reported to the Senate Disciplinary Committee for review. Please do not hesitate to ask your instructor or the Faculty of Graduate Studies if you have any questions concerning what might or might not be considered academic dishonesty.

Student Accessibility Services

Students with disabilities are encouraged to register as quickly as possible at the Student Accessibility Services if they wish to receive academic accommodations. To do so please phone 494-2836, email access@dal.ca, drop in at the Mark A. Hill Accessibility Centre or visit their website www.studentaccessibility.dal.ca All forms are now available on their website.