



Technology Commercialization -- PhD/MESc Engineering May 28-28 & July 21-23, 2022

INSTRUCTOR

Name:	Albert Behr	Office Location:	TBD
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Fax:	TBD	Class Time:	Session I – May 26 th – 28 th Session II - July 21 st - 23 rd

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COURSE DESCRIPTION:

Welcome to the Western Engineering Experiential -- Technology Commercialization course! This course focuses on the very specialized and specific issues and requirements for successfully launching technology-based products into the global market.

We will examine real-world tested strategies and tactics to assist you in competing successfully in the fast-moving world-stage market.

Using tested strategies and tactics, this class will help students take an existing product concept or patent, to live market validation or termination, company formation, strategic go-to-market planning, market introduction, Intellectual Property protection, corporate growth, and ultimate exit. Further, this course has been designed to assist Engineering students form a series of Go-NoGo checkpoints/gates that need to be considered as their innovation goes through the commercialization process.

This class is designed to move from analysis of a technology venture to actual potential implementation and commercialization. This Technology Commercialization course is very interactive and is focused on helping entrepreneurs launch real companies from real technologies.

In this class, you will develop a sound Go-to-Market strategy that involves reaching out to leading global firms for licensing / joint-ventures / strategic partnership / distribution and you will determine whether your venture/company should move forward in the “real world”, be modified based upon your active investigations, or terminated. The class will consist of lectures, interviews with technology

executives, and an operating plan/modified business plan/termination plan that you will present to the class.

If you are an aspiring Technology CEO, CTO, VP of New Product Introduction, or VP of Product Management, this very informative and exciting real-world course is for you!

COURSE OBJECTIVES:

The objectives of this course are to develop the business skills that are required to be a successful Technology Entrepreneur on the world stage. Students will learn the requisite skills to do a proper worldwide “market map”, determine their unique and sustainable technology advantage, how to value their innovation, how to protect their innovation, how to approach strategic partners for mutual success, and how to capitalize these activities when you have no money.

Students will need to demonstrate these skills through the development of a Worldwide Business/Go-to-Market 12 month Operating Plan. Should you find that upon detailed examination that the proposed product/service should not be brought to market, you would be expected to present a detailed Business Opportunity Assessment on the market, the players, the trends, and why you feel that you should not proceed with full product commercialization and rollout.

The following list details some of the specific aspects to be covered.

- 1. Introduction: What is Technology Commercialization:** Introduction to the phases of technology commercialization and the implications/traps in each phase.
- 2. Base Principles of Technology Commercialization:** Introduction and detailed discussion about the “Technology Adoption Curve”, “the 80% / 20% Rules” and Technology Partnering. Implications for your product in the market will be deeply discussed here.
- 3. Detailed Review on Each Phase of Technology Commercialization:**
 - a. **“Science Experiment” and IP Formation Phase.** Top-down vs. Bottom up analysis on tech formation. Market sizing exercise. IP and Patent protection examination. When to leave the “Bench” review
 - b. **Market Validation Phase.** How to measure market validation. Strategic partners analysis. Product Verification and Certification discussion.
 - c. **Company Formation Phase.** Initial company formation options and funding alternatives examination.
 - d. **Market Acceleration and Leadership Phase.** What is Market Acceleration and Leadership? How to become the “defacto” standard

in a market. How to create market tension between major players. Intellectual Property acceleration examination. Funding options discussion.

- e. **Market Exit Phase.** “Canadian History” and timing discussion. Strategic options review. Valuation consideration.

TEXTBOOKS:

Required Textbooks:

No textbooks are required for this course although the following books are strongly suggested reading materials.

- 1) Geoffrey A. Moore, *Crossing The Chasm, 3rd Edition: Marketing and Selling Disruptive Products to Mainstream Customers.* HarperCollins Publishers, 2014
- 2) Peter Thiel, *Zero to One: Notes on Startups, or How to Build the Future.* Crown Business, 2014
- 3) Eric Ries, *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses.* Crown Business, 2011
- 4) Bill Aulet, *Disciplined Entrepreneurship: 24 Steps to a Successful Startup.* John Wiley & Sons, 2013

As an Experiential Learning course, students are expected to take their innovative ideas and apply to this their own real-life and career experiences, and that of their team and classmates, to create viable solutions.

COURSE ASSESSMENT:

The course is pass/fail model, and the mark will be based on:

Grade Components:

Participation:	
- Instructor Evaluation	20%
- Individual New Product Idea Presentation	5%
- Interview with Worldwide Technology Partner (Midterm project)	15%
- Intellectual Property (IP) Analysis (Midterm project)	10%

- Written Go-to-Market/12 Month Operating Plan OR Business Opportunity Assessment (should you choose to not proceed with your Technology Business (Final Project)	35%
- Final In-class Presentation	15%
Total	100%

COURSE SCHEDULE:

Session 1: Thursday Morning: May 26th, 2022

Overview of Course and Expectations. Introduction and Base Principles of Technology Commercialization

Session 2: Thursday Afternoon: May 26th, 2022

*Phases of Commercialization --“Science Experiment” and IP Formation Phase:
Technology Creation Lecture & Discussion*

Due Today: Determination of your own Intellectual Property for classroom work.

Session 3: Friday Morning: May 27th, 2022

Due Today: Individual Presentations. 10 minutes per student. Present your Technology and initial commercialization idea to the class. Expect 10 mins of additional initial questions.

Session 4: Friday Afternoon: May 27th, 2022

*Phases of Commercialization --“Science Experiment” and IP Formation Phase:
Technology Protection and when/how you can “show things safely” externally Lecture
& Discussion*

Session 5: Saturday Morning: May 28th, 2022

*Phases of Commercialization --“Science Experiment” and IP Formation Phase: Market
Sizing / Domain Knowledge Acquisition / Vendors Lecture & Discussion*

*Phases of Commercialization -- Market Validation: Market Validation Lecture &
Discussion*

Mid-Term Assignments Due: Monday June 27th, 2022:

- 1) **“Interview with a Strategic Go-to-Market Partner” Assignment – (15 marks) due.** 5 page outline detailing what you have learned from your interviews with the targeted “Gorilla” Execs, and what you feel are the next steps for your technology and firm. Font and spacing for submissions are 12 point Arial font, double-spaced, single-sided for all submissions.

- 2) **“Intellectual Property (IP) Analysis” Assignment – (10 marks) due.** 10 page analysis detailing what you have learned after conducting an Intellectual Property (IP) and patent review about your technology relative to the your identified “gorillas” and how you feel you should adjust your technology/patents to better align the product for the market/partner. Font and spacing for submissions are 12 point Arial font, double-spaced, single-sided.

Session 7: Thursday Morning : July 21st, 2022

Phases of Commercialization -- Company Formation Phase Lecture & Discussion

Session 8: Thursday Afternoon: July 21st, 2022

Phases of Commercialization -- Market Acceleration and Leadership Phase (Part I) Lecture & Discussion

Session 9: Friday Morning: July 22nd, 2022

Phases of Commercialization -- Market Acceleration and Leadership Phase (Part II) Lecture & Discussion

Session 10: Friday Afternoon: July 22nd, 2022

Phases of Commercialization: Market Exit Phase Lecture & Discussion

Session 11: Saturday Morning: July 23rd, 2022: Final Assignment I Due (15 marks)

12 Month Go-To-Market/12 Month Operating Plan OR Business Opportunity Assessment In-Class Presentation. Time to sell us!

Final Assignment II Due (35 marks): Monday August 8th, 2022:

Delivery of 12 Month Go-To-Market/12 Month Operating Plan OR Business Opportunity Assessment Document

ASSIGNMENTS:

A. Participation – Individual (20 marks)

Students must actively participate in all classroom discussions. The Instructor will determine 20 marks towards your final grade.

Grading: Participation grades will be awarded on class contribution – Awarded based on **quality** of contribution. Provided on a sliding scale relative to contributions by peers

B. New Product Idea Presentation (5 marks)

Exercise:

Each student is to present their new product/technology idea. Each presentation is to be no more than 10 minutes in length and should cover the primary aspects of your product idea. Feel free to be creative in your presentation, and props are encouraged! You will also field 10 minutes of questions from the class after your brief presentation.

Your objective is to “sell” your product concept to the audience by providing important information on (product) the product idea, potential uniqueness, technology used, the market and incumbent players and potential opportunity.

Presentation will be on Friday Morning, May 27th, 2022

Grading:

100% instructor discretion. Like all ventures, each investor/company has their own viewpoint and risk/reward criteria. Your objective is to present to the class as if they were a potential licensing/Strategic Go-To-Market Partner interested in bringing your technology to market through their channels of distribution for a fast-growing technology firm.

C: “Interview with a Strategic Go-to-Market Partner” Assignment – (15 marks)

Exercise:

You must identify, secure a discussion with and write a brief report detailing the motivations of, and lessons learned by talking directly to a potential Strategic Partner.

The Strategic Partner **must be:**

- Relevant to the technology/idea you are approaching him/her for based upon your own Intellectual Property
- The business should be considered one of the top 10 companies in that sector.

Report Requirements and Grading:

- 1) Explain the project/concept and your interview process (1 mark)
- 2) Provide your list of questions in an appendix (2 marks)
- 3) Explain (12 marks):
 - a. the Strategic Partner's motivation to talk to you
 - b. what makes them unique and a good potential strategic partner for your technology
 - c. what they think of your technology and how it may fit within their firm
 - d. what would be the next steps in working with them
 - e. any other things you feel are pertinent
- 4) Note that marks are based on quality of the explanation and analysis, not on simply answering the above questions.
- 5) You will also be partially graded on the quality of your report relative to that of your peers.

Further Guidelines:

- Content: As in business, your report should be a quality report with pertinent (but not redundant) detail for an executive to review.
- Reports should have a cover page, main body of approximately 5 pages, and appendices.
- Font and spacing for all submissions are 12 point Arial font, double-spaced, single-sided.

Deadline: Monday June 27th, 2022 – Submit your completed report by end of day (midnight).

D. Intellectual Property Analysis Assignment – (10 marks)

Exercise:

Conduct an Intellectual Property (IP) analysis with the product or service your group has selected.

Your report should include the following:

- Main Report - Include at least (but not limited to):
 - Brief outline of your product/service and the problem it solves
 - Outline of your target market and/or product positioning
 - Analysis of the incumbent “near” technologies available in the market and the market players who own/represent it
 - Analysis on what you feel is your uniqueness, how it is sufficiently different from existing technologies, and why it is a sustainable protectable advantage. It is a “Process” or “Utility” approach for the IP? US/Canada/Worldwide?
 - What did you learn? / What changes are needed to the product/service?

- Appendices
 - Question list
 - Any other pertinent information

Further Guidelines:

- Content: As in business, your report should be a quality report with pertinent (but not redundant) detail for an executive to review.
- Length: Reports should have a cover page, main body of approximately 10 pages, and appendices.
- Font and spacing for all submissions are 12 point Arial font, double-spaced, single-sided.

Deadline: Monday June 27th, 2022– Submit your completed report by end of day (midnight).

E: 12 Month Go-To-Market/Operating Plan OR Business Opportunity Assessment Assignment – Final Project (50 marks)

Exercise:

Marks will be broken down as follows:

Presentation at end of term	15 marks
Written Go-to-Market/12 Month Operating Plan OR Business Opportunity Assessment (should you choose to not proceed with your Technology Business)	35 marks

Based on previous classes you should expect to spend approximately 10 hours per week working on your plan and related assignments. If you're shooting for an "A" in this course, you should be prepared to invest approximately 20-30 hours on your Operating Plan / Business Opportunity Assessment alone

Important: Should you find that upon detailed examination that the proposed Technology product/service should not be brought to market, you are expected to present a detailed Business Opportunity Assessment on the Market, the Players, the incumbent Technologies/Patents, the trends within the Industry, and why you feel that you should not proceed with full product commercialization and rollout. You will also need to explain in detail why you think you would lose, should you try to commercialize. You will still need to present a projected 12 month financial operating plan, as if you would have proceeded.

Final Presentation at end of term (Saturday Morning, July 23rd, 2022) – 15 marks:

Formal Presentation with a Question and Answer Session. Each student will have a 30 minute running clock to make their presentation and answer questions. The instructor and any guest reviewer(s) can ask questions at any time during the presentation so it's a good idea to limit your presentation to a maximum of 20 minutes. Other students may ask questions at the end of the presentation until the 30 minute time has run out.

Assessment Criteria:

- i. Your presentation must be for a new technology venture and involve an underlying concept that has the potential to serve as a platform device for a fast-growth company/partner.
- ii. You will need to do a proper "Market Map" of all the players/competitors in the market and your specific uniqueness and sustainable competitive advantages.
- iii. You must confirm there is or is not a market for your product technology by presenting your focused market/strategic partner viability study and your resulting Go/No-Go decision.
- iv. You need to discuss your Intellectual Property / Patents findings, strategies, and next steps.
- v. The plan should discuss the key considerations for the operation and financing required over the 12 months it covers (regardless whether you choose to proceed or not). This financing must be a combination of owners' equity, outside equity, debt, Strategic Partner investment (i.e. "Prepayments", "Non-Recoverable Engineering Fees", etc) internally generated funds, and other sources, e.g. tax credits or government support.
- vi. The plan should support an annual growth rate for the company of at least 50% - 100%.

Written 12 Month Go-To-Market/Operating Plan OR Business Opportunity Assessment (Due Monday August 8th, 2022) – 35 marks:

Assessment Criteria:

- i. The document must be for a new technology venture and involve an underlying concept that has the potential to serve as a platform device for a fast-growth company/partner.
- ii. You will need to do a proper "Market Map" of all the players/competitors in the market and your specific uniqueness and sustainable competitive advantages.
- iii. You must confirm there is or is not a market for your product technology by conducting a focused market/strategic partner viability study prior to the completion of your Operating Plan or Business Opportunity Assessment. This will prevent you from developing a plan for a company that has a limited chance of success.

- iv. You need to discuss your Intellectual Property / Patents findings, strategies, and next steps.
- v. The plan should discuss the key considerations for the operation and financing required over the 12 months it covers (regardless whether you choose to proceed or not). This financing must be a combination of owners' equity, outside equity, debt, Strategic Partner investment (i.e. "Prepayments", "Non-Recoverable Engineering Fees", etc) internally generated funds, and other sources, e.g. tax credits or government support.
- vi. The plan should support an annual growth rate for the company of at least 50% - 100%.

Further guidelines:

- Report length is based on providing pertinent (not redundant) information to a potential investor, creditor, alliance partner, etc. Detail is important, but should not be excessive.

Reports should include:

1. 1 page title page
2. 1 page executive summary
3. Font and spacing for all submissions are 12 point Arial font, double-spaced, single-sided.
4. Body of report would typically be 15-20 pages of text
5. Appendices as required (support documents, financials, etc.)
 - You must also include copies of all reference sources cited in your plan, i.e. interviews with potential strategic partners, journals, etc.
6. Articles, research reports, magazine articles and newspaper columns in a separate folder
7. The following financial statements must be included:
 - a. Projected Cash Flow
 - b. Projected Income Statement
 - c. Projected Balance Sheet
8. BIGGER IS NOT BETTER! The "tighter" the business plan, the better!

Deadline:

Monday August 8th, 2022– Submit your completed report by end of day (midnight).

FACULTY BIOGRAPHY

Albert Behr

A proud Canadian, Albert Behr is an innovator and leader focused on technology commercialization. Born in Winnipeg, Behr has been in the technology industry for more than three decades. His experience spans high-level marketing, operational, and financing roles across leading technology companies and startups around the globe.

In Phase I of his career, and while based in Silicon Valley, Seattle/Redmond and Tokyo, Behr held executive leadership roles with technology giants such as AT&T, Fujitsu, and Symantec. While in Canada, he served as chief strategy officer for BorderWare Technologies, COO of NRG Group, and senior VP for Platform Computing/IBM.

For Phase II of his career, and for the past 20+ years, Behr has been at the helm of the technology commercialization consultancy he founded, advising more than 1,100 tech companies. During that time, he led numerous large-scale strategic partnerships and funding efforts for some of the most promising IT, clean tech, and material sciences firms in North America, Europe and Asia. In early 2015, he began devoting time to speaking engagements around the globe and curriculum development for one of Canada's top universities, where he is a professor in the faculty of engineering and teaches a course focused on entrepreneurship, innovation, and technology commercialization strategies.

Albert earned an MBA in Marketing and Finance from North Dakota State University, and his undergraduate degree from the University of Manitoba in Psychology and Economics.