

Course Syllabus (Revised Dec 24th)

Course Code	TEMG 4000H
Semester	Spring 2024-2025
Course Title:	Special Topic: Commercialization of Inventive Ideas
Course Credit:	3
Pre-requisites	NIL
Max Class size:	24 students (all students welcome)
Course enrollment:	Instructor consent is required. All UG students, PG students should seek special approval from instructor for enrollment
Class schedules	2-hour lecture followed by 1-hour tutorial (schedule: TBA)
Classroom:	TBC - Blended Learning Classrooms (Rm 4582, 1104, 6580)
Instructor:	Dr. Daniel Chun Tel 3469-2950 Email djychun@ust.hk

Course Description (Long)

Inventive ideas are the result of extensive research and development by scientists and engineers, often leading to groundbreaking products, services, or platforms with the potential to revolutionize industries. However, transforming these innovative concepts into commercially viable ventures is a complex process that requires navigating various challenges. This course guides students through the journey of commercializing inventive ideas, from initial concept to market entry. Students will explore the critical steps in bringing inventions to market, starting with identifying product-market fit and developing comprehensive commercialization strategies and business plan. The course covers essential aspects such as identifying target markets, analyzing competition, estimating market size, and strategizing customer acquisition and sales channels. This course collaborate with the Office of Knowledge Transfer (OKT) and students will work on recommended HKUST's Deep Tech projects led by professors and their project teams to develop commercialization plans for their inventions. Building upon the project team's concepts, this course fosters authentic learning experiences and cultivates higher-order strategic thinking skills and interdisciplinary collaboration crucial for successful commercialization. By the end of the course, students will have a thorough understanding of the commercialization process and the ability to transform inventive ideas into marketable products or services, preparing them for the challenges and opportunities in bringing innovations to market.

Course Description (Short)

This course explores the process of transforming inventive ideas into commercially viable products or services. Students engage in project-based learning, developing comprehensive commercialization strategies that address market needs, target audiences, competition, marketing approaches, and customers channel development. In collaboration with the Office

of Knowledge Transfer (OKT), students will create actionable plans to bring innovative concepts to market, gaining hands-on experience in the journey from invention to successful commercialization.

Background and rationale for this course.

HKUST's faculty research has produced groundbreaking inventions across various fields, often receiving initial IP protection and seed funding. This course enables students to develop comprehensive strategies to transform these inventive concepts into marketable products or services. Students apply their business acumen and technological knowledge through active participation in authentic commercialization tasks. By working on real inventive ideas, they enhance their leadership and communication skills while solving problems in a dynamic innovation ecosystem. Through research, negotiations, discussions, and interactions with potential partners and customers, students gain valuable insights into managing innovations and strategic planning in commercial settings. The course uses project-based learning to deliver a unique blend of technology and business education, significantly impacting students' practical skills and understanding of the commercialization process. It fosters collaboration among various disciplines within HKUST, creating opportunities for mutual support and talent development between the Office of Knowledge Transfer (OKT), research labs, and faculty members. By focusing on the commercialization of inventive ideas, this course bridges the gap between academic innovation and market application. It equips students with the tools and knowledge to navigate the complex journey from concept to commercial success, addressing a critical need in the innovation ecosystem. This approach enhances the potential for successful commercialization of HKUST's research outputs and prepares students for diverse career paths in innovation management, technology transfer, and entrepreneurship.

Teaching and Learning Activities

This course comprises of 13 weeks with a blend of lectures, project-based learning, and workshops, students will develop comprehensive commercialization strategies that address market needs, competition, IP protection, product innovations, distribution and business roadmap projections. The key activities include team projects where students learn to apply key strategic frameworks and assume roles as associates to create a roadmap for commercialization. They will specifically conduct market assessments, analyze competition, customer acquisition strategies and distributions and refine their commercialization strategies with insights from Prof. Zhengbao Yang and his research team with their inventive ideas. Students will acquire practical skills and insights from the instructor and guest speakers (e.g. HKUST OKT's Dr. David Leung) into managing innovations within a dynamic ecosystem, bridging the gap between academic research and market application.

Course Intended Learning Outcome (CILO)

CILO 1	To evaluate and analyze the commercial potential of inventive ideas using business modeling skills and market assessment techniques
CILO 2	To apply and develop higher-order strategic thinking skills to create comprehensive commercialization strategies for innovative concepts.

CILO 3	To identify and justify target markets, analyze competition, and formulate growth strategies for inventive ideas in various industries.
CILO 4	To develop sales channel, distribution, projections and resource allocation plans, demonstrating financial acumen in the context of commercializing innovations.
CILO 5	To articulate and present commercialization plans, including go-to-market strategies and implementation roadmaps for inventive ideas.

Project team

Each team will consist of 3-4 students which play the roles founders and associates role to help the commercialize the inventive ideas into a start-up a strategic plan, business forecast and related investment pitch decks.

Projects recommended by the OKT

Prof. Zhengbao Yang's from the SENG has been leading the Smart Transducers and Vibration Laboratory (STVL) in developing innovative technologies that are excellent cases for this course. Initial discussions of projects include smart shoes equipped with sensor technologies for gait analysis and health monitoring, a railway track vibration detection system for improved infrastructure safety, energy harvesting IoT devices that power themselves using ambient vibrations, and advanced piezoelectric-based automotive sensors for various applications in vehicles. All these projects leverage the lab's expertise in smart transducers, vibration analysis, and energy conversion, presenting unique commercialization opportunities in fields such as healthcare, transportation, IoT, and automotive industries

Ref Link to STVL : <https://yanglab.hkust.edu.hk/index.html>

Course Grading Policy

The course grade consists of both class discussions, mid-term assessment and final written assessment in the form of the business proposal. Participation will be judged based on the student's attendance, contribution to class discussions and group project work.

Attendance	5%
Quizzes and research assignments	20%
Mid-Term Assessment	20%
Sales Channel / Distribution Strategy	10%
Final Business Proposal (Group project)	25%
Presentation (Group project)	10%
Peer Assessment	10%

Course Schedule (13-weeks)

Week	Topics	Briefly outline what this topic will cover (including reading / assignments if available)	Indicate which course ILOs this topic is related to
1	Introduction to Commercialization	Overview of the commercialization process, challenges, and opportunities in bringing inventive ideas to market	CILO1
2	Inventive Ideas Showcase	Introduction to HKUST inventions by PI/faculty members, discussing their potential commercial applications	CILO1, CILO2
3	Market Assessment	Identifying product-market fit, conducting due diligence, and understanding customer needs	CILO1, CILO2, CILO3,
4	Commercialization Strategy First look	Developing initial commercialization strategy and presentation deck for acquiring sales B2B customers - mid-term assessment	CILO4, CILO5
5	Product Development Roadmap	Creating plans for product development and setting critical milestones for commercialization	CILO3
6	Market Analysis	Refining market size estimation (TAM, SAM, SOM analysis) through desktop research and analysis	CILO1, CILO2,
7	Competitive Landscape	Reviewing competitive analysis, go-to-market strategies, and growth plans	CILO2, CILO3
8	Customer & Channel	Validating assumptions through consultations with potential distribution / key customers	CILO2, CILO4
9	Customer Sales acquisition	Developing the sales channels and customer acquisition	CILO3, CILO4
10	Business Model Refinement	Refining overall business model, financial projects - discussing societal impact and potential exit strategies	CILO1, CILO2, CILO3
11	Implementation Planning	Developing detailed product/project implementation plans	CILO3, CILO5
12	Commercialization Strategy Review	Review session with PI or OKT to refine commercialization strategies	CILO2, CILO5
13	Final Presentations	Presenting final commercialization plans and strategies	CILO5

Recommended Reading / Reference:

Baines, N., Klangboonkrong, T., & Smith, H. L. (2024). Exploring product/service innovation process in UK: University spin-offs from practice-based lens. *The Journal of Technology Transfer*, 49(2), 715-739.

Butler, D. (2014). *Business Planning for New Ventures: A guide for start-ups and new innovations*. Routledge.



Bobbink, W. (2019). The ultimate guide to financial modeling for startups. Retrieved from https://www.ey.com/en_nl/finance-navigator/the-ultimate-guide-to-financial-modeling-for-startups

Hanák, R., & Grežo, M. (2020). The effect of entrepreneurial experience on the quality of a business plan proposal in applying for angel investment. *International Journal of Entrepreneurial Venturing*, 12(6), 617-647.

Swamidass, P. M. (2013). University startups as a commercialization alternative: lessons from three contrasting case studies. *The Journal of Technology Transfer*, 38, 788-808.

Türko, E. S. (2016). Business plan vs business model canvas in entrepreneurship trainings, a comparison of students' perceptions. *Asian Social Science*, 12(10), 55-62.

Tokarski, A., Tokarski, M., & Wójcik, J. (2017). The possibility of using the business model canvas in the establishment of an operator's business plan. *Torun Business Review*, 16(4), 17-31.

<p>Endorsed by:</p>  <hr/> <p>Prof. Hong Xu Co-director of T&M-DDP Date: 31 Dec 2024</p>	<p>Approved by:</p>  <hr/> <p>Prof. Arthur Lau Associate Dean (UG Studies) of AIS Date: 31 Dec 2024</p>
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