CYA Syllabus

BUS 335|ENGR 335 Inventing Tomorrow: From Idea to Market

Fall 2024

Course Instructor(s): Dr. George Vekinis

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Class Times: Tuesdays and Thursdays, 10.00 – 11.30, at the NCSR "Demokritos", 27 Neapoleos St., Ayia Paraskevi, 15341 (Building 17)

(Office) Hours Available: 10.00 – 13.00

Course Description

Do you have a great idea for new technology and want to learn the correct steps to transform it into an innovative product for the market? Are you a technologist who wants to know how to turn your invention into a successful product? Do you want to learn how best to protect a new invention so it retains its value all the way to market? Or maybe you simply want to learn how to invent things? Then, this course is for you!

This practical course has been developed from extensive hands-on experience in advising and mentoring inventors and companies on how best to commercialize their ideas. As a senior "technology exploitation" advisor for the European Commission, the instructor has met and advised hundreds of scientists, technologists, and businessmen on how to maximize the potential of their innovations. The most important lesson to learn is that the route to successful commercialization is much like the scientific method: prove the concept, plan ahead, observe results, correct, and repeat until ready for the market. This approach works for all technologies with potential value, whether to an industry or directly to a consumer.

Learning Objectives

The course is loosely based on the book *Technology Transfer in Practice: from Invention to Innovation* (2014) and *The Researcher Entrepreneur: best practices for successful technological entrepreneurship* (2016), both authored by George Vekinis, the instructor.[1] The course integrates both theoretical background and practical guidance on how to commercialize a valuable idea. It is aimed at anyone who wants to:

- Develop the "lateral thinking" necessary to cultivate a technological idea and create something innovative from it.
- Learn how to transform a well-conceived technological idea into an invention.
- Understand the 10 stages and the 3 Milestones that lead from the idea to a commercial product.
- Learn what the most powerful techniques for protecting an invention, both formally and informally, are.
- Learn how to evaluate an idea and understand the many factors that affect its value, along with the strategies to enhance the value of a new invention.
- Learn how to secure funding for the development and commercialization of an invention.
- ...and everything else required for successful commercialization of a technology.

The course will develop the skills needed to become a successful technological entrepreneur, including, but not limited to:

- Evaluating a technology vis-a-vis its acceptance and value within the industry or the market.
- Identifying and applying Intellectual Property Rights to a technology.
- Effectively protecting a technology to ensure maximum commercialization value.
- Carrying out technological and commercial SWOT (strengths-weaknesses-opportunities-threats) studies.
- Conducting technological, market, legal, partnership, etc., risk analyses and devising mitigation

[1] Both books were self-published and will be made available freely by the instructor. They are both on their 2nd edition and available from Springer and from all major bookshops.

strategies.
- Determining the optimal path for the commercialization of specific types of technologies.
- Identifying methods for obtaining funding for R&D and commercialization.
- Assessing the feasibility and viability of innovations.
- Analyzing the legal aspects of entrepreneurship and Intellectual Property.
- Developing business plans and exploitation strategies.
- Learning the dos and don'ts of entrepreneurship through the examination of numerous real case studies.
- Understanding when a technology is ready for commercialization.

Course Requirements

During class, the students will be required to contribute to the discussions, especially on areas which may require elucidation. Specifically:

- Class Contribution – Class Contribution includes physical and mental presence in the classroom, arriving on time, preparation, participation in class discussions, and posting occasionally on the Moodle forum. Preparatory readings and assignments are to be completed before each class session so as to have more time for discussions. Class contribution is one of the most important factors for determining the final grade. Students are expected to come prepared, engage in discussions, ask questions, and voice their opinions in class. If students are extremely uncomfortable speaking in front of an audience, they may send their opinions or afterthoughts via email. If they do neither, their contribution grade will be low.

- Midterm Exam – Analytical questions on inventions, innovations, IP protection, etc. Will include some multiple choice questions.

- Written Assignment – Analysis of a case study for commercialization. Basic background information and data will be provided and the student is encouraged to enhance the data with any relevant information that they can find online. The student will be required to carry out a detailed SWOT and Risk analysis and offer recommendations – maximum length about 15 pages.

- Final Exam – Analysis of a different case study. All background information and data will be provided and the student will be required to carry out a SWOT and a risk analysis and offer recommendations for an action plan.

Details about assignments and exams will be given in advance. No late assignments or make-up exams will be accepted or arranged, unless discussed with the instructor in advance. If unable to attend class, please notify the instructor beforehand.

Evaluation and Grading

Your grade for this course will be based on the following distribution:

Percentage breakdown

Class contribution – 15%

Written Assignment – 30%

Mid-term exam – 20%

Final Exam – 35%

Evaluation Criteria - Course Assignments

Final Exam

- Completeness of background work
- Completeness and presentation of arguments: clarity, lucidity, succinctness and strength of arguments that support recommendations
- Discussion of different approaches
- Originality

Written Assignment

- Completeness of background work
- Completeness and presentation of arguments: clarity, lucidity, succinctness and strength of arguments that support recommendations
- Discussion of different approaches
- Originality

Regulations and Accommodations

Attendance Policy

CYA regards attendance in class and on-site (in Athens or during field study trips) as essential, so attendance at all scheduled meetings is required. All absences are recorded and have consequences that may affect your grade. Illness or other such compelling reasons which result in absences should be reported immediately at the Report Medical Issue form.

Academic Accommodations

Students are required to submit an official letter from the office at their school that handles academic accommodations (generally the Office of Disability Services), or to have that office send a letter. Students who have submitted such a letter to CYA should also talk to their professors individually to discuss how these accommodations will work in each specific course.

Site Visits and Accessibility

This course requires that students walk upstairs to reach the lecture hall (no lift available).

Policy on Original Work

Plagiarism is literary theft. As such, it is a serious offense which will not be tolerated either at your home institution or at CYA. Plagiarism on an examination or in a paper will result in an F for the course. You must cite the author of any and all ideas that you use that is neither common knowledge nor your own idea. If you are in doubt, it is safest to cite the source. Your work should be original and reflect your own ideas and thoughts. If you are unsure about what counts as original work, please consult your professor and check the Student Handbook.

Use of Laptops

In-class or onsite use of laptops and tablets and other similar devices is permitted if this facilitates course-related activities such as note-taking, looking up references, etc. Laptop or other device privileges will be suspended if devices are not used for class-related work.

Upgrade to 400-level Course

Courses can be upgraded to a 400-level. This typically requires an additional 25% of work on the part of the student. The option to upgrade becomes available during the second week of classes. If you are interested in this option, please talk to your professor.

Class Schedule

Class Day	Day/Date/Place (if applicable)	Topic / Readings / Assignments Due
	Sept 5 – 7	**Field Study: Delphi and Ancient Olympia**
1	Tue Sept 10	**An Invention is NOT an innovation** Ideas, inventions and discoveries, the scientific method, serendipity and aiming... distinction between invention and innovation **Can everyone be an inventor? An Innovator?** Characteristics of an inventor vs an innovator
2	Thu Sept 12	**Technology transfer from the lab to the market: the long road ahead** The 10 stages and the 3 critical milestones
3	Tue Sept 17	**Transformation Strategies and actions** The road ahead for: RD, protection, funding, communication, etc.
	Sept 18 – 21	**Field Study: Crete**
4	Tue Sept 24	**Transformation Strategies and actions** The road ahead for: RD, protection, funding, communication, etc.
5	Thu Sept 26	**Valuation and valorization of an invention** Extrinsic and intrinsic value of a technology – examples and case studies
6	Tue Oct 1	**Proof of concept and RD strategies and funding** How do you carry out PoC studies? How do you secure funding?
7	Thu Oct 3	**IP Protection and freedom-for-use strategies** Hybrid protection – things to be careful – case studies
8	Tue Oct 8	**SWOT analyses and Validation of technical feasibility** Types of SWOT analyses – examples
9	Thu Oct 10	**Risk Analysis** Types of risk-mitigation routes – case studies
10	Tue Oct 15	**Scaling up routes towards commercialization** Real world challenges – funding and planning
11	Thu Oct 17	**Assignment: Presentation and discussions: Analysis of a case study in Innovation management and drawing up of an action plan.** ▪ Deadline for submission: **November 16** **Mid-term exam preparation**

12	**Tue Oct 22**	**Midterm Week**
13	**Thu Oct 24**	**Midterm Week**
	Oct 25 – Nov 3	**Fall Break**
14	Tue Nov 5	**Legal aspects of commercialization routes** NDA, Contracts and licenses - things to be careful about
15	Thu Nov 7	**Legal aspects of commercialization routes** NDA, Contracts and licenses - things to be careful about
	Nov 12 – 15	**Field Study: Peloponnese**
16	Tue Nov 19	**Assignment discussion** Model answer
17	Thu Nov 21	**Validation of techno-economic viability** The "economic feasibility" parameter – getting ready for commercialization
18	**Fri Nov 22**	**Make-up T|TH class**
19	Tue Nov 26	**Business planning** Planning for exploitation - funding and strategies - examples
	Nov 28 – Dec 1	**Thanksgiving Break**
20	Tue Dec 3	**Industrialization and onto the Market** Final steps for industrialization or for entering the market
21	Thu Dec 5	**Case studies in technology transfer** Real world examples and discussion
22	**Fri Dec 6**	**Make-up T|TH class**
23	Tue Dec 10	**Failures: assets or liabilities?** Benefits gained from failures: "Fail fast, fail often"
24	Thu Dec 12	**Exam preparation** Dos and don'ts of the exam - Final comments
	Tue Dec 17	**Final Exam Week**
	Thu Dec 19	**Final Exam Week**

N.B.: The course schedule, in terms of subjects and readings, may be subject to change to benefit student learning and to keep up to date with current research.

Schedule at a glance

Day #	Date	Session	Venue
	Sep 5-7	**Field Study**	**Delphi and Ancient Olympia**

Day #	Date	Session	Venue
1	Sep 10	Inventions and Inventors	NCSR "Demokritos"
2	Sep 12	Technology Transfer (TT)	NCSR "Demokritos"
3	Sep 17	TT Strategies	NCSR "Demokritos"
	Sep 18 – 21	**Field Study**	**Crete**
4	Sep 24	TT Actions	NCSR "Demokritos"
5	Sep 26	Valuation and Valorization	NCSR "Demokritos"
6	Oct 1	Proof of Concept	NCSR "Demokritos"
7	Oct 3	Protection of IP	NCSR "Demokritos"
8	Oct 8	SWOT Analysis	NCSR "Demokritos"
9	Oct 10	Risk Analysis	NCSR "Demokritos"
10	Oct 15	Scaling Up	NCSR "Demokritos"
11	Oct 17	ASSIGNMENT	NCSR "Demokritos"
12	**Oct 22**	**Midterm Week**	NCSR "Demokritos"
13	**Oct 24**	**Midterm Week**	NCSR "Demokritos"
	Oct 25 – Nov 3	**Fall Break**	
14	Nov 5	Legal Aspects	NCSR "Demokritos"
15	Nov 7	Legal Aspects	NCSR "Demokritos"
	Nov 12 - 15	**Field Study**	**Peloponnese**
16	Nov 19	Assignment: Model Answer	NCSR "Demokritos"
17	Nov 21	Technology Viability	NCSR "Demokritos"
18	**Nov 22**	**Make-up T|TH class**	NCSR "Demokritos"
19	Nov 26	Business Planning	NCSR "Demokritos"
	Nov 28 – Dec 1	**Thanksgiving Break**	
20	Dec 3	Onto the Market	NCSR "Demokritos"
21	Dec 5	Case Studies	NCSR "Demokritos"
22	**Dec 6**	**Make-up T|TH class**	NCSR "Demokritos"
23	Dec 10	Failures!	NCSR "Demokritos"
24	Dec 12	Exam Preparation	NCSR "Demokritos"
	Dec 17	**Final Exam Week**	
	Dec 19	**Final Exam Week**	

Course Bibliography

Required reading

George Vekinis, "Technology Transfer in Practice: from Invention to Innovation" (2014), 1st edition[2]

[2] A 2nd edition is available from Springer and from all large bookshops.

Recommended readings

[1] George Vekinis, "The Researcher Entrepreneur: best practices for successful technological entrepreneurship" (2016), 2nd edition.

[2] Peter Drucker, "Innovation and Entrepreneurship", 1985–2009, various publishers.

[3] Various articles in The Journal of Technology Transfer, Springer.

[4] Various chapters in "Technology Transfer: From Invention to Innovation", edited by Annamária Inzelt and Jan Hilton, Springer, 1999.

[5] Neil F. Sullivan, "Technology Transfer: Making the Most of Your Intellectual Property", Cambridge University Press, 1995.

[6] Harvard Office of Technology Development, "Uncovering the Latest Trends in Technology Transfer", Harvard University. [Online]. Available: https://www.techtransfer.harvard.edu/uncovering-the-latest-trends-in-technology-transfer/

[7] Harvard Office of Technology Development, "Realizing Technology Transfer: Inspiring Success Stories", Harvard University. [Online]. Available: https://www.techtransfer.harvard.edu/realizing-technology-transfer-inspiring-success-stories/

[8] Harvard Office of Technology Development, "Safeguard Your IP: Essential Toolkit for Tech Transfer Protection", Harvard University. [Online]. Available: https://www.techtransfer.harvard.edu/safeguard-your-ip-essential-toolkit-for-tech-transfer-protection/

[9] Zili Yang and David Popp, "Technology Transfer", chapter in "Smart Solutions to Climate Change", edited by Bjørn Lomborg, Cambridge University Press (online), 2012.