Syllabus

Collaborative for Technology Entrepreneurship & Commercialization (CTEC)

Discovery to Business Model

Rutgers University - Fall 2022
MBA 22 620 685
MAE 16 650 562

Day/Time: Wednesdays, 6P-9P
Campus/Venue: Livi, RBS, 100 Rock, Rm 4031

Faculty Instructors / Coaching Team:

➢ CTEC Director: Asst. Professor Mukesh M. Patel, J.D.
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➢ Instructor: Professor Stephen Tse
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Mentors - Every team will be assigned executive mentors. Details will be provided in class.

Course Teaching Assistant (TA): Avianca Goldston

CTEC 1: Discovery to Business Model

One of our goals is to help develop and inspire the next generation of entrepreneurs and intrapreneurs while building high growth, technology-based companies for the future.

We believe this can be done through a hands-on, real world, apprenticeship experience and experiential course series.

At Rutgers, we see entrepreneurs as LEADERS: solving problems, seeking opportunities and building a sustainable future for our world through INNOVATION. Entrepreneurship is more than a skill, it's a PASSION, led by VISION and actualized via EXECUTION. It's the ability to SEE THE WORLD AS IT COULD BE and persuade others to help make it happen. ENTREPRENEURSHIP is executive leadership, and INTRAPRENEURSHIP is innovative, entrepreneurial thinking applied in established organizations and companies.

Becoming such a leader requires more than learning a set of tools or memorizing business-speak. You don't become an entrepreneur by passing an exam or writing a paper. You have to immerse yourself in the real world and learn by doing – an apprenticeship. CTEC is designed as an experiential, multi-disciplinary Venture Accelerator. Rutgers Business School is committed to providing this experience for the students who dare to innovate, create, impact and lead the future.

Introducing the Collaborative for Technology Entrepreneurship and Commercialization (CTEC) - A growth experience. Graduate students in Business and STEM disciplines come together and collaborate to develop the knowledge and master the skills necessary for entrepreneurship and technology commercialization while designing and developing a new venture. The course adapts a teaching method called "The TEC Algorithm" that was initially developed using a large grant from the National Science Foundation and provides models, frameworks and methods that help translate scientific discovery into commercial value creation. The algorithm was originally designed to move technologies from the laboratory to the marketplace, but it increasingly demonstrates broader usefulness in the discovery and exploitation of entrepreneurial opportunities. The Algorithm provides the tools and its implementation provides the experience.

At Rutgers, we utilize an improved version of this approach through a two-course series. Throughout both courses we maintain a consistent pedagogical focus: the best way to learn entrepreneurship and innovation is to engage in the fields. The overarching theme of the course is therefore to identify and exploit real entrepreneurial opportunities, primarily through the mechanism of creating new businesses – whether independent ventures or drivers of innovation in existing companies.

"Technology Entrepreneurship & Commercialization" (TEC) (Fall 3 credits)
RBS: 22:620:685 SOE: 16:650:562
This course focuses on "Discovery to Business Models" and provides frameworks for identification and assessment of opportunities by matching technological capabilities to unmet market needs. Starting with a portfolio of novel technologies and an IP portfolio, students systematically evaluate commercial potential and develop novel and valuable product ideas. We begin formulating strategies and designing business models for commercial viability.

"Business Models to Launch" (BML) (Spring 3 credits)
RBS: 22:620:687 SOE: 16:650:564
This course focuses on the commercialization process of refining product ideas, deeply testing both technological and market assumptions, customer discovery, and building an investment grade business plan, investor pitch deck and presentation, supporting the potential launch of a new venture, within or independent of an existing business.

NOTE: The above course series is part of the MBA concentration of Technology, Commercialization, Innovation & Entrepreneurship (TCIE). The above course sequence is strongly recommended; however, in select circumstances, students may take either one or both courses, in any order. There is no pre-requisite for the TEC course; however, the BML course is intended to be taken by students who have completed either the TEC course or Opportunity Identification & Evaluation (22:620:624). The CTEC collaborative experience is co-taught by faculty from RBS and SOE. STEM students can also register for an extra 1 credit practicum connected with each course (for a total of 4 credits per course).
The TEC course fulfills the Integrative Course requirement for the MBA program.

Websites / Contact Information:
CTEC: https://www.business.rutgers.edu/ctec
TCIE Concentration: https://myRBS.business.rutgers.edu/mba/entrepreneurship

Technology Entrepreneurship & Commercialization" (TEC) (Fall Semester)
RBS: 22:620:685 SOE: 16:650:562
This course focuses on "Discovery to Business Models"

1. Course Objectives

Provide a healthy and safe environment for students to engage in an experiential learning opportunity where they will develop the knowledge and skills to:

- Translate scientific descriptions into product concepts
- Identify, articulate and evaluate opportunities in market terms
- Perform primary and secondary market research
- Develop and optimize viable business models

CETEC 1 is the first course in a two-course sequence. During this semester, students will learn a structured process to evaluate technologies for commercial viability. It introduces our approach to technology commercialization, called "the algorithm." The algorithm was originally designed to move technologies from the laboratory to the marketplace, but it increasingly demonstrates broader usefulness in the discovery and exploitation of entrepreneurial opportunities. The second course in the CTEC sequence uses the information and evaluation undertaken in CTEC 1 to prepare business plans for commercialization. Throughout both courses, we maintain a consistent pedagogical focus: the best way to learn entrepreneurship is to engage in entrepreneurship. The overarching commitment of the course is, therefore, to identify and exploit real entrepreneurial opportunities, primarily through the mechanism of creating new businesses. We encourage student participation in start-up businesses in a manner that is appropriate for both the student and the business.

Student Responsibilities

Students participate in the course as an educational exercise. As a participant in the course, however, you agree to certain responsibilities to your teammates and the owners of the intellectual property (IP) that is made available to you. You must allocate enough time to complete tasks assigned to you as a member of a team in a timely manner and to the best of your abilities. You must agree to keep all unpublished information about any IP in the course confidential.

We do not take ownership of the technologies provided for course use. All information, reports and analyses pertaining to the technologies made available, become the

property of the owner of the IP and must also be kept confidential. The only exception to this obligation comes when a full business plan for a startup is prepared and becomes the basis for a startup company that is moving toward launch; under these circumstances, the business plan and related material become the property of the newly formed company.

Students will be required to sign a form (Team Agreement and NDA) agreeing to abide by these conditions as a requirement to continue in this course.

2. Course Structure

The course is intended to be useful to scientists and engineers who may follow career paths that evolve from pure R&D toward more direct commercial activities, and for business students and professionals who will be working in technology-intensive industries. It is useful for anyone wishing to engage in for-profit entrepreneurship.

The course consists of class meetings and team meetings, as follows:

- **Lecture & Discussion**: The first part of the class (45 to 60 minutes) includes lectures and discussions led by the course instructors.
- **Guest Speaker Series**: The second part (30 minutes, select classes) consists of guest speakers (industry experts, academics, technology entrepreneurs, professional service providers, investors, advisors).
- **Team Breakout Work Meetings w/ Mentors**: The third part (remainder of class time, typically 90 – 120 min) consists of team meetings, which include the students and mentors assigned to support each team. In general, we expect that it will be necessary for the team to meet face-to-face (during semesters that are live on campus, but will be via video conference during special circumstances or when the semester is deemed to be virtual) at least once per week **in addition to** the meeting time provided for class, and in addition to the time that team members devote to individual class and project tasks. These additional team meeting times are to be arranged by the teams and mentors. The mentors will use their own discretion whether to attend these additional meetings. The team will discuss and report its progress and activities to their mentors each week.

The team keeps a meeting and activity calendar as well as agendas and minutes for all meetings. Project and contact management are critical to managing team activities. Meeting Schedules, Agendas, and Minutes are submitted as part of the graded final workbook.

Class Impact

Here are some of the career paths for which this program prepares students:

Completion of the CTEC experience supports several potential pathways:

(1) ***Entrepreneurial Startup Ventures*** – opportunity to be part of a real startup as we expect the course sequence to support the potential launch of new innovative ventures and tech startups

(2) ***Intrapreneurial Executive Leadership*** (Corporate Innovation) – opportunity to leverage transferability of the skill sets and insights into intrapreneurship (executive leadership and/or corporate innovation) in private or public companies; Research and Development; New Product Innovation and Development

(3) ***Investing*** – opportunity to develop insights and skill sets to pursue angel investing, venture capital, and/or private equity

(4) ***Consulting / Advisory*** – opportunity to pursue startup / management consulting and/or advisory board roles

Potential Opportunities / Roles:

- Senior Mentors, Advisors, Boards
- Corporate Ventures
- Founders, Executive Teams
- R&D Management
- Business Development
- Strategic Technology Management
- Analysts
- Strategic Alliance Management
- IP Management
- Strategic Partners
- Technology Marketing
- Innovation Labs, Incubators, Accelerators
- Angel / VC Investor / LPs

3. Assignments

Each team will be responsible for completing all assigned readings, worksheets, reports, and presentations (deliverables):

All team deliverables will be included in their *'Deliverables'* folder. These are due on specified weeks throughout the semester (see Course Schedule). The mentors will monitor and encourage team progress on each deliverable.

Evaluation Criteria

There will be three areas considered during evaluation:

- **Team Deliverables**. Each team will turn in the CTEC assignments, including each section mentioned in Team Deliverables, as well as the worksheets and team management reports. The team's mentors monitor the Deliverables folder on a weekly basis, which must be up-to-date at the weekly Wednesday team meeting for this purpose. The Deliverables folder is evaluated by the team's Mentors at the end of the semester and is a major source of the team grade. The Deliverables are evaluated on technical correctness, completeness, as well as the amount, and quality of work. *Particular attention is paid to the decision-making of the team.*
- **Individual Contribution** will be evaluated based on: (the evaluator is listed in parentheses):
    - attendance at class and team meetings (TA and Mentors)
    - timely completion of assigned work (Mentors)
    - contribution to the team meetings (Mentors)
    - class discussions (Instructors)
    - quality of assigned work (Instructors and Mentors)
    - performance measured against specific team role(s) (Instructors and Mentors)
- **Peer Evaluations**. Periodic Peer Evaluation forms will be provided to every team member. Each team member will use the form to provide assessments of their own and their teammate's contributions.

Projects

The CTEC Program is providing a portfolio of intellectual properties (IP) to this class. These technologies have come from a variety of public and private sources. In each case, the original owner of the IP retains all rights to their technologies, but has agreed to make them available to the CTEC Program for commercialization. Each team will be assigned a set of technologies and some of the remaining IP will be made available in a pool, for inclusion in the team's portfolio of potential projects.

While the pedagogy for the course calls for the teams to be self-directive as they apply the CTEC Algorithm, it is important to note that CTEC is responsible for commercialization, but the IP rights remain with the owners of the IP.

CTEC is committed to launching and supporting new high growth ventures. It is also committed to preparing the next generation of entrepreneurs and intrapreneurs.

Towards that end, students in this CTEC course sequence may be invited to continue their participation in each project at the conclusion of the course as it passes from this academic setting. Each student's level of commitment, dedication and contributions to the project will be considered when determining possible inclusion on the founding team.

4. Grading

There will be a total of 100 points available, distributed as follows:

- Team Performance (Decision making, Deliverables quality) 15
- Final Presentation 15
- Final report 15
- Contacts 15
- Individual Contributions (Role Contributions, Quality, Volume, Activity) 30
- Peer evaluation (5 at midterm and 5 at final) 10

TOTAL 100 points

100 ≥ A+ > 97 ≥ A > 93 ≥ A- > 90 ≥ B+ > 86 ≥ B > 83 ≥ B- > 80 ≥ C+ > 76 ≥ C > 73 ≥ C- > 70 ≥ D+ > 66 ≥ D > 63 ≥ D- > 60 ≥ F

Textbook

There is no textbook required for the course.

Learning Management System

We will be using Canvas and Google Drive.

Each **team** will create a Deliverables folder in Canvas and/or Google Drive (as advised) for the completed Worksheets, Reports, and Presentations.

Course materials include:

- Syllabus and Schedule
- Lecture Slide Decks
- Worksheets
- Readings / Videos

Note on readings: Articles and reading materials will be periodically provided in the "Assignments" folder online. These materials provide valuable background and

important information for the course. Students are required to read these materials and participate in class discussions. Please note: additional readings may be assigned on a “just-in- time” basis during the semester.

Time Commitment

Each student is required to meet in each class session and with their team one other time per week. Team members have individual work assigned to them by the team during the week, which may involve face-to-face or virtual meetings with external experts. Assignments and meeting attendance will be reported to team mentors each week.

Attendance

Attendance at all regularly scheduled class meetings is mandatory. Team meetings with your team are mandatory. Meetings with other people to gather information about your project will be assigned in team meetings and are mandatory. Your participation in gathering data and preparing reports is mandatory. Your team mentors and team leader should be contacted in advance if you cannot attend a meeting.

Professional Ethics

Any breach of professional ethics will result in dismissal from the class, an automatically failing grade in the course and a report to the university for further disciplinary action. A breach of professional ethics includes violating the conditions of course enrollment or academic dishonesty.

It is unethical to put your name on work for which you do not contribute. If for any reason you are only able to make minimal contributions to your team it is ethical and professional to report your actual level of contribution. You will have the opportunity to report your level of contribution at the end of the semester.

Contact Information and Office Hours

If you have questions or concerns or are interested in talking about the course or your goals, it is recommended that you deal with them as follows:

- Simple procedural questions, i.e., regarding deliverables, dates, etc. – ask at the beginning of class, or email the TA, and if there is no response in a reasonable time

period, then to one of the Instructors.

- Academic questions regarding course content – ask in class, email the set of instructors, or ask the team mentor.

Special Accommodations / Office of Disability Services:

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form. For more information please contact Kate Torres at (973)353-5375 or in the Office of Disability Services in the Paul Robeson Campus Center, in suite 219 or by contacting odsnewark@rutgers.edu.

NEW HEALTH AND SAFETY (COVID) GUIDELINES AND POLICIES:
In order to protect the health and well-being of all members of the University community, masks must be worn by all persons on campus when in the presence of others (within six feet) and in buildings in non-private enclosed settings (e.g., common workspaces, workstations, meeting rooms, classrooms, etc.). Masks must be worn during class meetings; any student not wearing a mask will be asked to leave.
Masks should conform to CDC guidelines and should completely cover the nose and mouth:
https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html
Each day before you arrive on campus or leave your residence hall, you must complete the brief survey on the My Campus Pass symptom checker self-screening app.

Course Schedule *(subject to change, as necessary)*

Week 1: (9/7/22)
Course Intro – Submit Team Agreement and NDAs
Provide Contact Information (to TA / Instructors)
Introductions (Students / Faculty / Mentors)
CTEC Introduction
*** All Students MUST submit resumes via link in google drive by Week 2.

Week 2: (9/14/22)
Search/Product Ideation Opportunity Description Worksheet
Client relationships
Review Portfolio of Technologies / Bid for and assign Core Technologies
Teams will be announced **after** Add/Drop.

Week 3: (9/21/22)
Product Definitions; Innovation Charter
Technology Description Worksheets
Ideation Methods (Nominal Group Technique)

Week 4: (9/28/22)
Problem Statement
Market Research
Technology Documentation
Product Idea Worksheet
Contact Worksheets
Initial TPM Worksheet / Product Attributes Worksheet
Library Resources

Week 5: (10/5/22)
Value Proposition
Product Attribute-Market Matrix
Worksheet Summary TPM
Selection criteria
Market Description Worksheet
Preliminary Market Assessment Worksheet
Product Definition Worksheets

Week 6: (10/12/22)
*** DRAFT PRACTICE PRESENTATIONS ON WORKSHEETS FROM Week 5

Week 7: (10/19/22)

*** IDEATION REPORTS and PRESENTATIONS DUE
Ideation Reports (Provide Link for Mentors and Instructors)
Team Role Discussion
Value Proposition WS
Algorithm Phase I
Team Reformulation / Calibration

Week 8: (10/26/22)
Team Activity – “Pitch” 1st Functional Assessment
Algorithm Phase 1 Discussion
VOC

Week 9: (11/2/22)
Functional Assessments
Strategic Assessments
Technologist Communication
Business Models

Week 10: (11/9/22)
Financial Analysis
Equity Investments: Bootstrapping, Angels, Venture Capital, Corporate, Grants
Introduction to Algorithm Phase II

Week 11: (11/16/22)
*** PHASE I REPORTS Due (all teams)
*** PHASE I PRESENTATIONS Due
Upload Phase II Drafts into google drive for mentor review by TBD

Week 12: (11/23/22): THANKSGIVING HOLIDAY (Friday schedule / NO CLASS)

Week 13: (11/30/22)
Technologist Communication draft (to Mentors)
Introduction to Algorithm Phase II (Continued)

Week 14: (12/7/22)
*** All Deliverables (Final) Due
- PHASE II REPORTS and PRESENTATIONS
- Information Gathering Logs Due

*** Peer Evaluations (final) Due

Week 15: (12/14/22) - Last Class
Course Evaluation
Happy Hour / Social Networking