

Technological Entrepreneurship Certificate

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Abstract

The Technological Entrepreneurship Certificate at The University of Iowa is earned in conjunction with an engineering degree. The College of Engineering in partnership with the John Pappajohn Entrepreneurial Center at The University of Iowa has developed the first certificate of its kind in any U.S. college or university. The Center is the only one of its kind in the country to mesh students and faculty in engineering, business, and medical sciences. Engineering students pursuing the certificate program take a minimum of 18 semester hours of entrepreneurial courses. The program enables engineering students to study the entrepreneurial process as it relates to technology.

Engineering students at The University of Iowa are exploring venture capital, marketability of products, and technology transfer. They are preparing to launch tomorrow's successful businesses while earning their engineering degree. It not only serves students who intend to start and operate their own business, it also helps any student interested in gaining a better understanding of the entrepreneurial process. The wide range of electives permits students to tailor business courses best suited for their individual interests.

I. Introduction

This paper describes the development of the certificate program from the perspective of the first author who acted as midwife. Ed Moldt's role was that of parent, one of several. The model was the usual academic process, punctuated equilibrium. Resistance to change and the formalization of new activity characterizes this model once breakthrough is achieved. Key to the success was leadership from the top.

Richard K. Miller was appointed Dean of Engineering in 1992 with a goal of the construction of a major addition to, and renovation of the engineering building. The requisite fund raising involved entrepreneurial alumni; and general recognition of the importance of entrepreneurial ideas in our student's skill set.

Dean Miller in partnership with Gary C. Fethke Dean of the Henry B. Tippie College of Business initiated discussions in 1993 which lead to the recruitment of Edward M. Moldt as a consultant. Under Ed Moldt's direction the entrepreneurial activity on campus

developed into the John Pappajohn Entrepreneurial Center, and the establishment of several related classes.

The University had already in place several certificate programs. A certificate program in international business was of particular interest. The general University approval process for certificates was found to be workable within the institution.

II. Program development

The proposed certificate program was developed jointly between the Colleges of Business and Engineering. The College of Engineering awards the certificate, while the College of Business develops and teaches the classes. The certificate program in international business was the template.

Self interest concerns eased the process. The College of Engineering has capped enrollment with about 7% of the total University enrollment, but attracts about 35% of the entering students whose ACT score is 29 or above. These high ability students are found attractive to many of the faculty who teach classes in business. While from Engineering's perspective, a formal tie to Business would be desirable in attracting high ability students.

The Engineering Faculty Council, an elected representative body, reviewed the proposed program, made suggestions, and passed the proposal to the faculty. Several key faculty, active in curricular matters, were also consulted individually on details. Several weeks of intensive effort followed, resulting in about five major versions each with several variants. A key item which evolved was the principal that each department would have complete control over which business classes would count towards engineering degree credit. It was felt that this intensive negotiation effort was essential in obtaining Engineering faculty approval.

II. Status and plans

A small fraction of engineering students, about 3%, actually sign up for the program. A larger portion of students, about 10%, have expressed interest and take one or more entrepreneurial classes. About 20% of the engineering students take one or more business classes.

The visibility of the certificate program seems high. As we look towards our next ABET visit, it is to be expected that a more complete evaluation will be available. An effort to expand the certificate to graduate students is under way. The level of interest is lower and the result is unclear.

III. Certificate requirements

Students may enter the program as sophomores with at least a 2.75 UI grade point average. Students will propose a specific plan of study with their advisor. The plan will be reviewed and must be approved by the department chairperson and the College entrepreneurial faculty representative.

To earn a Technological Entrepreneurship Certificate, students must:

1. Receive an engineering degree, based on completing 134 semester hours (6 more semester hours than the standard degree requirements).
2. Maintain a 2.00 minimum grade point average on all course work taken for the certificate.
3. Take at least 12 semester hours of the 18 semester hours of course work for the certificate in residence at The University of Iowa or in approved study-abroad programs.

Engineering students pursuing the Certificate program will take a minimum of 18 semester hours of entrepreneurial courses including:

Accounting for Non-Business Students (3 s.h.)

Entrepreneurship: New Business Formation (3 s.h.)

The Entrepreneurship curriculum includes the following electives in addition to the basic courses, from which engineering students may choose a minimum of 9 s.h.:

Small Business Management (3 s.h.)

Persuasion and Communication (2 s.h.)

Medical Venturing (2 s.h.)

Entrepreneurship Through Personal Acquisitions (2 s.h.)

Entrepreneurship: Business Consulting (3 s.h.)

Legal Aspects of Entrepreneurship (3 s.h.)

Developing a Professional Service Business (2 s.h.)

Data Product Design and Development (2 s.h.)

Managing Technology Transfer (2 s.h.)

Entrepreneurship Through Franchising (2 s.h.)

Strategic Management of Technology & Innovation (2 s.h.)

Technology Applications for the Entrepreneur (2 s.h.)

Real Estate and Entrepreneurship (2 s.h.)

Entrepreneurial Marketing (3 s.h.)

Corporate Venturing and Innovation (2 s.h.)

Family Business Management (3 s.h.)

Summer Practicum (3 s.h.)

Capital Acquisition & Cash Flow Management (3 s.h.)

Managing the Entrepreneurial Process (3 s.h.)

V. Testimonial from the first two certificate holders

Tim Bechen and Dong Banh, who graduated in May 1997 with BS degrees in engineering, were the first two students to earn University of Iowa certificates in technological entrepreneurship.

Banh, whose bachelor's degree is in mechanical engineering, grew up helping his parents in their Des Moines, IA, restaurant and grocery store. "I think that when it comes time for me to talk to bankers and financial people, having earned this certificate will make a big difference." Banh already has launched one successful enterprise. Adventure Isle Collectibles sells collectible cards, toys, and comic books over the Internet.

"I didn't want to sit in a cubicle for the rest of my life," Bechen says. "I also didn't want to just solve problems for someone else. I like the fact that with my own business, I can take an idea and run with it. Bechen adds that he also is intrigued by the notion that engineers can go beyond solving a series of individual technical problems to establish and achieve long-term business goals.

Both graduates note that their engineering training was put to good use in their business classes. "Engineering teaches you how to think," Bechen says. "While other students saw designing a new business as a gigantic problem, I could break it down: How do we get a certain amount of financial backing? How can we become incorporated in two months? Where can we find the technical expertise to help us get up and running?

"And there were many times," Banh adds, "when I was asked to explain the technology to the business students, medical students, and lawyers in my classes." "Traditionally, it's been the engineers who have come up with the creative ideas and the business people who get rich off of them," he says. "Why not let the engineers learn the business and get rich, too?"

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EDWARD M. MOLDT

Ed Moldt is currently Professor and Director of the John Pappajohn Entrepreneurial Center and most recently was the founder of the Center for Entrepreneurship and Innovation at Indiana University. He subsequently served as Managing Director of the Sol C. Snider Entrepreneurial Center at the Wharton School of the University of Pennsylvania. The entrepreneurial program ranked #1 in the nation at the time he retired from Wharton in 1992. He then served as the founding Director of the Institute for Entrepreneurial Management at the University of Iowa and was instrumental in the development of the John Pappajohn Entrepreneurial Center. He has been closely associated with the Ewing Marion Kauffman Foundation as Entrepreneur in Residence and currently as Entrepreneurial Consultant. He was the second recipient of the Distinguished Owner-Manager Alumnus award from Indiana University. Ed is a Price Babson Fellow and recipient of the Appel Prize for Entrepreneurial Leadership. His entrepreneurial companies cover a broad range of industries ranging from country clubs, equipment leasing, residential care, dental laboratories, primary health care, indoor sports facilities, real estate and dozens of other niches. He received an AB degree from Loras College, Dubuque, Iowa; and, a BA degree in German and Philosophy and an MBA in Finance from Indiana University.

JOHN P. ROBINSON

John Robinson is currently Professor of Electrical & Computer Engineering and serves as an ABET evaluator representing the IEEE for Electrical Engineering and for Computer Engineering. He has been employed in 31 different positions ranging from dishwasher to dynamiter. John is a registered professional engineer and a published poet. He was Associate Dean for Academic Programs in the College of Engineering for 4 years 9 months ending in September 1997. He received a BSEE from Iowa State University and MS & Ph.D. from Princeton University.