



BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION, INFORMATION OR DISCUSSION

TOPIC: University of Baltimore: Master of Science in Innovation Management and Technology Commercialization

COMMITTEE: Education Policy

DATE OF COMMITTEE MEETING: November 14, 2011

SUMMARY: The proposed program seeks to address one of the USM 2020 Strategic Plan themes, "advancing Maryland's competitiveness in the new economy" and to address the shortage of managerial talent in growing Maryland-based technology firms.

A recent survey by a University of Baltimore faculty member identified that the leading reason that technology ventures left Maryland for other locations was the weak labor pool for managers who understood the distinctive issues faced by growing technology firms.

The proposed M.S. in Innovation Management and Technology Commercialization is designed to prepare individuals for managerial roles in technology-oriented firms, particularly those located in Maryland. The program design is founded on four key themes essential for success in technology-based firms: organizational creativity, new product development, management of growth, and resource acquisition. Opportunities provided for virtual and face-to-face interactions among participants will provide a significant resource as students learn from each other's rich experiences. The program will integrate technological, market, and organizational issues into the core of the program and will offer a capstone practicum in collaboration with the Maryland Technology Development Corporation (TEDCO) that is unique to this program.

It is anticipated that individuals who would find this program of interest would include university science and engineering faculty, research and development scientists employed by federal labs, scientists and engineers in the Mid-Atlantic region, managers in Maryland-based technology firms, graduates of UB's Simulation and Digital Entertainment program, and managers from firms moving into the technology sector.

ALTERNATIVE(S): The Regents may not approve the program or may request further information.

FISCAL IMPACT: No additional funding is necessary. The program will be supported through tuition.

CHANCELLOR'S RECOMMENDATION: That the Committee on Education Policy recommend that the Board of Regents approve the proposal from the University of Baltimore to offer the Master of Science in Innovation Management and Technology Commercialization.

COMMITTEE RECOMMENDATION:

DATE:

BOARD ACTION:

DATE:

SUBMITTED BY: Irwin Goldstein (301) 445-1992 irv@usmd.edu

UNIVERSITY SYSTEM OF MARYLAND INSTITUTION PROPOSAL FOR

- New Instructional Program
- Substantial Expansion/Major Modification
- Cooperative Degree Program

University of Baltimore

Institution Submitting Proposal

Innovation Management & Technology Commercialization

Title of Proposed Program

Master of Science

Degree to be Awarded

Fall Semester 2013

Projected Implementation Date

Proposed HEGIS Code

Proposed CIP Code

**Department of Marketing &
Entrepreneurship**

Department in which program will be located

Dr. Dennis Pitta

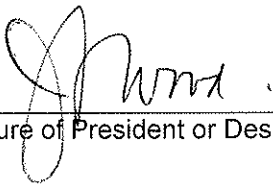
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Contact E-Mail Address


Signature of President or Designee


Date

Relationship to Mission

The University of Baltimore's mission is to provide innovative education in law, business and liberal arts, building capabilities and enabling students to address significant 21st century challenges, particularly those facing Baltimore and the region. The University is an integral partner in this increasingly technology intensive and innovative environment, encouraging new venture creation, exploitation of new technologies, and effective management of growing, technology-oriented firms. The University has a history of applying its strengths and resources to the development and launch of new programs that fulfill state needs. The proposed M.S. in Innovation Management & Technology Commercialization exemplifies this approach—aiming to serve a significant regional need while capitalizing on the University's core competencies.

Characteristics of the Proposed Program

Uniqueness of this program: Addressing a priority for Maryland higher education. The University System of Maryland (USM) 2020 strategic plan identifies "advancing Maryland's competitiveness in the new economy" as one of five strategic themes. One major challenge associated with this theme is technology transfer and commercialization. In an address to the Maryland Technology Development Corporation on March 17th, 2011, USM Chancellor William E. "Brit" Kirwan discussed this challenge and cited the need to 1) create an entrepreneurial culture within USM faculty, 2) collaborate with the business community to commercialize university discoveries to penetrate the economy, and 3) support seed funding, proof-of-concept funding, intellectual property and patent development, and commercialization. One central measure demonstrating that this challenge is being met has been identified in the current USM strategic plan—starting 325 successful companies by 2020. The proposed M.S. will assist in meeting this USM objective by both helping USM faculty to establish technology firms and improving the managerial effectiveness of firms already established by such faculty.

A second rationale for the proposed M.S. program is to address the shortage of managerial talent in growing Maryland-based technology firms. A recent survey by University of Baltimore faculty member J.C. Weiss identified that the leading reason that technology ventures left Maryland for other locations was the weak local labor pool for managers who understood the distinctive issues faced by growing technology firms. UB's long experience with preparing its graduates for managerial roles in local firms will contribute to the uniqueness of the proposed program.

Maryland ranks #1 in the United States in R&D per capita and is the second largest technology cluster in the US outside of Silicon Valley. The 2008 State New Economy Index ranked Maryland fifth in innovation capacity, fourth in knowledge jobs and economic dynamism, and third in how the state compares on new economy measures, according to the 2020 USM strategic plan. The state attracts \$12 billion in R&D funding annually to seven research universities, 12 federal agencies, and over 70 labs and centers. In 2006 the Maryland Department of Planning identified 14,135 high technology firms in the state, representing a little more than 10% of all firms in the state. Approximately 8.8% (1244 firms) of Maryland's high technology companies had more than 50 employees. These firms employed 236,319 people. Larger technology firms represent an important target market for this program.

Potential competition for the proposed M.S. program currently includes UMBC's Master in Professional Studies: Biotechnology, UMUC's Master of Science in Biotechnology Studies, and the Certificate in Innovation Management at the University of Maryland—College Park. Towson University is establishing a School of Emerging Technologies within its College of Science and Mathematics. This school will focus on computer-based and digital technologies, rather than innovation management or technology commercialization. Johns Hopkins has proposed to MHEC a new Master's in Biotechnology Enterprise and Entrepreneurship through its Center for Biotechnology Education. In a recent article in the Baltimore Business Journal, UMBC's vice provost for academic affairs stated, in relation to the new Johns Hopkins program, "there are more than enough students to go around." In addition, the University of Texas—Austin offers an online Master of Science in Technology Commercialization.

Educational Objectives of the Program

The M.S. in Innovation Management & Technology Commercialization is designed to meet this challenge. The Program's educational objectives are outlined below. Graduates from this program will be able to (Innovation Management-related objectives indicated by "IM", Technology Commercialization-related objectives indicated by "TC"):

- Create technology-oriented products, services, and processes (IM, TC).
- Evaluate the research & development activities of an existing organization (IM, TC).
- Design and implement a new product development program for a technology-oriented product or service (IM, TC).
- Analyze the interactions between changes in markets, technologies, & organizations (IM).
- Analyze and improve the business activities of a post-startup technology firm, i.e. marketing, strategy, operations, human resources management, and financial management (IM).
- Design and implement a resource acquisition strategy for a technology firm (IM).
- Analyze and, where appropriate, propose a technology transfer program (IM, TC).

Description of the Program as it would appear in the catalog

The M.S. in Innovation Management & Technology Commercialization is designed to prepare participants for managerial roles in technology-oriented firms, particularly those located in Maryland. Opportunities provided for virtual and face-to-face interactions among participants will provide a significant resource as students learn from each other's rich experiences. This 30-credit program is designed for great flexibility so that students can participate without any interruption to full-time career responsibilities.

The program integrates technological, market, and organizational issues into the core of the program and offers a capstone practicum in collaboration with the Maryland Technology Development Corporation (TEDCO) that is unique to this program. The Program is founded on four key themes, all essential for success in technology-based firms:

- Organizational creativity
- New product development
- Managing the growing technology firm
- Resource acquisition

The program has two foundation courses as prerequisites: IMTC 601 and IMTC 602 (3 credits each) which may be waived based on prior coursework. The 30-credit program includes a six-course core (18 credits) that features one practicum that is unique to this program. A choice of four elective courses (12 credits) allows participants to explore topics to suit their individual interest.

Degree Requirements

Foundation Courses (6 credits)

IMTC 601 ^{*^}	Business Fundamentals for Entrepreneurs and Innovators I (3)
IMTC 602 ^{*^}	Business Fundamentals for Entrepreneurs and Innovators II (3)

Required Courses (18 credits)

IMTC 750 ^{*^}	Introduction to Innovation Management & Technology Commercialization (3)
MGMT 760 [^]	Organizational Creativity & Innovation (3)
MKTG 762 [^]	Market Opportunity Analysis (3)
IMTC 790 ^{*^}	Managing the Growing Technology Firm (3)
IMTC 791 ^{*^}	Resource Acquisition for Technology Ventures (3)
ENTR 795	Entrepreneurship Practicum (3)

Elective Courses (9 credits) *Select three courses from the following:*

PBDS 705	The Design-Business Link (3)
IMTC 792*^	Innovation in Developing & Emerging Economies (3)
IMTC 761*^	Patents, Trademarks & Technology (3)
MKTG 770^	Product Development (3)

Other courses as approved by the program advisor, such as appropriate courses in the College of Arts and Sciences, College of Public Affairs or additional business courses.

Open Elective (3 credits)

Any additional elective as approved by the program director.

**New or redesigned courses*

^Course may be offered online

Student Learning Outcomes and Assessment

Learning outcomes are tied to individual courses and are articulated in each course syllabus. Over the course of the program, students will be able to:

- Apply creative techniques to develop new products, services and technologies.
- Apply the innovation management process to commercialize a new initiative.
- Analyze specific markets and appraise their potential for success.
- Demonstrate the most effective techniques used to manage a technology firm.
- Identify appropriate sources of capital, intellectual property and human talent for entrepreneurial start ups.

Assessment is performed by means of a combination of examinations, work products such as business plans, product concepts, position papers and other traditional assessment methods. Assessment metrics are contained in learning rubrics tied to the course objectives of individual courses.

Demonstrable quality of program faculty

Dr. Michael Laric, Dr. David Lingelbach and Mr. J.C. Weiss will be the principal instructors in this program. Dr. Laric is a Professor in the Merrick School of Business who teaches and does research in the fields of technology commercialization and new product development. Dr. Laric co-founded and directed UB's Lab to Market program (technology commercialization) in the 1990s. He has negotiated collaboration agreements between the Merrick School and NASA's Goddard Space Flight Center. Dr. Lingelbach is an Assistant Professor in the Merrick School who teaches and researches in the fields of entrepreneurship and entrepreneurial finance. Mr. J.C. Weiss is a full-time instructor in the Merrick School with prior experience as both a venture capitalist and president of a NASDAQ-listed biotechnology company.

In addition, the Merrick School is currently recruiting a new faculty member in innovation management at the assistant/associate professor level. This faculty member is expected to join the Merrick School in the fall of 2012.

Potential Participants Who Would Benefit from this Program

- USM science and engineering faculty, particularly those at UMB and UMBC
- Research and development scientists employed by Federal labs (i.e. NASA, NIH, Fort Detrick, NAVAIR (Patuxent River) and BARC) who have intellectual property such as patents, patents pending, or innovations looking for business knowledge to help commercialize their inventions.

- Other scientists and engineers located in the Mid-Atlantic region interested in technology commercialization
- Managers at Maryland-based technology firms
- Graduates of UB's Simulation and Digital Entertainment program
- Managers from non-technology firms interested in moving into the technology sector

Library requirements

Appropriate library resources are available.

Facilities and equipment

No special facilities or equipment are required.

Finances

TABLE 1: RESOURCES					
Resources Categories	2012	2013	2014	2015	2016
1. Reallocated Funds					
2. Tuition/Fee Revenue (80% of (c+g) below)	\$32,640	\$65,280	\$130,560	\$195,840	\$195,840
a. #F.T. Students					
b. Annual Tuition/Fee Rate					
c. Annual Full Time Revenue (a x b)					
d. # Part Time Students	5	10	20	30	30
e. Credit Hour Rate	\$680	\$680	\$680	\$680	\$680
f. Annual Credit Hours	12	12	12	12	12
g. Total Part Time Revenue (d x e x f)	\$40,800	\$81,600	\$163,200	\$244,800	\$244,800
3. Grants, Contracts, & Other External Sources					
4. Other Sources					
TOTAL (Add 1 - 4)	\$32,640	\$65,280	\$130,560	\$195,840	\$195,840

TABLE 2: EXPENDITURES

Expenditure Categories	2012	2013	2014	2015	2016
1. Total Faculty Expenses (b + c below)	\$15,258	\$34,099	\$68,198	\$102,297	\$102,297
a. # FTE (Based on 450 CrHrs/FTE)	.13	.27	.53	.8	.8
b. Total Salary (\$100,971 avg based on 87% FT and 13% adjunct)	\$13,463	\$26,926	\$53,851	\$80,777	\$80,777
c. Total Benefits	\$1,795	\$7,173	\$14,347	\$21,520	\$21,520
2. Total Administrative Staff Expenses (b + c below)	\$4,550	\$4,550	\$9,100	\$9,100	\$9,100
a. # FTE	.05	.05	.10	.10	.10
b. Total Salary(1 FTE=\$70,000 avg)	\$3,500	\$3,500	\$7,000	\$7,000	\$7,000
c. Total Benefits	\$1,050	\$1,050	\$2,100	\$2,100	\$2,100
3. Total Support Staff Expenses (b + c below)	\$2,841	\$2,841	\$5,682	\$5,682	\$5,682
a. # FTE	.05	.05	.10	.10	.10
b. Total Salary (1 FTE=\$40,000 avg)	\$2,000	\$2,000	\$4,000	\$4,000	\$4,000
c. Total Benefits	\$841	\$841	\$1,682	\$1,682	\$1,682
4. Equipment					
5. Library					
6. New or Renovated Space					
7. Other Expenses					
TOTAL (Add 1 - 7)	\$22,649	\$41,490	\$82,980	\$117,079	\$117,079

Appendix 1

M.S. in Innovation Management & Technology Commercialization Course Descriptions—New and Redesigned Courses

IMTC 601—Business Fundamentals for Entrepreneurs and Innovators I (3). Designed to be one of the first two courses in business for M.S. in Innovation Management & Technology Commercialization candidates from non-business backgrounds. Topics covered focus on aspects of business and management studies relevant to new venture creation and innovation. These include small team formation and leadership, creativity, marketing new products and services and other relevant topics. *Prerequisite: admission to the M.S. in Innovation Management & Technology Commercialization program permission of instructor.*

IMTC 602—Business Fundamentals for Entrepreneurs and Innovators II (3). Designed to be one of the first two courses in business for M.S. in Innovation Management & Technology Commercialization candidates from non-business backgrounds. Topics covered focus on aspects of business and management studies relevant to new venture creation and innovation. These include accounting and finance topics including accounting for intangibles, valuation, finance, sources of finance and other relevant topics. *Prerequisite: admission to the M.S. in Innovation Management & Technology Commercialization program permission of instructor.*

IMTC 750—Introduction to Innovation Management & Technology Commercialization (3). Designed to be the survey course for the M.S. in Innovation Management & Technology Commercialization. Topics covered include the innovation process, creativity, research & development, technology transfer and new product development. *Prerequisite: IMTC 601 or permission of instructor.*

IMTC 761—Patents, Trademarks, & Technology (3). This course introduces students to three important areas of intellectual property law: trade secrets, patents, and trademarks. Together, these bodies of law protect the technology, image, and brand for products, processes, and services. The course addresses the policies underlying the protection of intellectual property and compares the different ways intellectual property can be used to protect commercial interests, particularly in rapidly changing technological areas like computers and the Internet. This course is intended for students who want an introduction to intellectual property. *Prerequisite: IMTC 750 or permission of instructor.*

IMTC 790—Managing the Growing Technology Firm (3). This course addresses the principal business-related issues facing senior- and middle-level managers in growing technology-oriented firms. Topics covered include marketing, strategy, human resources management, and managerial accounting as each relates to this organizational setting. *Prerequisite: IMTC 750 or permission of instructor.*

IMTC 791—Resource Acquisition for Technology Ventures (3). The processes by which technology venture acquire resources to implement strategies is addressed. Topics covered include bootstrapping, angel financing, venture capital, strategic alliances, corporate venturing, licensing, and government financing of technology ventures. *Prerequisite: IMTC 602 or permission of instructor.*

IMTC 792—Innovation in Developing & Emerging Economies (3). This course addresses the distinctive innovation practices in developing and emerging economies. Topics covered include frugal production, reverse innovation, and bottom of the pyramid strategies. *Prerequisite: IMTC 750 or permission of instructor.*

Appendix 2 Course Descriptions—Existing Courses

MGMT 760--Organizational Creativity and Innovation (3). Focuses on strategy and techniques for successfully leading intrapreneurship and innovation in organizations. Covers the role of power, influence and communication in the change process, confrontation and effective intervention, concepts and techniques of organizational development, frameworks for creativity and acceptance of innovation. Included are individual and group research and experiential exercises. *Prerequisite: MGMT 600 or permission of instructor.*

MKTG 762--Market Opportunity Analysis (3). Introduces the subject of opportunity analysis in marketing, intrapreneurship and entrepreneurship and the practice of their requisite skills. Includes the analysis of markets, competition, preliminary cost feasibility and intellectual property and also involves the creation and development of strategic positioning appropriate to the marketing opportunity.

ENTR 795—Entrepreneurship Practicum (3). This course immerses students in the planning and execution of complex entrepreneurial activities aimed at launching or growing innovative ventures. Activities involve new enterprise formation, new product/service planning and introduction, organization direction setting and control, and/or management of growth or turnaround. While students are under the general supervision of the faculty, they are expected to display responsible independent action. *Prerequisite: ENTR 760 and MKTG 762 or permission of instructor*

PBDS 705--Design-Business Link (3). Relying largely on case histories and class discussions, this course examines the role of design as a competitive business strategy, with an emphasis on the many ways that designers and business people can work together to provide the synergies that successful design can bring to any organization.

MKTG 770--Product and Brand Development and Management (3). This course will focus on the firm's product and brand development and management strategies, with a special emphasis on innovative offerings. The influence of the social, legal and technological environment, as well as relationships with users and channel members, on the implementation of product and brand strategies are analyzed and discussed in depth. The course encourages applications of the learned concept to tangible and intangible products such as goods, services and ideas. *Prerequisite: MKTG 640 or permission of instructor.*