UNIVERSITY OF CALIFORNIA ACADEMIC SENATE

COORDINATING COMMITTEE ON GRADUATE AFFAIRS

Notice of iLinc Video Conference
Wednesday, January 2, 2013
10:00 a.m. – 1:00 p.m.
Audio Primary Dial-In: 1-866-740-1260 | Passcode: 9879466
http://www.universityofcalifornia.edu/senate/

Action	Item		Enclosures
Information/ Discussion 10:00-10:20	**I.**	**Chair's Report/Announcements/Updates** – *Chair Ruth Mulnard* • December 12 Academic Council Meeting • December 10 PDST Task Force Meeting • December 14 Budget Call *(Donald Mastronarde)* • COGD Conference Call Report *(Ari Kelman)* • December 19 Academic Council Conference Call • Upcoming Meeting Schedule	
Action 10:20-10:25	**II.**	**Consent Calendar** • Approval of the Agenda • Approval of the Meeting Minutes of December 5, 2012 ***ACTION REQUESTED:*** *Approve the agenda and minutes as noticed.*	**1** (to follow)
	III.	**Proposed Graduate Degrees and Programs for Review** *All program proposals are posted on the CCGA SharePoint site; contact the committee analyst if you would like the proposal(s) e-mailed to you.*	
Action 10:25-10:30		**A. Proposal for a Program of Graduate Studies in Pursuit of the Degree of Master of Technology at UC Santa Barbara** ***ACTION REQUESTED: Assign a lead reviewer.***	**2**
Discussion 10:30-10:40		**B. Proposal for a Graduate Program leading to the M.S. degree in Pharmaceutical Chemistry at UC Davis** – *Lead Reviewer Youngho Seo (UCSF)*	
Discussion 10:40-10:50		**C. Proposal for a Graduate Program leading to the M.S. degree in Games and Playable Media at UC Santa Cruz** – *Lead Reviewer Martin Olsson (UCB)*	
Discussion 10:50-11:00		**D. Proposal for a Graduate Program leading to the Ph.D. in Art History at UC Riverside** – *Lead Reviewer Joseph Nagy (UCLA)*	

Discussion 11:00-11:10

E. Program for an M.S. in Healthcare Administration and Interprofessional Leadership at UC San Francisco – *Lead Reviewer Bruce Schumm (UCSC)*

Discussion 11:10-11:20

F. Proposal for a Self-supporting Master of Finance Program at UC Riverside – *Lead Reviewer Donald Mastronarde (UCB)*

Information/ Discussion 11:20-11:30

III. Announcements from the President's Office, Academic Affairs
Pamela Jennings, Graduate Studies Director, Office of Research and Graduate Studies
Hilary Baxter, Interim Director, Academic Planning, Programs and Coordination

Information/ Discussion 11:30-11:50

IV. Consultation with the Academic Senate Leadership –
Robert Powell, Academic Council Chair
William Jacob, Academic Council Vice Chair

In preparation for CCGA's upcoming meeting with legislators in Sacramento, they will guide the committee in developing a list of topics that might be discussed at the meeting.

Discussion/ Action 11:50-12:00

V. Updates/Inquiries from the Divisional Senates – *Chair Mulnard and Members*

A. Irvine: Request to Change the Name and Degree Title of the Pharmacology and Toxicology Graduate Program to the Pharmacological Sciences Graduate Program – *Jutta Heckhausen (UCI)* **3**

All proposed name changes for graduate degree programs are forwarded to CCGA for Systemwide review. CCGA has the authority to deem the each proposal as either a "simple" name change" or one that requires an expedited review of the program. If CCGA feels that the name change signals a fundamental modification of the program, a change in degree requirements, or a need for substantial new resources, then CCGA may conduct an expedited review. If CCGA concurs with the campus that the action is a "simple" name change, then the Systemwide review is complete and the campus decision is final.

ACTION REQUESTED: *Determine whether or not the request constitutes a "simple" name change.*

B. Others

Discussion/ Action 12:00-12:10	**VI.**	**Systemwide Senate Review Items** – *Chair Mulnard and Members* **A. Proposed Open Access Policy** – *Vice Chair Donald Mastronarde (UCB) and Bruce Schumm* (UCSC) *(Comments due Jan. 11, 2013)* **B. Final Review of Proposed Revised APM 015 – Faculty Code of Conduct** – *Kwai Ng (UCSD) and Jutta Hechhausen (UCI) (Comments due Jan. 16, 2013)* ***ACTION REQUESTED:*** *Determine for each review whether or not CCGA will opine.*	
Discussion 12:10-12:40	**VII.**	**Discussion and Input from CCGA on SSP Policy Revisions** – *Chair Mulnard and Members*	**4**
Discussion 12:40-1:00	**VIII.**	**CCGA Discussion on Academic Efficiency** – *Chair Mulnard and Members*	
Discussion *As time permits*	**IX.**	**New Business**	
Discussion *As time permits*	**X.**	**Executive Session** (members only please)	

Agenda Enclosures:

1. Draft CCGA Meeting Minutes of December 5, 2012 (to follow)
2. Background: Proposal for a Program of Graduate Studies in Pursuit of the Degree of Master of Technology at UC Santa Barbara
3. Background: UC Irvine Request to Change the Name and Degree Title of the Pharmacology and Toxicology Graduate Program to the Pharmacological Sciences Graduate Program
4. Background: Academic Planning Council Comments on September 2011 UC Policy on Self-Supporting Graduate Degree Programs and Implementation Guidelines

CCGA 2012-13 Remaining Meeting Schedule:

February 6, 2013 – 12322 Franklin
March 6, 2013 – 5320 Franklin
April 3, 2013 – 5320 Franklin
May 1, 2013 – 5320 Franklin
June 5, 2013 – 5320 Franklin

TECHNOLOGY MANAGEMENT

UNIVERSITY OF CALIFORNIA | SANTA BARBARA

A Proposal for a Program of Graduate Studies
in pursuit of the degree of

Master of Technology Management

Revised: December 1, 2012

Proposed by: Bob York, Professor, ECE
Dave Seibold, Professor, Communication
Gary Hansen, Professor, ME
John Bowers, Professor, ECE
Divy Agrawal, Professor, CS
Kevin C. Almeroth, Professor, CS

UC SANTA BARBARA
engineering

UCSB

Table of Contents

Section 1. Introduction

1.1 Aims and Objectives

The College of Engineering (COE) at UC Santa Barbara proposes a new Professional Master's degree, the Master of Technology Management (MTM). This program will leverage existing strengths in engineering and technology innovation at UC Santa Barbara with the goal of nurturing exceptional and innovative technology leaders. The intent is to develop UCSB-MTM into an exemplary form of business and management education for the technology sector. MTM is differentiated from other professional graduate business programs in: (i) the targeted applicant pool and admissions requirements; (ii) its tightly integrated and specialized curriculum; and (iii) the opportunities for which it will prepare our students. Specific features of the program include:

- It will be a one-year stand-alone professional masters program with a professional degree fee (PDF)
- Admission will be focused on highly qualified students with undergraduate or graduate degrees in engineering, the sciences or mathematics, or quantitative social sciences with concentrations in technology. This will foster a cohort of uniformly prepared and qualified students with a common objective of becoming leaders in technology-based enterprises and endeavors.
- The admissions process will be highly selective, emphasizing a combination of prior academic achievement, employment background, and demonstrated leadership potential. The MTM curriculum is designed for technically inclined students, preferably with some prior non-academic professional work experience, but will be accessible to exceptional recent graduates as well.
- The curriculum will comprehensively address the basic skills of management with special emphasis on quantitative skills and the management of technical projects, programs and companies. The degree will enhance students' transition to successful careers in technology and innovation management.
- Support for career placement of graduating students will be an integral part of the program.

This new graduate degree program will be administered by faculty and staff in a newly approved academic unit[1], the Technology Management Program (TMP). Ladder-faculty participation will include a combination of new hires in TMP and FTE transfers or joint-appointments with existing faculty in COE and the Division of Social Sciences (DSS) within the College of Letters & Science (L&S).[2] The program will also likely employ a small number of adjunct faculty/lecturers drawn from a pool of experienced industry practitioners, and temporary high-profile visiting faculty from peer institutions.

Herein the term "professional degree" associated with the proposed MTM degree program is meant to distinguish the program from other academic degrees (e.g. M.S. or M.A.) in that: 1) it is intended primarily for students interested in non-academic careers; 2) it has a stronger focus on practical training as opposed to theory; and 3) it will include a PDF.

[1] Appendix F includes the proposal to establish TMP formally as an academic unit, approved by the UCSB Faculty Legislature on Dec 5, 2012.

[2] A short glossary of acronyms and shorthand used in the proposal can be found on page 30

1.2 Background and Historical Development

University science and engineering programs have traditionally designed their educational curricula and research efforts to focus on the fundamental technical skills required to *create* new innovations, but transitioning new discoveries into products or services that *directly benefit society* at large requires a much broader and more diverse set of skills. These include team building and understanding of organizational behavior and management, marketing and communication, basic economics, project and program management, negotiations, marketing & sales, accounting & finance. As depicted in Figure 1, successful innovation lies at the nexus of these areas of study and the disciplines in which they are emphasized. The Masters of Technology Management aims to bring these skills together in a tightly coordinated and inter-disciplinary program of study.

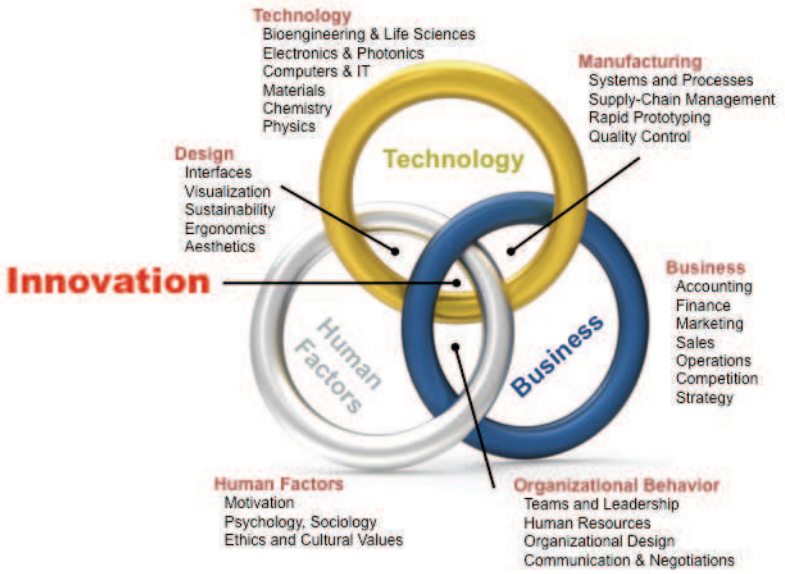

Figure 1 – Successful innovation occurs at the nexus of Technology, Business, and Human Factors. TMP's MTM brings these elements together in an interdisciplinary program.

The origins of TMP at UCSB trace back more than a decade to the establishment of a Graduate Program in Management Practice (GPMP) in 1998 and the Center for Entrepreneurship and Engineering Management in the COE slightly earlier. In 2003 these activities were merged under the operating title of "Technology Management Program" in anticipation of eventual academic unit status. Over time the program has evolved to serve over 600 undergraduates and 80-100 graduate students annually (existing enrollment data can be found in Section 3.4 *Student Demand*). TMP offers a nationally-recognized curriculum of undergraduate and graduate coursework and two certificate programs: the GPMP graduate certificate program, and a Technology Entrepreneurship certificate for undergraduates (in partnership with UCSB Extension). Appendix D includes information on the existing certificate programs. TMP also conducts an annual New Venture Competition—now entering its 14th consecutive year of operation and enjoying external annual sponsorship of over $80k—and a successful lecture series that is consistently featured on local cable networks and has recorded over 9.8 million individual on-line views on UC-TV.

In parallel with the evolution of TMP there has been a concurrent burgeoning research interest nationally and globally in the study of technical entrepreneurship and management of innovation. Recognizing an urgent need for a new breed of engineers, the National Academy of Engineering (NAE) and American Society for Engineering Education (ASEE) have both recommended greater emphasis on business fundamentals, leadership/management training, and entrepreneurial thinking in engineering curricula.[3,4]

[3] See *Educating the Engineer of 2020: Adapting Engineering Education to the New Century,* and also *Engineering Research and America's Future: Meeting the Challenges of a Global Economy*, National Academies Press, 2005.

[4] *Creating a Culture for Scholarly and Systematic Innovation in Engineering Education: Ensuring U.S. engineering has the right people with the right talent for a global society*, report of the American Society for Engineering Education, 2009

Several programs have emerged within the UC and other peer institutions (described in more detail in Sections 1.5 *Relationship to Programs at Other UC Institutions* and 3.3 *Program Differentiation*) offering baccalaureate, masters, and doctoral degrees in these areas. UC Santa Barbara is well positioned to distinguish itself in this area, bringing a combination of excellence in engineering research and entrepreneurship in the COE together with strengths in organizational behavior and quantitative social sciences within the Departments of Sociology, Communication, and Economics in the DSS. If approved, the proposed new unit and degree program would become the first academic program on campus to bridge the COE and the DSS, with joint faculty appointments anticipated across these colleges. Potential faculty participants are described in Section 4 *Faculty*.

In 2008 the COE entered discussions with the campus Academic Senate to formalize the status of TMP as an academic unit and initiate the process of creating a new degree offering. A formal external academic review of TMP was proposed to help justify an expanded program, and an Ad Hoc Review Committee was formed to coordinate the review; the site visit took place in Spring 2010. The External Review Committee (ERC) provided helpful confirmation of a critical role for TMP on campus and within the COE in particular, emphasizing that entrepreneurial thinking and leadership education have steadily become an imperative for engineering schools, and echoing the aforementioned calls by NAE and ASEE. As one ERC member[5] noted during the exit interview, "if UCSB did not already have a TMP it would soon have to create one." Noting an abundance of opportunities for collaborative research in organizational science and management at UC Santa Barbara, the ERC encouraged the campus to devise a strategy for TMP to evolve a rigorous graduate program and graduate research component, building on significant pockets of expertise scattered among the faculty in the College of Letters and Science, College of Engineering, Bren School of Environmental Management, and the Graduate School of Education.

In summary the proposed degree program and associated new academic unit can be argued for in three ways: 1) it is an imperative for our future engineering programs, a view supported by the National Academy of Engineering, American Society for Engineering Education, and evidenced by the emergence of related departments and programs at peer institutions; 2) it builds on a strong and vibrant initiative that has evolved on campus over a period of many years, with significant interdisciplinary faculty interest bridging Engineering and Social Sciences; and 3) the plan to anchor and expand the program emerged as a result of the successful external review conducted by the UCSB Academic Senate.

1.3 Proposed Timetable

Following successful completion of the campus and system-wide approval processes, program build-out (including hiring of new faculty and staff and requisite space renovations) would begin immediately thereafter. In the following timetables and budget we use "Year 1" to represent the duration of the startup-up phase, beginning with system-wide approval and the formal advertised launch of the program and recruitment of the first cohort. Year 2 then begins with the arrival of the first cohort and first year of instruction. Given the uncertainties in timing with respect to system-wide approval and faculty recruitment, "Year 1" could possibly span more than one academic year. Recruiting the first cohort of

[5] Prof. Tom Byers, Department of Management Science and Engineering, Stanford University, and co-director of the Stanford Technology Ventures program.

students would not begin in earnest until it is clear that the requisite faculty (e.g. transfers, new hires) and instructional resources are in place to ensure a successful program launch.

Table 1 — Projected enrollment for the first 5 years

	Year 1	Year 2	Year 3	Year 4	Year 5
New MTM Degree	-	<40	<60	<80	<100

An initial plan for enrollment growth (headcount) in the new MTM degree program over the first 5 years is charted in Table 1. We plan an initial cohort of up to 40 students for the Professional Masters program, which could eventually grow to roughly 100 students in maturity. This planned growth is meant to be illustrative; the actual rate of increase will be carefully controlled in the early years to ensure successful delivery of the curriculum with the resources available to the program (see Section 1.7 *Plan for Evaluating the Program*, and Section 3.4 *Student Demand* for additional detail).

This period of growth for the new degree program roughly coincides with the expected implementation of the newly approved Long-Range-Development Plan (LRDP) for UC Santa Barbara that increases the campus enrollment cap by an additional 5,000 students, a significant fraction of whom are expected/hoped to be graduate students. Consequently we do not expect the new degree program to adversely affect enrollments in any existing graduate programs on campus. Anecdotal evidence in fact suggests that the existing TMP program is already attracting new graduate students to our core disciplines in COE who would not otherwise have chosen UCSB.

1.4 Relationship to Campus Academic Plan and Existing Programs

Adding a new academic unit and degree-granting program in the area of Technology Management was anticipated in the formative years of TMP and has been a part of the Campus Academic Plan since 2005. This was and continues to be a high priority in COE, with a greater sense of urgency now in view of the aforementioned recommendations by the NAE and ASEE. As mentioned in Section 1.2 *Background and Historical Development*, discussions to establish a new unit and degree program were initiated in 2008 and resumed more aggressively following an external academic review that was completed in Spring 2010. This proposal thus continues the original campus plan.

The proposed professional degree program is a unique offering relative to other departments and programs on campus, and is not expected to compete with these programs. The program will help forge new collaborative efforts between the College of Engineering and the Division of Social Sciences, particularly the Departments of Economics, Communication, and Sociology. The focus on professional training and a fee-bearing structure will help minimize any adverse impact on resources. Collaborative opportunities also abound with the Bren School of Environmental Science and Management, and at present, Bren students interested in the Eco-Entrepreneurship program (roughly a third of the Bren student population) already participate in the GPMP Certificate program and associated coursework offered through TMP. It is anticipated that certain faculty in the Departments of Economics, Communication, and Sociology could also contribute in a teaching role in the program via joint appointments or other compensation incentives (potential faculty participants are listed in Section 4 *Faculty*). Their participation in TMP will lead to new and innovative research activities spanning multiple disciplines.

1.5 Relationship to Programs at Other UC Institutions

Following the recent academic program review, a comprehensive benchmarking study of similar programs within the UC and at peer institutions was conducted. Some comparative information about the programs and their curricular offerings are summarized in Section 3.3 *Program Differentiation*. Based on our analysis we do not anticipate significant competition with our sister institutions, owing to a differentiated program of study, a special combination of campus academic strengths, and a unique regional entrepreneurial and industrial ecosystem. While several new Professional Masters programs are beginning to appear in other Engineering colleges within the UC system, the proposed plan for UC Santa Barbara is distinct in several important respects. UC Santa Barbara is one of only two UC campuses without a business/management school (along with UC Santa Cruz, and not counting UCSF). The graduate-level management programs at our sister institutions are often heavily influenced by their existing business schools and consequently offer degrees that borrow courses and content from conventional Masters of Business Administration (MBA) programs. UC Berkeley recently revised a pre-existing Master of Engineering degree to include some management-related coursework and a professional fee structure[6], while other UC campuses are developing fee-based professional Master of Engineering Management (MEM) degrees[7] that are similarly constructed as joint programs between the campus business and engineering schools (essentially a hybrid degree combining existing courses from the engineering and MBA programs). Like UCSB, UC Santa Cruz does not have a business school and has instead elected to create a new program called Technology and Innovation Management (TIM) within their engineering college, but unlike the degree proposed herein, UC Santa Cruz offers traditional academic M.S. and Ph.D. Degrees in that department/discipline. Whereas most of our sister institutions are proximate to large industrial areas, UC Santa Barbara is not, and consequently we anticipate a unique cohort of student participants comprised of a smaller fraction of local business professionals[8] and a greater fraction of recent engineering and science graduates from around the state and country.

Because UC Santa Barbara is planning a rather unique program there are clear cooperative opportunities with our sister institutions. We plan to host a number of visiting faculty to bring valuable alternative perspectives to our students, and visiting faculty from our sister institutions and other peer programs would of course be welcome. Drafts of this proposal have been submitted to our colleagues at UC Berkeley, UC Merced, and UC Santa Cruz (programs with the most similar offerings to what is being proposed herein). Appendix A includes written endorsements from the external reviewers. TMP is already a member of the Global Venture Lab Network[9] hosted by UC Berkeley, a consortium of entrepreneurship programs around the world that meet frequently to share new ideas to promote entrepreneurial education.

[6] Approved by the UC Regents in Nov 2010, revising a pre-existing but non-fee-bearing Master of Engineering degree.

[7] P. Patel, "The Other MEMs: The Master of Engineering Management Degree", *IEEE Spectrum*, Feb 2011. UC Irvine has launched one already; other UC campuses are reportedly considering or planning to introduce such degrees.

[8] Demand in the local business community is not insignificant. The California Central Coast has a long culture of technology entrepreneurship, and the demand for local business training has prompted Pepperdine's Business School to create a new MBA program in the area (see http://bschool.pepperdine.edu/programs/mba/santa-barbara/)

[9] see http://cet.berkeley.edu/global-venture-lab-network-1

1.6 Program Administration

Pending approval of the accompanying proposal (Appendix F) to establish a new academic unit in COE (the Technology Management Program), the proposed degree program would be administered through this new unit, and all existing curricular and outreach activities that are conducted through the TMP would be merged into this new academic unit.

1.7 Plan for Evaluating the Program

In the early formative years we intend to conduct a mandatory quarterly review of the academic program with participating faculty and instructors to ensure and maintain a well-integrated curriculum that adequately serves the needs of the professional student. These reviews, expected to take place prior to the start of each academic quarter, and will be also be used to monitor and manage subsequent enrollment growth. Student exit surveys and statistics on job-placement of graduates will provide measurable data for an ongoing objective analysis of the success of the program.

Additionally we propose an internal audit and review after completion of the third full year of the proposed unit and graduate degree program, to be conducted by appointees of the Dean of COE. It is anticipated that the program would then be subjected to normal periodic academic reviews every 5-7 years as with any campus academic unit. It is worth repeating here that the Technology Management Program has *already* successfully completed a formal external academic review in April 2010 and formally establishing TMP as an independent academic unit with a strong graduate program is a key recommendation to emerge from the positive external evaluation of the program.

Section 2. The Degree Program

A terminal professional Masters degree in Technology Management is proposed. Required individual and team projects will serve as an experiential capstone project in lieu of a thesis or comprehensive examination. No doctoral program is proposed at this time.

2.1 Admissions Requirements and Preferences

The program is intended primarily for students with backgrounds STEM-related fields like engineering and physical/life sciences; a B.S. degree or higher (M.S., Ph.D.) in these disciplines is preferred. Students with other degrees will be considered for admission provided they have a solid record of academic achievement in quantitative coursework (e.g. mathematics, economics, statistics), and either (a) have had a meaningful employment or internship experience in a technology-driven business, or (b) have taken additional coursework in a technology-related field. It is anticipated that graduates of the program will ultimately assume leadership roles in technology businesses, so it is critical that they have a solid foundation in STEM disciplines.

The new degree program is expected to attract students already employed in industry as well as recent graduates who have not yet entered the workforce. The latter group will be required to satisfy a minimum non-academic employment, nominally an internship in industry the summer before the start of the first fall quarter, or similar equivalent experience. The required employment must be documented and approved as part of the admission process, and enrollment in classes will be contingent upon verification of satisfactory completion of this employment requirement. While the applicant pool should be uniform in terms of technical or quantitative preparation, a diverse mix of work experience is anticipated in each cohort. This is desirable for team-oriented projects and discussions, presenting challenges that mimic typical working conditions in technology companies.

For recent technical graduates the Graduate Record Examination (GRE) General Test will be required for admission, and a GRE Subject Advanced Test – preferably in Computer Science, Engineering, Physics or Mathematics – is highly recommended. For applicants more than three years past graduation with significant work experience, the Graduate Management Admissions Test (GMAT) will serve as an acceptable alternative. Official grade transcripts and degree certifications will be required from the applicant's most recent academic institution. A GPA of 3.5 or higher is recommended for admission into the program. Competence in a foreign language is similarly encouraged but not required. International students whose first language is not English are required to take the TOEFL exam or IELTS to be considered a candidate for admission.

The program is intended for a select group of technical students who have demonstrated some leadership potential, assessed through a combination of: 1) a required written statement-of-purpose submitted by the applicant; 2) at least three letters of recommendation from a combination of academic and non-academic referees, including former employers and professional supervisors if appropriate; and 3) a personal interview of the applicant (by phone, Skype, or in person) with faculty leaders. The personal interview would be selectively employed as needed for clarification of the students' preparatory background and/or to evaluate the communication skills of the applicant. The written statement-of-purpose will also be used to evaluate the writing skills of the applicant; all admitted students will be expected to demonstrate proficiency in basic professional writing skills at a level normally expected of first-year graduate students.

We anticipate that some students already enrolled in M.S. and PhD degree programs at UCSB may be interested in pursuing the MTM degree. Owing to the highly structured and rigorous nature of a one-year management program, these students would be encouraged to first complete their existing degree objective before being admitted to MTM, but exceptions will be considered on a case-by-case basis. Some of these students may have already had some participation in the existing TMP Graduate coursework and perhaps the GPMP Certificate program, in which case no more than two of the GPMP courses will be eligible for credit towards the MTM, to be evaluated on a case-by-case basis. Undergraduate coursework in TMP will not be eligible for credit towards the MTM.

2.2 Program of Study

2.2.1 Unit Requirements

A total of 42 units will be required for the Masters degree. This includes 33 units of traditional coursework, and 9 units associated with professional seminars and an integrative capstone project.

2.2.2 Required Courses

The curriculum will be comprised of a new set of 400-level courses listed under a new "TMP" course code designation (all existing courses in TMP are currently listed under the course code ENGR). Proposed course numbers and titles are listed below, with proposed catalog descriptions found in Section 5 *Courses*. The new courses will only be open to MTM students in good academic standing:

- TMP 401 – Seminar: Opportunity Recognition in New Technology. 2 units
- TMP 425AB – Seminar: Interdisciplinary Commercialization Team Project. 4 units (2 units each)
- TMP 411 – Theory of Markets and Competition. 3 units
- TMP 421 – Individual, Group, and Organizational Effectiveness. 3 units

- TMP 431 – Accounting and Financial Problem-Solving. 3 units
- TMP 441 – Analysis for Business and Management Decisions. 3 units
- TMP 442 – Project, Program, and Operations Management. 3 units.
- TMP 451 – Market Research under Uncertainty. 3 units
- TMP 452 – Managing the New Product Launch. 3 units
- TMP 461 – Business Models in Technology-Driven Industries. 3 units
- TMP 462 – Negotiations and Sales Management. 3 units
- TMP 471 – Leading Change. 3 units.
- TMP 475 – Business Planning in Dynamic Markets. 3 units

These core required courses will provide students with a solid understanding of the management of technology in an enterprise, working effectively in a team-oriented organization, the use of analytical tools to make sound management decisions and engineering design choices, the design and implementation of systems to support the enterprise, and the business principles and practices to be a valuable contributor and/or leader within the organization. Some MTM classes may include case-study discussion as part of the instruction, and many courses will be coordinated with a required top-line professional seminar each quarter. The seminar in fall quarter (TMP 401) will review emerging technologies and opportunities for applying new technologies to solve pressing societal problems.

TMP has historically offered some other graduate coursework in connection with the GPMP Certificate[10]. GPMP is comprised of stand-alone courses that can be taken in any order and are open to all graduate students on campus, and frequently taught by lecturers drawn for a local pool of practitioners. While we anticipate continuing the GPMP, it is not possible to use any of those courses for MTM. The structured and sequential nature of the proposed program combined with the uniformity of background preparation in the targeted cohort of students requires a more streamlined, tailored, and rigorous curriculum. The fee-bearing nature of the proposed program also necessitates an independent set of courses.

2.2.3 Elective Courses

The program is designed to be a structured one-year professional management curriculum. Consequently the number of electives will likely be limited even in program maturity. We initially anticipate a small group of electives covering broad topics relevant to management technology, with other elective courses added later depending on the research interests of new faculty in the program and possible new directions in the pedagogy of engineering management education. Three electives that will likely be available at the time of program launch will be:

- TMP 489A – Special Issues in Commercialization in the Life Sciences. 3 units
- TMP 489B – Special Issues in Commercialization in IT. 3 units
- TMP 489C – Special Issues in Data Analytics. 3 units

The TMP 489 electives will allow students an opportunity to focus specifically on management and commercialization issues in their own particular domain of expertise, and will leverage core strengths and expertise at UCSB in engineering, information technologies, life, and physical sciences.

[10] See Appendix D for information on the GPMP

2.2.4 Sample Program

Table 2 illustrates the structure of the program along with brief course descriptions (full descriptions can be found in Section 5 *Courses*)

Table 2 — Sample Program with abbreviated course descriptions

Prior Summer	Fall Quarter Foundation	Winter Quarter Value Creation	Spring Quarter Integration
Internship or employment in a university, corporate, or government research lab, or other similarly meaningful practical experience in science & engineering (must be approved as part of admissions process and completed by start of Fall quarter) Priority given to those with evidence of leadership, communication, emotional maturity. Positive orientation towards risk and over coming challenges.	**TMP 401: Seminar: Opportunity Recognition in New Technology**	**TMP 425 A/B: Seminar: Commercialization Team/Leadership Project (includes once per week leadership workshop)**	
	TMP 411: Theory of Markets and Competition Micro and Macro Econ, Theories of Competition, Creative Destruction, Industrial Org, Innovation, Diffusion	**TMP 442: Project, Program & Operations Management** project and program management tools, supply chain, critical path, crisis management, Human Resources, budgeting and planning considerations	**TMP 452: Managing the New Product Launch** Strategies for researching and introducing innovative technologies to businesses and markets, demand and price forecasting, global marketing.
	TMP 421: Individual, Group and Organizational Effectiveness Working in teams, leadership, motivation, negotiations, organizational design	**TMP 451: Market Research Under Uncertainty** Quantitative and qualitative data collection and analysis, focus groups, survey research, forecasting.	**TMP 462: Negotiations and Sales Management** Getting to Yes, Labor, vendor and investor management, understanding stakeholders, communications strategy
	TMP 431: Accounting and Financial Problem-Solving Financial & non-financial measures, operating cycle, cash flow, Financial Planning Systems, Risk Assessment	**TMP 461: Business Models in Technology Driven Industries** Business models and structures for value creation, innovation, competitiveness; leadership and decisions	**TMP 475: Business Planning in Dynamic Markets** Preparation of a comprehensive business plan (strategy implementation) in connection with top-line Team Project
	TMP 441: Analysis for Business and Management Decisions Theoretical models and mathematical tools to be used for: quantitative analysis, statistics, decision theory, management	**TMP 471: Leading Change** Lean design and operations, creativity, start-up process vs. new product development, team building	**TMP 489: Special Issues Technology Commercialization** A) Life Sciences Businesses B) Information Technology Businesses C) Advanced Data Analytics D) Energy Efficiency E) Sustainable Business Practices

2.2.5 Integrative Capstone Project

The combination of TMP 425A-B and TMP 475 will serve as an integrative capstone project, the culminating practicum for students in the MTM program. This will satisfy the requirements for UC Santa Barbara's Master's Plan II (Project). The student teams will engage in a project that addresses a strategic problem in technology management—this could involve creating a new venture based on an innovative product or service concept, or developing a commercialization strategy for an emerging technology within an existing organization. The project will provide hands-on experience in applying the curriculum to real-world problems, and an opportunity to refine essential professional skills such as interpersonal communication, collaboration, leadership, written communication and oral presentation. The final requirements for the master's program are the completion of a substantial written plan and an oral defense of the team project.

TMP 425A Seminar: Commercialization Team/Leadership Project: The first quarter of the sequence will focus on team formation and idea vetting, with project ideas derived from student/faculty interest, the campus IP portfolio, or sponsoring businesses. Teams will typically consist of three or more students. Each team will be expected to establish a Capstone Project Committee prior to the end of the winter quarter. The Committee will consist of at least three ladder faculty, of which two must be affiliated with TMP. The Capstone Project Committee is expected to meet with the team periodically to give critical feedback and ensure that adequate progress is being made toward successful completion of the project.

TMP 425B Seminar: Commercialization Team/Leadership Project: The second quarter will focus on assessing and guiding team progress and discussing lessons learned, with oral presentations by each team for feedback from faculty mentors and student peers. A leadership workshop will be conducted as part of TMP 425 A-B, co-taught by ladder faculty to guide individual and team development and help the group resolve conflicts as they arise.

TMP 475: Business Planning in Dynamic Markets: This final course will involve the preparation and submission of a comprehensive written plan documenting all aspects of the team project, encompassing key concepts in marketing, operations, and finance. Each team project and final written plan will be evaluated and must be approved by the Capstone Project Committee. The student teams will be required to submit their written materials and give a final oral defense of their project to the committee.

The oral presentation and written materials will provide a basis for assessing individual contributions and learning outcomes in the program. After completion of the MTM curriculum and the team project, students will have demonstrated an ability to analyze opportunities for commercializing new technologies and apply state of the art research findings to the management of technology firms.

2.3 Normative Time to Degree

The proposed degree is intended to be an intensive, one-year stand-alone management program. Thus the normative time should be one-year. However, to allow for extenuating circumstances we may permit some students to complete the cumulative program over a longer period of two consecutive years, subject to careful review and prior approval of their plan by the TMP Faculty.

2.4 Licensing/Certification

Not applicable

Section 3. Projected Need

3.1 Importance of the Discipline

The importance of the discipline was addressed at length in Section 1.2 *Background and Historical Development*; to avoid a significant duplication of material we refer the reader to that section. Briefly, we find the aforementioned recommendations of the National Academy of Engineering and American Society for Engineering Education (*op. cit.* page 4) to be compelling arguments for the importance of the discipline. The numerous engineering management programs that have sprung up (see Sections 1.5 *Relationship to Programs at Other UC Institutions* and 3.3 *Program Differentiation*) also provide supporting evidence that many universities similarly have recognized the importance of this field.

3.2 Meeting the Needs of Society

Companies that make tangible products or provide advanced technical services require leaders with both technical *and* management training. Modern MBA programs may not be adequately serving the needs of these companies, not only in terms of content but also in the types of students admitted. At some of the elite business schools up to 75% of all MBA graduates go into investment banking, financial services or consulting.[11] Science or engineering students are often not admitted without many years of prior managerial experience, leading to a chicken-and-egg problem for would-be technical leaders. Indeed, as

[11] Geoff Gloeckler, "MBA Pay: the $3.6 Million degree", Business Week, June 13, 2011

former Harvard Business School Professor Fleming[12] points out, "…the top business schools seem to have a bias against the technical applicant, possibly because such applicants are thought to lack communication skills and managerial talent...or perhaps the school's mission does not include the education of technical managers". TMP will introduce a new graduate degree that is an alternative to a traditional MBA, targeting a special group of students with strong technical backgrounds, and focusing specifically on managing technical innovations.

The need for programs like MTM is also being driven in part by some important changes affecting higher education. State-funded universities have been in a slow and steady contraction for many years, a process likely to continue given severe structural problems in state and federal budgets. Demographic changes also point to student enrollments declining after many years of growth as the "echo boom" fades, which could fuel further contraction in faculty sizes even as economies improve. This portends a shrinking market for research faculty and a decline in the number of students seeking the Ph.D. At the same time many technical fields are advancing at such a rapid rate that post-graduate education is increasingly essential for young people entering in the workplace, as is continuing education for executives. Professional masters degree programs are an attractive practical option for technologists.

Even at the undergraduate level there is concern that universities are not providing adequate training in marketable skills for social science and liberal-arts majors, and consequently these students are having difficulty finding jobs upon graduation. Decades ago these students could find employment in a variety of industries and learn necessary skills on the job. This is no longer the case due to a steady erosion of America's industrial base, outsourcing of jobs abroad, and increasing competition for fewer entry-level jobs in the remaining companies. For the U.S. to regain its competitiveness globally, universities need to do a better job of producing well-rounded graduates with a strong culture of entrepreneurship and job-creation. It is generally accepted that new technologies and innovative enterprises will be vital to re-building America, and it is imperative that we better prepare and empower our most important natural resource in this effort: bright young science and engineering graduates.

TMP will help shape a new generation of college graduates that can make a more immediate impact upon graduation, within existing companies or by creating new ventures. This will benefit all levels of local, state, and national economies for job creation and global competitiveness. Research universities in particular need such programs to help translate innovative research into revenue-generating intellectual property. Given its core strengths as an energetic young research university and its freedom from the inertia of a traditional management school, UC Santa Barbara is uniquely positioned for this effort.

3.3 Program Differentiation

The design and intent of the proposed program is to provide an alternative to the MBA for early-career technical students. The program is distinguished by: 1) a focus on management of technology and technology-oriented companies (as opposed to financial and consulting services, for example, or finance-based corporate management); 2) close attention to organizational behavior and team-building; 3) emphasis on ethics and sustainable, socially-responsible business practices; and 4) comparative lack of coursework in financial engineering, and greater emphasis on product development, project management, and entrepreneurship; and 5) a focus on recent graduates or early-career professionals with technical backgrounds. The coursework is designed to take advantage of the strong quantitative skills of the

[12] L. Fleming, W. Yang, and J. Golden, "Science and Technology Entrepreneurship for Greater Societal Benefit: Ideas for Curricular Innovation." *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*, vol. 21, 167-184, 2010

technical student, allowing for a rapid pace in numerical content (e.g. accounting, finance, data analytics, economics), with extra attention on addressing gaps in their training (e.g. organizational behavior and team dynamics, oral presentation skills and interpersonal communications, negotiations, etc).

Table 3 — Summary of Management Programs within the UC

Campus	Business School	Other Management Programs					Comments
			Degree		Certificate		
		MBA	U-Grad	Grad	U-grad	Grad	
Berkeley	Haas School of Business	✓	✓	✓		✓	Regent approval in Nov 2010 for new Professional Masters program in Engineering. Joint Management of Technology (MOT) Certificate between Haas and UCB Engineering.
Los Angeles	Anderson School of Management	✓	*	✓			Price Center for Entrepreneurial Studies, geared mostly towards MBA students and practicing professionals.
San Diego	Rady School of Management	✓	✓	✓	*		Management degrees offered through business school. Von Liebig Center within Jacobs School of Engineering (similar to TMP) offers certificate through extension.
Irvine	Paul Merage School of Business	✓	✓	✓			Don Beall Center for Innovation and Entrepreneurship within the business school, open to Merage students only. New Masters of Engineering Management degree is in approval pipeline
Riverside	School of Business Admin.	✓	✓	✓			Business School offers a BS with concentration in Entrepreneurship. Joint degree program with Engineering in "Business Informatics".
Davis	Graduate School of Management	✓	*			✓	Center for Technology Entrepreneurship within business school. Business Development Certificate for graduate students in engineering and science.
Merced	Ernest & Julio Gallo School of Management	*	✓				E&J School nearing completion. Undergraduate Management program housed in School of Social Science (some links with Economics)
San Francisco	—	*	NA		NA		Joint DDS-MBA Program with USF
Santa Cruz	—		✓	✓			Technology and Information Management Program in School of Engineering. Also Business Management major in Economics Dept.
Santa Barbara	—				*	✓	Undergrad certificate is approved by COE but not the broader campus, and offered in partnership with UCSB Extension.

Note: Asterisks imply offerings that are limited in scope, current approval status, or level of student participation

Most UC campuses now have significant research and degree activities in areas relating to Technology Management and Entrepreneurship, offering either a professional MBA or some other formalized management curriculum (Table 3). Seven of the ten UC campuses now have professional schools of business or management. UC San Francisco offers a combined DDS-MBA through a partnership with the University of San Francisco, and has recently launched an entrepreneurship program for MDs. Of the two remaining campuses, UCSB stands alone without an academic department or degree program in this area. UC Santa Cruz recently established a program called "Technology and Information Management" within its Baskin School of Engineering, and now offers masters and doctoral degrees in that discipline (with

some similarity to the unit and degree proposed herein). UC Berkeley has just launched (*op. cit.* p7) a new set of fee-bearing professional degree programs under the title of "Master of Engineering". UC Irvine will launch a new Master of Engineering Management degree in Fall 2013, and other UC campuses are reportedly planning similar degree programs within their respective engineering programs.

Table 4 — Related Engineering Management Programs Outside of UC

Institution	Program/Department	Description
†Stanford	Department of Management Science and Engineering (MS&E)	Housed in the School of Engineering, offers B.S., M.S., Ph.D., and minor in MS&E. A hybrid Industrial Engineering and Management curriculum. 32 faculty, 27 lecturers, 17 staff. Also operates the Stanford Technology Ventures Program as a center within MS&E
USC	Office of Masters & Professional Programs	Housed in Viterbi School of Engineering, offers numerous professional engineering degrees including Masters of Science in Engineering Management.
MIT	System Design and Management	Cosponsored by the MIT School of Engineering and the MIT Sloan School of Management, offers a 1+ year Professional Masters in Engineering and Management. Strong Systems Engineering focus, open only to experienced professionals with engineering degrees.
U. of Michigan	Dept. of Industrial and Manufacturing Systems Engineering	Offers M.S. in Engineering Management. 36 credit-hour program open to students with an undergraduate engineering degree and 5 years working experience, or students with a previous graduate degree in engineering.
†Cornell	School of Engineering	Cornell offers 15 different professional MEng degrees including a Masters of Engineering Management.
†Dartmouth	Thayer School of Engineering	Offers professional Masters of Engineering Management, a joint program between Thayer School of Engineering and Tuck School of Business.
U. Penn	Jerome Fisher Program in Management and Technology	A joint program between Penn Engineering and Wharton School of Business. Offers Executive Masters in Technology Management, also dual-degree (Economics and Engineering) for undergraduates.
†Northwestern	Dept. of Industrial and Systems Engineering	Offers a one-year professional Masters of Engineering Management
U. of Texas, Austin	Center for Lifelong Education	The Center operates professional degree programs for the Cockrell School of Engineering. Offers two-year professional M.S. in Engineering Management, combines engineering & management coursework.
†Duke	Dept. of Engineering Management	Housed in Pratt School of Engineering, offers Masters in Engineering Management that combines management & engineering coursework. Some faculty participation from both the Duke Fuqua School of Business and Pratt
U. of Illinois	Dept of Industrial & Enterprise Systems Engineering	Offers joint engineering and MBA program with U. of Illinois College of Business.
Johns Hopkins	Department of Engineering Management	Housed in Whiting School of Engineering. Offers M.S. in Engineering Management combining management & engineering coursework. Some coursework offered through Center for Leadership Education

†*Denotes members of a newly created Masters of Engineering Management Programs Consortium (www.mempc.org)*

Outside of the UC system the situation is similar (Table 4). The universities with professional business/management schools typically leverage that resource to form collaborative degree programs with

engineering schools or other campus departments. Even in many of those cases (notably Stanford), there are now departments and degree programs that exist independent of the business schools.

While UC Santa Barbara has been slow to establish a new department and degree program in engineering management, this also presents an opportunity to distinguish itself in this area with a differentiated program that takes advantage of the unique combination of campus academic strengths and the regional entrepreneurial ecosystem. As mentioned earlier, most comparable graduate programs at our sister institutions are either similar to conventional MBA programs, or are hybrid programs combining coursework from engineering and business schools. The proposed MTM degree will be focused exclusively on technology management and will be geared towards students with strong technical or quantitative backgrounds, but will differ from an MBA program by having a stronger emphasis on technology commercialization, operations, organization behavior/management, economics, and ethics, building on a UCSB's strengths and specifically targeting gaps in the training of most science and engineering students. Whereas most programs across the country focus exclusively on either business majors or engineering majors with significant prior industry experience, our program will be accessible to a more diverse group of younger students at the early stage of their career. In short, we believe the absence of a traditional business school at UC Santa Barbara can be turned to an advantage, allowing us to create a unique management program that would be difficult to replicate elsewhere.

3.4 Student Demand

That many of our peer institutions already have—or are now creating—new engineering management degrees is evidence of a strong demand for alternatives to conventional MBA programs. Some of the universities mentioned in Table 4 have long had professional engineering degrees (such as the classic "Industrial Engineering" degree), but have seen a surge of interest in the newer Masters degree in Engineering Management (MEM).[13,14] The number of applicants to Dartmouth's MEM program, for example, have quadrupled in the past decade; Duke's program graduated 137 students in 2009, up from 13 in its first class of 1997. Stanford, Cornell, Dartmouth, Northwestern, and Duke have recently teamed up to form the Masters of Engineering Management Programs Consortium (MEMPC) to raise awareness of these successful new degree programs in academia and corporations.

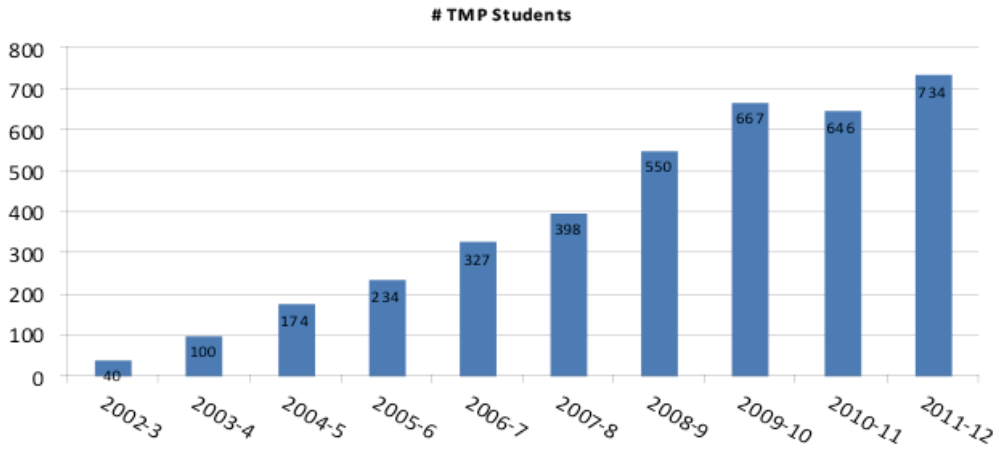

Figure 2 — Historical Enrollment growth in TMP (combined graduate and undergraduate, using unique individual headcount where students are not counted more than once if enrolled in multiple courses.)

[13] P. Patel, "The Other MEMs: The Master of Engineering Management Degree", *IEEE Spectrum*, Feb 2011

[14] R. Knight, "Rise of the Business-Savvy Engineer", Financial Times, July 26, 2010

Further evidence of student demand for a Technology Management degree program can be found internally at UC Santa Barbara in the organic growth of the existing TMP program. Figure 2 illustrates the cumulative enrollment numbers in TMP coursework from 2002-2012. During this period the demand for TMP courses grown substantially, but is now limited by the available instructional resources in the program and self-imposed caps on class size (almost every TMP course is oversubscribed). The program historically has done little or no internal marketing, and there are still UCSB faculty and students that are unaware of its existence, making the enrollment growth even more remarkable. The existing program is open to all majors, and a breakdown of student participation by College/Division at the undergraduate and graduate levels are shown in Figure 3. Participation at the undergraduate level is skewed towards social science students, largely from Economics, Communication, and Sociology; this reflects the campus enrollment statistics. Additionally, students from engineering and MLPS often have difficult lab-oriented classes with fewer opportunities for extra coursework of free electives. Participation at the graduate level is skewed towards science and engineering; these are generally students who are nearing completion of their degree and are interested in commercializing inventions from their research and/or anticipating non-academic employment.

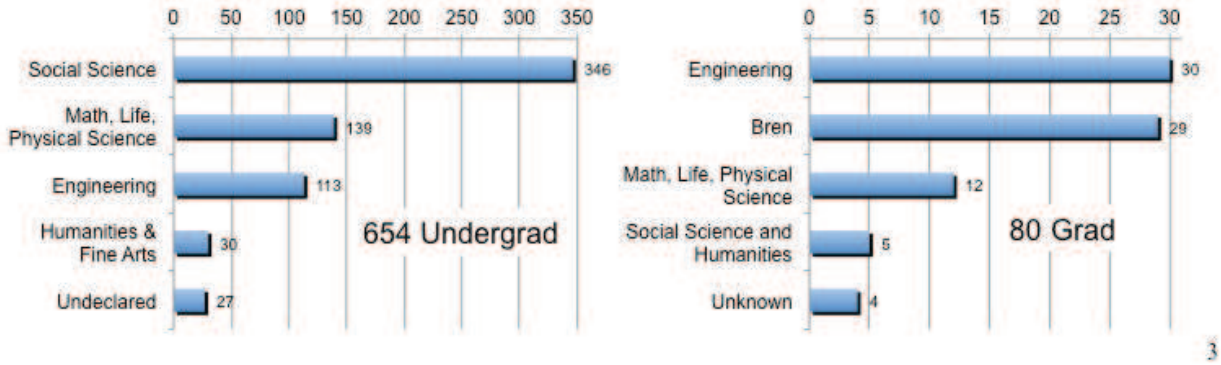

Figure 3 — Typical breakdown of enrollments by College/Division (2011-12 data)

The anticipated enrollment growth (headcount) in the new TMP over the first 5 years is charted in Table 5 (this augments data originally presented in Table 1 with additional data relating to ongoing Elective/Certificate enrollments in programs that will be continue in the new unit; additional information on these certificate programs can be found in Appendix D). Our plan calls for limiting the undergraduate participation to 300, a significant decrease in population from current levels (655 in 2011-2012). This reduction is an anticipated consequence of new changes that TMP leadership is implementing beginning in 2011-2012 to add more rigorous admissions criteria for TMP courses. We also anticipate the number of elective/certificate enrollments at the graduate level to decline slightly as some students opt to pursue the Professional Masters program instead (anecdotally, many GPMP students have indicated a preference for a formal degree program).

Table 5 — Projected Enrollments in *all* TMP programs for the first 5 years

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Existing Offerings					
Undergrad	300	300	300	300	300
Grad	80	80	70	60	60
New MTM Degree	**-**	**< 40**	**<60**	**<80**	**<100**

We are planning for an initial cohort of up to 40 students for the Professional Masters program, eventually growing to 100 in maturity (two cohorts of roughly 40-50 students). This planned growth is meant to be illustrative; the actual rate of increase will be carefully controlled in the early years to ensure successful delivery of the curriculum with the resources available to the program. Reflecting our desire for this program to be differentiated by a highly selective admissions process and elite graduating class, we do not expect to host more than two cohorts simultaneously. The target applicant pool for this degree includes a subset of recent science & engineering graduates from across the country, and possibly some students that are enrolled and nearing completion of other masters and doctoral degrees on campus. The interest among existing graduate students is evidenced in the enrollment numbers shown in Figure 3, and those data only include students already matriculating in other degree programs at UC Santa Barbara. As noted in Section 2.1 *Admissions Requirements*, existing UCSB students would be expected to complete their primary degree objectives before beginning the MTM degree, and would still be expected to satisfy the minimum non-academic work experience requirement.

3.5 Opportunities for Placement of Graduates

Most engineering graduates find employment in industry, with only a small fraction opting for academic careers. Employment opportunities for engineering graduates have been consistently strong for decades, even during the recent unprecedented global recession. Figure 4 illustrates U.S. employment data from 2003-2009 for the career category of "Engineering Managers", the closest Dept. of Labor category germane to the proposed degree program. The U.S. Department of Labor also reports that Engineering Managers represent the 10th highest paying profession, or the 3rd highest if medical professions are excluded from the list (behind Psychiatrist and CEO). By 2018, the U.S. Bureau of Labor Statistics projects that there will be approximately 195,000 engineering manager jobs in the U.S. alone.

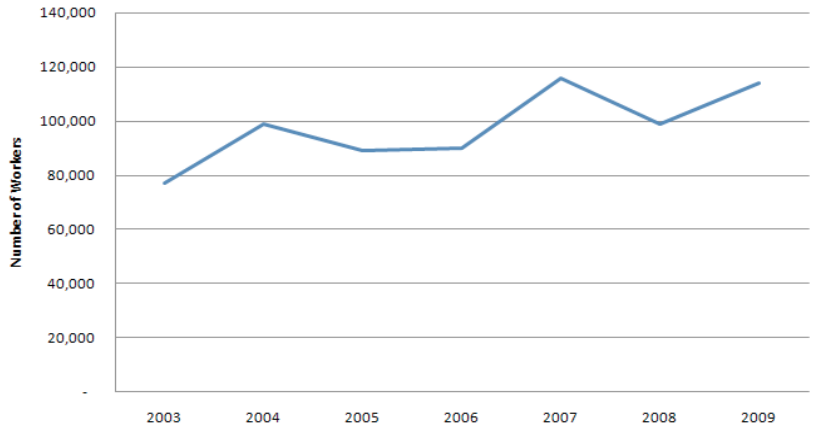

Figure 4 — Employment data on Engineering Managers (source: U.S. Bureau of Labor Statistics).

While the data indicate a consistent and growing demand, it is generally agreed that the United States does not simply need more engineers—it needs *high quality* engineers with better training in business fundamentals and innovation management.[15] That is precisely what the MTM degree is designed to do. We intend to use some of the revenue generated by the supplemental fees to establish a placement activity specifically for MTM graduates. We anticipate that this will be managed by two new career staff, an Executive Director and a Career Counselor. The executive director will be an experienced executive and would serve as a corporate liaison for the program, working closely with our Corporate Affiliates Program in the College of Engineering to develop relationships with future employers of MTM graduates.

[15] Patricia Galloway, "Innovation—Engineering a Better Engineer for Today's Workforce", *Leadership and Management in Engineering*, vol. 4, 127 (2004)

The Career Counselor will provide individual career advice to MTM students. Such placement activities are common to most professional schools, including our own Bren School for Environmental Science and Management. As outlined in the proposed operational budget, the associated career staff positions and other resources for career placement will be funded entirely from the fee revenue.

Section 4. Faculty

A large number of faculty on campus have expressed an interest in becoming more actively involved in TMP when it becomes a formal academic unit and a degree-granting program. Below is a break down of potential involvement of existing campus ladder faculty, listed in two categories: 1) potential joint-appointments (teaching role and research interest); 2) research interest only. The future role of adjunct faculty and lecturers is also discussed.

4.1 Faculty with potential teaching and research involvement in TMP

(In alphabetical order; letters of support in Appendix A)

Prof. Divy Agrawal, Dept. of Computer Science (Prof. VII): Ph.D. in Computer Science, SUNY at Stony Brook, NY, 1987; B.E.(Hons) in Electrical Engineering, Birla Institute of Technology and Science, 1980. Teaching and research interests in the areas of Analytics, Business Intelligence, and Data Mining in the context of Information-driven Enterprises; modeling information propagation and marketing campaigns on social media and online social networks; data and information security and privacy; scalable information infrastructures for distributed enterprises. Potential joint appointment.

Prof. Kevin C. Almeroth, Dept. of Computer Science (Prof. VI): B.S. (1992), M.S. (1994), and Ph.D. (1997) degrees in Computer Science from the Georgia Institute of Technology. Dr. Almeroth is the Associate Director of the Center for Information Technology and Society (CITS), a founding faculty Member of the Media Arts and Technology (MAT) Program, Technology Management Program (TMP), and the Computer Engineering (CE) Program. He also serves on the boards of directors and/or advisory boards of several startups. Dr. Almeroth has also served as an expert witness in a number of interesting patent cases.

Prof. John Bowers, Fred Kavli Chair in Nanotechnology, Departments of Electrical & Computer Engineering and Materials, (Prof. Above Scale): B.S. Physics, U. of Minnesota, 1976; M.S. & Ph.D. in Applied Physics, Stanford University, 1981. From 1982-1987 Prof. Bowers was a member of the technical staff at AT&T Bell Laboratories, and subsequently joined the faculty at UCSB. Prof. Bowers is one of the founders of CEEM/TMP on campus and a serial entrepreneur, founding Calient Networks, Terabit Technology (acquired by Ciena), Aerius Photonics (sold to FLIR in 2011), and Aurrion, an independent company in Santa Barbara employing 25 people. Has taught courses in Entrepreneurship and New Product Develop in CEEM/TMP since 2002. Prof. Bowers currently serves as the Director of the Institute for Energy Efficiency. Probable joint appointment.

Prof. Gary Charness, Dept. of Economics (Prof. IV): Ph.D. in Economics, UC Berkeley. Teaching and Research interests in Micro/behavioral economics, with specialty in negotiation, bargaining, conflict management. Potential joint appointment.

Prof. Harry (Ted) Frech, Dept. of Economics (Prof. IX): B.S. Industrial Engineering, U. of Missouri, M.A., Ph.D. in Economics, UCLA. Primary teaching and research interests in Industrial Organization,

microeconomics, business and property law, with research application to health organizations. Directed the professionally-oriented MA-level program in Economics.

Prof. Gary Hansen, Dept. of Mechanical Engineering (Assoc. Prof. III): MBA and Ph.D. in Business Administration, 20 years on the faculty at University of Washington School of Business, research and teaching emphasis in corporate strategy, entrepreneurship and technology management. Would move 100% into TMP pending approval of the new academic unit.

Prof. Gary Libecap, Bren School of Environment Management & Dept. of Economics (Prof. IX): Specialist in economics and social entrepreneurship. Taught for years in the Eller School of Business at the University of Arizona. Since joining UCSB, has worked with Professor Gary Hansen to forge closer connections between TMP and the Eco-Entrepreneurship and Corporate Entrepreneurship tracks in Bren.

Prof. John Mohr, Dept. of Sociology (Prof. VI): 1992 Ph.D. Sociology, Yale University; 1983 M.A. Sociology, Yale University; 1979 M.A. Comparative Culture, UC Irvine; 1978 B.A. Philosophy, UC Irvine. Expert in organizational theory, and experienced with network analysis and other quantitative methods and statistical analyses. Research in Organizational Sociology is focused on how to theorize and measure the characteristics of organizational fields. Prof. Mohr's work as a methodologist (in archival methodologies and quantitative content analysis) is well known and well regarded. Prof. Mohr has served as Associate Dean in the Graduate Division at UCSB and also as the director of the Alliance for Graduate Education and the Professoriate (AGEP) UCSB Program on Graduate Diversity in STEM Disciplines (NSF sponsored Campus Transformation Initiative) and also the Director of the UC-Diversity Initiative for Graduate Study in the Social Sciences (UC-DIGSSS) UCSB Program (NSF sponsored Campus Transformation Initiative) and (also) Director of the UCSB Social Science Survey Research Center. Possible joint appointment.

Prof. Karen Myers, Dept. of Communication (Assoc. Prof. I): 2005 Ph.D. Arizona State University; 2001 M.A. University of New Mexico; 1985 B.S. Business Administration Arizona State University (with emphasis in Marketing). Conducts research on socialization in organizations, and has published studies of women and minority assimilation into STEM disciplines. 2011 Plous Award recipient in L&S. After receiving her B.S. in Marketing Myers launched a successful publishing company. Myers developed and implemented the organization's marketing plans, and served as the primary marketer for the business. After 12 years, Myers sold the business to enter graduate school where she focused on organizational communication. Myers' research and teaching continue to be related to marketing. She maintains expertise in the latest advances in marketing and especially trends in Internet-based social media marketing. Myers has taught marketing courses on the UC, Santa Barbara campus including Marketing Communication (COMM 160MA and COMM 166) and Marketing Management (ENGR 210). Possible joint appointment.

Prof. Ron Rice, Dept. of Communication (Prof. Above Scale): Ph.D. [and M.A.] Stanford; B.A Columbia. Endowed chair in Communication (Rupe Chair [in the Social Effects of Mass Communication]). Specialist in information systems and information, network analysis, new media, organizational theory and organizational change in new organizational forms, and diffusion of innovations. Very strong quantitative research skills. Co-director of the Carsey-Wolfe Center [drop: for Film, Television, and New Media]; affiliated appointment in Bren; and affiliate of the Center for Information Technology and Society (CITS). Taught technology managers at AT&T [and MacQuarie University (Australia)] while he was a professor at Rutgers. Possible joint appointment..

Prof. Dave Seibold, Dept. of Communication (Prof. Above Scale): 1975 Ph.D. Michigan State University; 1972 M.A. University of Michigan; 1971 B.A. Iona College (Summa Cum Laude). Specialist in teams in organizations, communication and organizational change, and innovation management. Helped found the Graduate Program in Management Practice in 1999, and has served as its director since 2000. Extensive research and technical assistance in corporations, including technology firms, during the past 30 years. Seibold joined the Department of Communication as a Professor in 1990, and served as Department Chair from 1998-2004. Formerly he was a faculty member at Purdue University (1975-1976) and the University of Illinois at Urbana-Champaign (1976-1990). He also has been a distinguished visiting professor and lectured at more than two dozen universities worldwide. He is an elected Fellow of the International Communication Association and an elected Distinguished Scholar in the National Communication Association. Prof. Seibold's research and teaching interest fall into four categories: communication and interpersonal influence processes (persuasion, compliance-gaining, motivation); group interaction (decision making processes, problem-solving techniques, and team development dynamics); organizational communication (participation structures and processes, temporality in workgroups, innovation and organizational change, management and strategic communication); and applied communication (bridging theory and practice, organizational training and development, evaluation of programs). Prof. Seibold teaches ENGR 241/285E (Management of Innovation) in TMP annually. Possibly would shift 100% to TMP if the new academic unit is approved.

Professor Bob York, Dept. of Electrical & Computer Engineering (Prof. VIII): Ph.D. In Electrical Engineering, Cornell University, 1991; M.S. in Electrical Engineering, Cornell University, 1989; B.S in Electrical Engineering, University of New Hampshire, 1987. Currently serving as Director of TMP, served as chair of Ad Hoc Review Committee in 2009-2010 that organized external PRP-like review of TMP. Prof. York's research interests are in RF/wireless electronics and antennas and novel electronics materials. Prof. York co-founded AgileRF Inc. in 1999, and has served as an advisor or consultant for several other companies in California. Prof. York holds numerous patents, several of which are under active licensing agreements. Could assume an administrative role in COE during transition and implementation of new professional degree program.

4.2 Faculty with potential research involvement

(In alphabetical order)

- Prof. Rich Appelbaum, Sociology, Global & International Studies
- Prof. Ted Bergstrom, Economics
- Prof. Bruce Bimber, Political Science
- Prof. Jim Blascovich, Psychology
- Prof. Bob Deacon, Economics & Bren
- Prof. Andrew Flanagin, Communication
- Prof. Noah Friedkin, Sociology
- Prof. Roland Geyer, Bren
- Prof. Brad Paden, Mechanical Engineering
- Prof. Diane Mackie, Psychology
- Prof. Matthew Potoski, Bren
- Prof. Sarah Thebaud, Sociology

- Prof. Rene Weber, Communication and Psychology
- Prof. John Yun, Education

4.3 Adjunct/Visiting Faculty and Lecturers

Professionally qualified adjunct faculty or lecturers often play a role in many business and management programs, and indeed TMP has historically benefited from the active participation of business leaders and entrepreneurs as important lecturers in the classrooms, notably as guest speakers in seminars, or as instructors in entrepreneurship, finance, project management, etc. Certain topics (e.g. managerial accounting and finance) lend themselves naturally to adjunct faculty involvement, because although such coursework *could* be taught in some cases by existing ladder faculty, the faculty will probably lack specific research activities in these areas, and consequently the perspectives of active or experienced corporate practitioners are often more valuable to the student. Nevertheless, the formation of a new unit will allow TMP to increase ladder faculty participation and consequently *reduce* its historical reliance on lecturers. Only extremely well-qualified professionals, preferably with PhDs and years of service in leadership roles, will be considered for involvement in the new unit (note that TMP already employs three such lecturers). In the early start-up years of the program we anticipate that visiting faculty from peer institutions could help address potential instructional deficiencies until full-time faculty can be hired, and in fact could be an effective way of identifying potential future hires for the program.

Section 5. Courses

5.1 Course Descriptions

The complete set of courses to be created for the program is listed below, along with proposed catalog descriptions and potential instructors. Note that we also intend to list these courses under a new "TMP" course code designation (all courses in TMP are currently listed under the course code ENGR). In all cases these new courses will only be open to MTM students in good academic standing.

TMP 401 –Seminar: Opportunity Recognition in New Technology
2 units, offered Fall quarter
A series of lectures by faculty and visiting speakers covering new advances, business practices, and opportunities in technology, innovation management, entrepreneurship, education and social responsibility, with particular emphasis on understanding the difference between an interesting technology and a viable business opportunity.
Potential Instructors: Hansen, Bowers, Almeroth, new hires

TMP 411 – Theory of Markets and Competition
3 units, Offered Fall Quarter
A general survey of Macro and Micro economic concepts as they apply to business creation, resource allocation, competition and market evolution. Includes historical, social, political, economic, and legal environments within which business operates, a discussion of capitalism & alternatives, monetary policy and its impact on domestic and global business, responsibility to customers & employees, ethics, sustainability. Theories of diffusion as well as socio-political views of technological development will be presented in the context of current and evolving global and digital economies.
Potential Instructors: Frech, Charness, new hire

TMP 421 – Individual, Group and Organizational Effectiveness
3 units, offered Fall Quarter
Understanding individual differences and impact those differences can have on group and team behaviors. Theories of groups and teams with an emphasis on leadership, motivation, negotiations, organizational design. This course examines management functions related to key organizational processes envisioning and strategic planning, creating high performance teams, establishing appraisal/reward systems, and innovation and organizational change. Focus on leading innovative technical people, leadership that fosters entrepreneurship and intrapreneurship, and new forms of organizing and in rapidly changing or temporary environments.
Potential Instructors: Seibold, Mohr

TMP 425 A&B – Seminar: Interdisciplinary Team Project
2 units each, offered Winter and Spring, must be taken consecutively
Prerequisites: satisfactory completion of TMP 421
This two-quarter sequence is a hand-on, experiential projects that will be undertaken by teams of 3-5 students. In the context of a meaningful engineering or consulting project the project aims to increase student capacity for teamwork and leadership, understanding the dynamics of influence and negotiations, how to deal with differing opinions and personalities, the art of active listening, giving and receiving feedback, and generally putting into practice concepts introduced in TMP 421 and 473. The course will include a weekly leadership seminar. Teams will form during the first quarter of the sequence and identify/refine a viable project concept and team formation, with project ideas deriving from student personal interests, instructor suggestions, recently filed IP, or internship/field work. The second quarter will focus largely on implementation and discussion of team dynamics in a "flipped" classroom approach where students present their progress on a weekly basis to the instructors.
Potential Instructors: Seibold, Charness, Mohr, Hansen

TMP 431 – Accounting and Financial Problem-Solving
3 units, Offered Fall quarter
Begins with a discussion of fundamental cash flow and operating cycles of business, and financial & non-financial measures of business health and performance. Examine the role of traditional financial reporting, Pro Forma development and analysis, Discounted Cash Flow, and other managerial decision making tools. Product costing, cost terminology, budgeting, cost volume-profit analysis, and standard costs, as well as non-traditional management accounting topics such as variable costing and activity based costing.
Potential Instructors: Professional practitioners, lecturers drawn from UCSB Accounting Program

TMP 441 – Analysis for Business and Management Decisions
3-units, Offered Fall quarter
Prerequisites: undergraduate course in multivariable calculus
Theoretical models and mathematical tools for quantitative analysis, statistics, decision theory, management. Students will learn how various business situations are modeled and optimized effectively using mathematical modeling and quantitative techniques. Examples include time-series analysis, regression, optimization (linear, nonlinear, and discrete), probabilistic modeling, decision analysis, and simulation.
Potential Instructors: Agrawal, York, new hire

TMP 442 – Project, Program and Operations Management
3 units, Offered Winter quarter
Prerequisites: satisfactory completion of TMP 421 and TMP 441
Provides students with knowledge and tools to manage complex projects and operations to ensure that a project is completed on time, within budget, and with high quality by exploring specific techniques for accomplishing those three goals. Introduction to commonly used business systems and strategies for managing Value/Supply Chains, Information, Human Resources, considerations and strategies for global business operations Prepares students to manage people, budgets, scheduling, and quality of projects.
Potential Instructors: York, Bowers, Almeroth, practitioner

TMP 451 – Market Research Under Uncertainty
3 units, Offered Winter quarter
Prerequisites: satisfactory completion of TMP 411 and TMP 441
Data analytics, demand forecasting, defining and estimating market segments, determining consumer preferences . Explore the entire cycle of market research, from objectives and planning; choice of methodology; designing questionnaires and focus group guides; collecting, analyzing and interpreting data; and presenting findings. Special emphasis on using market research to develop and support decision-making processes to minimize risk and direct-resource investment.
Potential Instructors: Myers, new hires

TMP 452 – Managing the New Product Launch
3 units, Offered Spring quarter
Prerequisites: satisfactory completion of TMP 442, TMP 451, and TMP 461
Developing new products from conception, R&D, trial to launch, R&D strategy, project management, planning, organizing, and deploying resources. Explores engineering and business topics important to the development of innovative customer-driven engineering products. Design optimization, innovative thinking and the principles and methodologies of product development are examined. Students are taught the tools, techniques and organizational structures that support new product launch, including stakeholder and alliance partnerships.
Potential Instructors: Bowers, York, new hire

TMP 461 – Business Models in Technology Driven Industries
3 units, offered Winter quarter
Prerequisites: satisfactory completion of TMP 411, 421, 431 and 441
Business models and structures for value creation, innovation, competitiveness; leadership and decisions Features case studies and discussions to understand approaches and techniques to manage technological innovation and change within their organizations, including design and incentivization of teams and organizations to promote innovation. Understanding industry and technology impacts on business model selection and evolution. Special emphasis on sustainable business practices and strategies to maintain a competitive global business.
Potential Instructors: Hansen, new hires

TMP 471 – Leading Change
3 units, Offered Winter quarter
Prerequisites: satisfactory completion of TMP 411 and 421
Addresses leadership in complex environments characterized by technology, sustainability and the need to operate across boundaries. It introduces students to contemporary models, concepts and theoretical

frameworks of leadership and examines different forms of leaderships, including emergent, sustainability, cross-boundary and transformational. Provides frameworks to help students strengthen leadership abilities to address business problems under high uncertainty, exert influence, and drive change across a wide range of commercialization projects.
Potential Instructors: Hansen, Seibold, new hire

TMP 462 –Negotiations and Sales Management
3 units, Offered Spring quarter
Prerequisites: satisfactory completion of TMP 461
This course is designed to introduce a range of theories about mediation and participatory processes, and improve conflict management skills. Introduces prescriptive and descriptive negotiation theory as it applies to dyadic and multiparty negotiations, to buyer-seller transactions and the resolution of disputes, to the development of negotiation strategy and to the management of integrative and distributive aspects of the negotiation process. The course is based on a series of simulated negotiations in a variety of contexts including one-on-one, multi-party, cross-cultural, third-party and team negotiations. Specialized topics in sales management includes: principals of direct, indirect and on-line sales; pricing and distribution strategies; personal selling and sales force management; sales forecasting and management; the art and science of creating agreements between two or more parties.
Potential Instructors: Charness, sales practitioners

TMP 475 –Business Planning in Dynamics Markets
3 units, Offered Spring quarter
Prerequisites: satisfactory completion of TMP 401, TMP 425A, TMP 451, and TMP 461
A required capstone course that brings together all elements of MTM coursework including market research and validation, competitive/risk analysis, demand forecasting, financial modeling, planning for building the organizational structure and management team, raising capital, R&D plan and IP strategy, product development strategy, factors of production, manufacturing plan, and technology development roadmap. This course assimilates identifiable facts associated with the product or technology (data on customer/market validation, cost of the factors of production, etc.), a fictitious organization and management team, and conjecture regarding future movements of markets, competitor reaction to a new competitor, etc. The experiential component of the course will likely be accomplished in the context of preparing a comprehensive business plan (strategy implementation) for an emerging technology as part of the TMP 425A&B Interdisciplinary Team Project, based on student personal interests, instructor suggestions, recently filed IP, or internship/field work. Includes both an oral presentation and written report.
Potential Instructors: Hansen, Seibold, multiple faculty involvement

TMP 489 – Special Issues in Technology Commercialization
3 units, Offered Spring quarter
Prerequisites: satisfactory completion of TMP 401, 411, 425A
This seminar is intended to provide current focused research and theory on newly developing issues in specific technological or managerial subjects. Building off the current Graduate courses dealing with the particular issues of commercialization in Life Sciences, Information Technology, Data Analytics, and Energy Efficiency, and Sustainable Technologies. Faculty and topics will vary depending upon the needs of the students and the interests of visting faculty.
Potential Instructors: Bowers, York, Almeroth, Charness, Agrawal, Rice and others

5.2 Initial Teaching Plan

We anticipate that the program will initially be delivered by a combination of existing campus faculty, new hires, and some lecturers/practitioners. Teaching engagement for existing faculty would be implemented though joint appointments, or through overload teaching and subsequent summer compensation. We also anticipate that team-teaching will be used in many courses, particularly those that span the interests of multiple faculty in the program.

While the teaching plan at program launch will depend critically on our progress in making new hires and joint appointments and the availability of key faculty for overload teaching, a possible and plausible first year plan is summarized in Table 6; this assumes at least two new faculty hires and participation of some existing faculty identified in Section 4.1:

Table 6 — Possible Initial Teaching Plan

Fall Quarter Foundation	Winter Quarter Value Creation	Spring Quarter Integration
TMP 401: Seminar: Opportunity Recognition in New Technology Lead instructor: Hansen	**TMP 425 A/B: Commercialization Team/Leadership Project (includes once per week leadership workshop)** Instructor: Seibold	
TMP 411: Theory of Markets and Competition Instructor: Frech	**TMP 442: Project, Program & Operations Management** Instructor: Almeroth	**TMP 452: Managing the New Product Launch** Instructor: Bowers
TMP 421: Individual, Group and Organizational Effectiveness Instructor: Seibold	**TMP 451: Market Research Under Uncertainty** Instructor: Myers	**TMP 462: Negotiations and Sales Management** Instructor: New Faculty
TMP 431: Accounting and Financial Problem-Solving Instructor: Local Practitioner	**TMP 461: Business Models in Technology Driven Industries** Instructor: New Faculty	**TMP 475: Business Planning in Dynamic Markets** Students assigned to one of several faculty advisors
TMP 441: Analysis for Business and Management Decisions Instructor: Agrawal	**TMP 471: Leading Change** Instructor: Hansen	**TMP 489: Special Issues Technology Commercialization** Instructor drawn from local domain experts and practitioners

Section 6. Resource Requirements

A detailed operational budget forecast is given in Appendix B, and structured to indicate the anticipated fiscal impact on the College of Engineering over the first 5 years following program approval. The following summarizes some of the key resource requirements and rationale for the new unit and degree program that are embodied in the detailed budget; additional budgetary assumptions are listed in Appendix B.

6.1 Faculty FTE

Instruction in the *existing* TMP is conducted by one dedicated ladder faculty (Hansen), two ladder faculty teaching on an overload basis (Bowers, Seibold), and 6 professional lecturers (note: most lecturers in TMP conduct two courses per year and hence contribute 2/9 FTE each for a total of 1.33 net lecturer FTE for the program). If approved, the new unit would seek to add ladder faculty through a combination of new hires and joint appointments, with some appointments of temporary visiting ladder faculty in the near

term. A total of six (6) faculty FTE and two (2) lecturer FTE will be required to sustain the existing TMP curriculum and the new degree program in maturity.

A preliminary strategy for building faculty FTE is as follows: after approval and establishment of the new academic unit, Prof. Hansen of Mechanical Engineering is expected to immediately transfer 100% to TMP. The five additional faculty FTE will be comprised of new hires and possible joint appointments with existing faculty in the College of Engineering and Division of Social Sciences. It is anticipated that at least one FTE could be associated with the 100% transfer of one existing faculty member on campus[16]. In addition, a search for a new hire is already underway; this is the aforementioned renewal of a suspended search that was approved by the EVC following the successful program review. Pending a successful recruitment for this position and Academic Senate approval of this proposal, the EVC has also formally allocated an FTE to COE for a new TMP hire in 2013-2014 (of course, final approval for these searches will still be sought through the normal campus processes.) Thus the program already has a clear path to adding four of the six required FTE as soon as the program is approved. The program plans to have five full-time faculty on campus before the arrival of the first cohort of students and the start of instruction. The last (sixth) FTE will be sought for a new hire by Year 4 of the program; prior to that point we anticipate hosting a visiting faculty member to assist with teaching responsibilities, and this has been factored into the budget in Appendix B. Anonymous private giving to the College of Engineering has already secured $1.25M set aside for a potential endowed chair for this program, expected to be used for one of the first new hires.

Table 7 — Projected Faculty FTE

	Year 1	Year 2	Year 3	Year 4	Year 5
Faculty FTE	3	5	5	6	6
Lecturer FTE	1.33	1.33	1.67	1.67	2

The anticipated faculty and lecturer FTE growth is summarized in Table 7. The faculty FTE will largely support the new degree program, whereas most of the lecturer FTE will continue to support the existing certificate programs. Some additional support from lecturers/practitioners and visiting faculty will help staff the curriculum, particularly in certain areas (such as Accounting, Finance, Law, & Sales) that are inherently practice-oriented subjects. But at least 70% of the instruction in the coursework associated with the new graduate degree program will be taught by ladder faculty, with a maximum of 30% taught by professional practitioners or adjunct faculty. Some faculty teaching engagement from the Division of Social Science may also be sought through overload compensation (typically via summer ninths), depending on the wishes and circumstances of the individual faculty and their departments; for example, some faculty and chairs from heavily impacted departments have expressed a preference for this option as opposed to joint appointments in order to better manage teaching loads in their departments. Ergo the budget in Appendix B includes an allocation for possible overload compensation.

6.2 Staff FTE

Existing curricular and outreach activities are currently supported by a staff of 3.5 FTE in COE, with outreach activities funded entirely by TMP's own fundraising activities. A net increase of 4 staff FTE

[16] Note that this process can only be initiated after the new unit is approved and established, but Deans Alferness and Oliver have already begun discussions to facilitate a possible resource exchange (see letters from Deans in Appendix A)

will be required by the time the first cohort of students arrives (Year 2), with subsequent hiring as needed based on student enrollments. This staffing projection reflects some particular needs associated with a professional degree program that may not be required in other academic units, including more specialized marketing expertise and support for admissions and job placement activities. A Graduate Program Assistant will be hired to provide student advising (listed as an SAO position in the budget). Anticipated growth of staff FTE is shown in Table 8. The budget in Appendix B documents specific staff positions envisaged in the new program.

Table 8 — Projected Staff FTE

	Year 1	Year 2	Year 3	Year 4	Year 5
Total Staff FTE	4.5	7.5	8	8	8+

There are synergies with some existing staff in the College of Engineering that will be exploited and are built into these staff resource projections. For example, staff in the College of Engineering already handle most of the financial/accounting responsibilities for the program, and we anticipate that the existing Academic Personnel staff will handle all AP/HR responsibilities associated with faculty/staff in the new program. Any contract & grant support that is required by new faculty in TMP will be channeled through the relevant support staff in existing COE departments (note that some of the faculty participants TMP already have appointments in these departments, and we anticipate that some new hires will as well).

6.3 Space and Other Capital Facilities

The existing TMP faculty and staff reside in offices in Phelps Hall; the program currently occupies 2,400 ASF that is part of the College of Engineering inventory. Assuming this space carries over to the new unit on a continuing basis, most of the additional space requirements will be associated with offices for new faculty and staff hires, and offices for the new graduate students. Assuming an assignable square footage (ASF) of 140 per faculty/staff and 50 ASF per graduate student (standards currently used by the College of Engineering for space allocations), approximately 6,000 ASF of additional office space will be needed. The Program will also require a dedicated classroom space in or near Phelps that will be renovated to create a professional seminar room (estimated to require over 2,000 ASF) to accommodate approximately 60 students; this is a "horseshoe" shaped seating plan that is commonly used in discussion-based instruction to facilitate classroom/group interactions. This resource could be made available to other campus programs but scheduling would be under the control of TMP.

6.4 Equipment

Equipment needs are anticipated to be associated primarily with administration (e.g. copy/fax/scanner system) and instruction (Audio/visual equipment for the new classroom). Some of these are requested as part of the initial seed funding for the program, with most other recurring equipment needs paid for by fee revenue in later years.

6.5 Computing Costs

Campus computational resources that are currently used in the existing TMP should be sufficient for the early years of the Program, exclusive of personal computers of which we anticipate one new computer for each new faculty/staff hire. Subsequent needs will be paid for by resources generated by the program.

6.6 Library Acquisitions

Key subscriptions for business and management-related databases and publications have been identified and summarized in Appendix E. These new acquisitions will be phased-in gradually over the first five years of the program. An initial annual allocation of $50,000 is included as part of the seed funding in early years to begin adding the most critical library resources (listed as "must haves" in Appendix E). Additional library acquisitions will be added in subsequent years as needed and as funding permits. To acquire all of the resources listed in Appendix E would require up to $125,000/year; we have therefore shown the library allocation gradually increasing from $50,000/year to $125,000/year in the proposed budget (Appendix B). It should be clear from the budget that all new library acquisitions will eventually be funded entirely by fee revenue when the program reaches maturity. The actual rate at which library resources will be added will depend critically on the actual pace of enrollment and revenue growth.

6.7 Other Operating Expenses

Aside from salaries and benefits for faculty and staff, operating expenses will include marketing/advertising, office supplies, course materials (books, case studies, etc.), staff development, telecommunications, and travel/entertainment. In addition, UC Regents policy for professional programs requires a Non-State-Funded Administrative Services fee (NSFAS) assessed at 8% of expenses. These and other indirect costs are detailed in Appendix B. Advertising is anticipated to be most significant in the early years of the program. In maturity many of the operational expenses will be absorbed by the professional fee structure. Operating expenses associated with External Student programs such as the New Venture Competition and Lecture Series will continue to be supported by external sponsorship until the new degree revenue is sufficient to cover those expenses.

6.8 Summary of Projected Budgetary Needs

Under the enrollment assumptions described earlier, the mature program will require at least 6 ladder faculty FTE, 2 lecturer FTE, and 8 staff FTE, representing net increases of 5 faculty FTE and 4.5 staff FTE beyond what is currently allocated to TMP. The program requests at least 8,000 ASF of additional space, of which 6,000 ASF will be used for office space, and 2,000+ ASF will be used for a new instructional facility. Other operational costs are summarized in Appendix B, with detail on new library resources in Appendix E. Funding for some of the increased lecturer and staff positions will ultimately come from revenue generated by the supplemental fees once the program reaches maturity, hence we do not anticipate any long-term impact on existing campus programs. In the near term the program will of course require seed funding from the College of Engineering to finance some of the early hiring and to engage existing faculty from outside of the college in order to successfully launch the program. As documented in the budget of Appendix B, seed funding totaling roughly $2M is anticipated for the program to reach a break-even point.

Section 7. Graduate Student Support

While the issue of Graduate Student support is more critical in research-oriented degree programs, there are potential opportunities for such support in the proposed degree program in connection with (a) Teaching Assistants (TAs) for the courses, and (b) merit- or need-based scholarships and fellowships. Funding for both would be sustained by the fee structure of the program as well as endowments established by private giving. The existing TMP program on campus has already secured a $500,000 endowment for "Harold Frank Scholars", and TMP distributes an additional $10,000 each year in scholarship via other private giving. Fellowships and Scholarships are consistently a top priority in TMP

fundraising activities and will continue to be in the future. For Professional programs with a PDF, UC Regents Policy 3103 requires that 33% of all fee-revenue be set aside for financial assistance. This is included in the operational budget forecast in Appendix B. Disbursement of these funds would be under the control of the program and used to enhance accessibility for underprivileged students.

Grants from State and Federal Research Agencies are a third potential source of funding for student support. As evidence of the potential for this support, Profs. Scott (Chemical Engineering), York (ECE), and Beltz (Mechanical Engineering) recently secured a grant for $600,000 over 5 years from the National Science Foundation entitled "ESTEEM: Enhanced Support in Technology Management for Engineering Majors", with 85% of the funds earmarked for underprivileged students in engineering. Its is expected that ladder faculty in TMP will continue to pursue similar grants for the purpose of nucleating new research activities and supporting graduate students.

Section 8. Changes to Senate Regulations

New Santa Barbara Regulation 330 to be appended.

Glossary of Terms/Acronyms

ASEE: American Society of Engineering Educators
ASF: Assignable Square Footage
Bren: short for the *Bren School of Environmental Science and Management* at UCSB
COE: College of Engineering at UCSB
DSS: Division of Social Science
ERC: External Review Committee
EVC: Executive Vice Chancellor
GPMP: Graduate Program in Management Practice
L&S: College of Letters & Science at UCSB
MLPS: Division of Mathematical, Life, and Physical Sciences at UCSB
MBA: Masters of Business Administration
MEM: Masters of Engineering Management
MTM: Masters of Technology Management
NAE: National Academy of Engineering
NSFAS: Non-State-Funded Administrative Services
PDF: Professional Degree Fee
TMP: Technology Management Program at UCSB

Appendix A – Letters of Support

Twenty-one letters of support are attached in the following sequence:

Internal Letters

Faculty

- Prof. Divy Agrawal, CS
- Prof. Kevin Almeroth
- Prof. John Bowers, ECE
- Prof. Gary Charness, Econ
- Prof. Ted Frech, Econ
- Prof. Gary Hansen, ME
- Prof. Gary Libecap, Bren
- Prof. John Mohr, Soc
- Prof. Karen Myers, Comm
- Prof. Ron Rice, Comm
- Prof. Dave Seibold, Comm

Administration
(see Appendix C for Dean Alferness' College of Engineering Resource and support memo)

- Dean Melvin Oliver, Division of Social Science
- Dean Steve Gaines, Bren School of Environmental Science and Management
- Dean Pierre Wiltzius, Division of Mathematical, Life, and Physical Sciences
- Prof. Subhash Suri, Chair of the Department of Computer Science
- Prof. Jerry Gibson, Chair of the Department of Electrical & Computer Engineering
- Prof. Tresa Pollack, Chair of the Materials Department
- Prof. Kimberly Turner, Chair of the Department of Mechanical Engineering

External Letters

- Lee Fleming, Director, Coleman Fung Institute for Engineering Leadership, UC Berkeley
- Prof. Marc Mangel, Director, Technology and Information Management Program, UC Santa Cruz
- Erik Roland, Prof. of Technology Management, UC Merced

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DEPARTMENT OF COMPUTER SCIENCE
SANTA BARBARA, CALIFORNIA 93106-5110

PHONE: (805) 893-4385
EMAIL: agrawal@cs.ucsb.edu
February 5, 2012

To Whom It May Concern:

I would like to express my strongest support for establishing the Technology Management Program as an academic unit at UCSB and strongly endorse the proposal for a program in graduate studies for the Master of Technology Management.

In my view the strengths of this program is that it focuses on the issues of *innovation* and *entrepreneurship* instead of imparting classical business management education. Fostering and nurturing the next generation of graduates in engineering, sciences, and quantitative social-sciences is particularly critical to maintain the competitive edge of higher education and high-technology driven economy in California and United States. An advanced graduate training in Technology Management will be extremely valuable to the next-generation of technologists, entrepreneurs, and business leaders.

My research expertise is in the areas of databases, distributed computing, large-scale information systems, cloud computing technologies, security and privacy of data, and social media analytics. As part of my research efforts, I maintain a very active collaboration with industrial partners via joint research and development projects and through student internships. I envision that my involvement with the high-tech industry (e.g. companies such as IBM, AT&T, NEC, Microsoft, LinkedIn, VMWare, Google, Yahoo, Amazon, etc.) – can be leveraged to strengthen the Technology Management Program. In terms of specific courses that I can offer the students in this program would be a course on "data-driven decision making". Some other courses that I can offer in the technology arena would be courses on E-commerce models, Online Advertising Networks, and Economics of Cloud Computing.

In closing, I would strongly urge that the proposal for a program in graduate studies for the Master of Technology Management be approved by the campus.

Sincerely,

Divyakant Agrawal
Professor of Computer Science

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COMPUTER SCIENCE

SANTA BARBARA, CALIFORNIA 93106

October 31, 2011

Kevin C. Almeroth
Department of Computer Science
University of California
Santa Barbara, CA 93106-5110

To Whom It May Concern:

As part of our application to create a Professional Master's Degree and formalize the Technology Management Program into a "capital 'P' program", I would like to offer this letter of support. I am tremendously enthusiastic about our proposal and think it will be a significant step forward in the evolution of both TMP and the University's mission. These two steps will establish a formal program of student in technology management and will enable the kinds of inter-disciplinary research in technology management that exists now only as informal, opportunistic collaborations. And where there is already a strong educational component, it needs to be formalized. I believe this proposal accomplishes these goals.

I have been involved in TMP since the early days of the Center for Engineering and Entrepreneurial Management (CEEM) and from almost the first day I arrived at UCSB. I am be enthusiastic about what CEEM/TMP has accomplished and also excited about its future potential.

The level of my involvement in TMP has varied over the years, and more recently I have been less involved as the programmatic elements already in place have matured. But with this proposal I see a whole new series of opportunities. Once this proposal passes, I hope to have a 0% appointment in the Program and I hope, as circumstances permit, that I will have the opportunity to become more heavily involved, not just in advising students, but in teaching and administration.

In conclusion, a formal Program in Technology Management would be of immense value to the students and faculty involved by creating the ideal environment in which to do the kinds of research that give UCSB its character. With this in mind, I strongly support our proposal.

Sincerely,

Kevin C. Almeroth

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John E. Bowers
Director, Institute for Energy Efficiency
Fred Kavli Professor of Nanotechnology,
Department of Electrical & Computer Engineering
UC Santa Barbara
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Date: Jan. 20, 2012

To: Robert York
Director, Technology Management Program

From: John Bowers
Director, Institute of Energy Efficiency
Kavli Professor, Department of ECE

Re: Establishment of the Technology Management Program and Master of Technology Management degree

I am happy to enthusiastically support and endorse the establishment of the Master of Technology Management degree and the Technology Management Program as an academic unit. The TMP program and the courses it provides are essential to the education of scientists and engineers at UCSB as well as students from across the campus. The College of Engineering does an excellent job preparing students to be good engineers. However, it is even more important to teach them the skills to be *leaders* in their companies and universities. The TMP program is essential to give them the skills to be successful in their careers after graduation. It is important to have not just strong engineering skills, but an understanding of how to be effective in changing and leading their organization to be successful in their business. I have had many students tell me how grateful they were for this program and the classes they took here, and I've had many more former students return to tell me that the TMP training was the most important aspect of their UCSB experience.

The proposed degree program is important to provide a complete, coherent, broad platform of management skills. It is also important to give our students a competitive advantage in the marketplace. It is important for students not just in science and engineering, but across campus because graduates in humanities and social sciences need to have management skills and in many cases will be responsible for managing technology for their business.

Personally, I have been interested in technology management for the past twenty years. I began teaching a course in Entrepreneurship twenty years ago this spring because our students were lacking in management skills and because of their demand for knowledge of basic skills in Entrepreneurship. Most recently, I have been teaching a course in Product Development, and I will do so again this spring. I think this course is important

for students to learn and understand the process of efficiently, quickly, and properly developing their ideas and concepts into first class products that make their companies successful. I have seen many bright students fail at convincing their bosses and companies to pursue a promising direction because they don't understand the process to properly do so. Even worse is then their design is substandard because they didn't follow a proper integrated process to end up with an excellent design.

These skills are important for students interested in industrial careers. These skills are equally important to students interested in academic careers because running a successful research group requires similar management skills to running a small company. Two graduate students in my group took my entrepreneurship courses here, started successful companies, and subsequently became successful academics, gaining tenure after joining universities. A number of other students are now CEOs of companies. *This Program and this MTM degree are important because our goal is to develop leaders, not technicians.*

I intend to pursue a joint appointment in TMP and to continue teaching and mentoring students in this program.

Overall, I *strongly* endorse this Program and this Degree. They are important to making our students successful. They will also help make our students competitive because these skills are needed and because many other universities now offer similar programs and employers value this skills. Please feel free to contact me with any questions.

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DEPARTMENT OF ECONOMICS
2127 NORTH HALL
SANTA BARBARA, CALIFORNIA

January 20, 2012

To Whom It My Concern,

I am writing in support of the UCSB Department of Engineering's proposal for the Technology Management Program (TMP) and a Master's program in Technology Management. This is a very innovative program. The idea behind the program is to bring together technical expertise and managerial skills, enabling a "special group of students with strong technical backgrounds and leadership qualities" to apply sound management practices and insights to technical innovation. The highly-ranked UCSB College of Engineering and the entrepreneurial experience of its faculty are close to ideal for this endeavor.

Traditional MBA students do not have much training in this area, and are less than adequately prepared to manage business that are highly technical in nature. The TMP is designed to help address this educational gap and can be combined with other terminal masters program within the College. This feature offers considerable flexibility for students. I see this program as a way to bring business management education onto the UCSB campus, something that I believe is sorely needed in the absence of a business school. I also believe that this will be a high-quality program.

My own background includes experience in a variety of financial and business areas (including real estate, arbitration, and options trading) as well as formal training in economics. This provides me with a solid foundation on which to build courses in this area. Two courses that I currently teach would be well-suited to the TMP. First, I teach Game Theory, which deals with strategic interaction in a variety of environment. This is a counterpart to the Strategy courses typically taught in MBA program, but is more mathematically rigorous (as befits a program in a technical area). Second, I teach Negotiation, a course with great practical importance. In any business interaction, there is scope for negotiations and having some experience and guidance in negotiation is invaluable for one's success in the field environment. This course teaches people to understand the process of negotiation from a hands-on perspective, with actual negotiation in cases with simulated roles.

I have already expressed a conditional willingness to teach in the TMP and conceivably even pursue a joint appointment. In my opinion, the TMP should be an exciting program at UCSB, with a variety of positive externalities for a number of other academic disciplines on campus.

Please do not hesitate to contact me if you would like any further information from me.

Sincerely,

Gary Charness
charness@econ.ucsb.edu

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DEPARTMENT OF ECONOMICS
SANTA BARBARA, CALIFORNIA 93106-9210

PHONE: (805) 893-3670
FAX: (805) 893-8830

Jan. 12, 2012

Re: Support for Technology Management Program

To Whom It May Concern:

I strongly support the TMP proposal for a new academic unit and an MTM degree. This program is an important step. To effectively manage technology requires a broad background, including the basics of economics, finance and the interpretation of statistics in the social sciences.

Technology doesn't discover itself, nor implement itself. The broader view involves understanding how and why resources, both public and private, go in particular technical directions. This requires an understanding of the economic, political and social setting for technological innovation, e.g. public choice, finance, international trade and intellectual property law. At the other end of the process, implementing technology requires, in addition, an understanding of competitive strategy and how to motivate and monitor organizations. The new TMP program provides a firm institutional base for doing this here at UCSB.

The new program promises to strengthen the existing program and integrate it into the rest of the campus. It promises to integrate existing faculty around a new and important theme, particularly in the social sciences. In the fairly near future, I see a role for TMP in coordinating and promoting research, as well as teaching, on the key issues of technology choice, progress and implementation. Existing science and engineering faculty are both very productive in their fields and very entrepreneurial, so the possibilities for cooperation and cross-fertilization are legion.

My background is slightly unusual. My undergraduate degree is in engineering. I have taught MBAs as a Visiting Professor at the University of Chicago, School of Business and as an Adjunct Professor at the Sciences Po de Paris. Most of the Sciences Po students had engineering and science degrees. My research interests are broadly in microeconomics, including industrial organization (strategy, competition, monopoly, regulation), law and economics (including antitrust law) and health economics. Some of my consulting in years past has involved high tech products, such as ring laser gyroscopes, polymeric positive temperature coefficient resettable fuses and pulse oximeters. My experience would be relevant to many different possible courses and other activities in the TMP program.

Because I believe the program to be important for the university and directly interesting and relevant to my research and teaching interests, I will be pleased to help out in many ways, such as teaching, co-teaching, advising students, obtaining a joint appointment and helping in program governance.

Sincerely,

Ted Frech
Professor

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Gary S. Hansen
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February 10, 2012

Professor Bob York
Director, Technology Management Program
College of Engineering
Campus

Dear Bob:

I writing to express my full support for the creation of a new formal academic unit or "Program" entitled the "The Technology Management Program", and the creation of a new Professional Master's degree to be related to that program. Below I comment on the benefits of these proposals, how my teaching and research commitments align with those of a new Master's Degree, and the participation I envision if both are approved.

Prior to joining UCSB as a Visiting Professor in 2001 and then as a ladder faculty in 2003, I was a Professor of Management at University of Washington's Foster School of Business researching and teaching in the field of Strategic Management. I received an MBA and Ph.D from the University's Michigan's Stephen M. Ross School of Business. As a tenured member of Washington's 10th ranked Management Department my research earned over 1500 citations; I've been recognized by my academic field with the "Outstanding Research Award in Strategic Management" (one recipient a year) by the Strategic Management Society a high impact, highly selective journal in the social sciences; participated in the re-design of two MBA Programs; created and led a top 10 ranked entrepreneurial research, Master's and PhD program (Center for Innovation and Entrepreneurship) at the University of Washington; was a founding partner in Stanford University's Roundtable on Entrepreneurship Education (REE); appointed by the Governor to the Board for Washington's Technology Center; a Director of the Washington Research Foundation; and built and lead senior management development programs for the Boeing Corporation, Microsoft, and the Hong Kong Shanghai Bank. In 1999, as a faculty of the Foster School of Business I developed in conjunction with faculty from University of Washington's Electrical Engineering and Bio-Engineering Departments the first Technology Entrepreneurship Certification program in the country. It is from this background that I note the importance of UCSB fully supporting the TMP and MTM Proposals. As the Proposals report there is overwhelming student demand for classes and a graduate degree as well as demand in the academic journals for the research of TMP and its affiliated faculty. The benefits of a fully approved TMP will extend to Schools and Departments across the UCSB campus. I have first hand knowledge of business education and research programs and their evolution over the past 30 years in the US and overseas and can state categorically and emphatically the importance of

UCSB's planned master's degree and the formation of a formal academic unit or "Program" in Technology Management.

Business management research has evolved significantly over the last several years from generalized industry studies of large bureaucratic Weberian organizations to research programs more focused on organizational growth and wealth creation processes in dynamic contexts within both de novo and ongoing organizations – innovation and entrepreneurial growth are forefront in the academic literature. The foundational work of Schumpter, Hayek, Mises, Williamson, Wernerfelt, Penrose and others have significantly shifted business scholars emphasis to intangible and tacit resources as well as structural and process determinants of firm growth and success. In the latest issue of the *Strategic Management Journal*, over two thirds of the articles addressed issues in innovation, technology business growth, and tacit knowledge development and acquisition. Ten years ago, innovation and growth would have made up less then 5-10% of any journal issue. UCSB is well positioned with its current researchers in technology diffusion, group processes, network dynamics, logistics, business history, brain sciences, etc. to increase its significant role in the intellectual conversation of issues central to TMP -- innovation, organizational and human management, creativity, and the creation and management of intellectual capital.

Given that UCSB has to date chosen to limit its "professional" educational initiatives, it is important that discuss how and why a "business" oriented academic unit can uniquely engage simultaneously with the social and hard sciences to leverage and extend current campus research while increasing resources necessary to pursue excellence broadly. It needs to be understood that leading business schools (Hass School at Berkeley, Anderson School at UCLA, Ross School at Michigan, Foster School at Washington) like other departments on research campuses have as their primary mission the creation of new knowledge through both theoretical and empirical research. At these institutions business education is not that of a trade school or provider of business training in "applications". Research in not *Business Week* or the *Wall Street Journal.* Business research, and hence education, has its roots in several fundamental disciplines in which the UCSB campus has strong departments and hence venues for strengthening interdisciplinary research programs – interdisciplinary research is a long appreciated distinctive competency of UCSB. Business research and education are at their very roots interdisciplinary and founded in mathematics and the social sciences. Business finance and accounting have their roots in economics. Marketing has its foundations in psychology, communications and economics. Organizational theory and human resource management are founded in sociology, psychology and anthropology. Decision theory and operations are built upon mathematics, economics and statistics. Some recent theoretical contributions have come from biology (organizational ecology) and physics (chaos theory and organizational uncertainty). My research in the Strategic Management area is focused on what is referred to as the Resource-Based View of the Firm (RBV) and as such my work requires integration with current contributions in economics (transaction costs, option theory) as well as political science (network theory), and education (theories of learning). This interdisciplinary or boundary-spanning research has enabled me to help supervise two Bren doctoral theses as well as one in UCSB's School of Education. My training at the University of Michigan's School of Business required studies in microeconomics, organization theory and statistics. It is only logical that as the faculty of the technology

management program grows through affiliations, joint appointments and new hires that strong research links will continue to be built with many of the traditional departments in the social sciences as well as with those integrative programs like Bren, Media Arts Technology and Society and the Center for Information Technology and Society.

The fundamental role of innovation in business organizations to the creation of wealth and economic well-being has long been recognized. Yet traditional business schools have sadly focused more on the resource allocation process within organizations that they have in the actual entrepreneurial process of creation and growth. Graduates of colleges of engineering while excellent at technological innovation are often criticized for a lack of understanding of the social processes of organizations. The TMP has been designed from inception to provide an important and innovative education and research activity at the intersection of technological innovation and organizational and managerial processes. As detailed in the Proposals, many business schools and colleges of engineering are now seeking to develop similar programs.

In my discussions with faculty and staff leaders of the Faculty Senate in 2003-04, as Associate Dean for Technology Management Programs, it was clear that the Senate was not yet enthusiastic to formally recognize a new Academic Unit or "Program" for an initiative that was 6 months old with an untested curriculum, having limited enrollment history, and only nascent faculty involvement. The notion of a focused business education as oppose to the traditional "Business School" or "MBA" was novel and being pursued by only a few Universities. To the Senate leaders at that time, a future formal proposal would need to demonstrate that all these issues had been resolved. Since 2005, the Technology Management program has earned the participation of over 120 UCSB faculty in its classrooms, lectures, research symposiums and associated activities. Several thousand undergraduate students from across 40 Departments or Programs have sought out its courses, and hundreds of the campus's best Ph.D students have taken graduate level technology business management classes easing their transition from academic researchers to leaders in private research laboratories and technology start-ups. When the Dean of the Graduate Division was considering closing the Graduate Program in Management Practice (GPMP), Dean Lee approached me to integrate the GPMP educational mission within the TMP. Working with Communications Professor and GPMP Co-director David Seibold, we revitalized the curriculum, increased ladder faculty participation, rebuilt campus relations and graduate enrollment and participation in the GPMP doubled. The TMP was the co-developer and co-provider for what is now Bren's most popular graduate program the "Eco-Entrepreneur". The three annual TMP international research forums in new energy technologies created and funded by TMP were the birthplace for what is now the Institute for Energy Efficiency. While the State and related UC financial constraints are not over, the campus cannot afford to postpone or delay the approval of this program based upon limited campus resources as it did in 2010. TMP has certainly meet the hurdles for Program status and the fee enhanced graduate program will continue in the TMP tradition of contributing to the University far more then its costs.

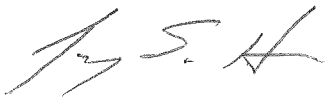
The Technology Management Program was conceived to be a benefit to the UCSB campus as a whole. In the original proposals set before the Faculty Senate in February 2009, it was demonstrated that TMP either directly through gifts or participation in grants helped to increase UCSB resources in excess of $22 million providing support in the form of scholarships to both

graduate and undergraduate students, increased research support to faculty across the campus and new facilities.

It is important to approve the, 42-unit graduate degree program (taught and supervised by ladder business and related faculty) and the Program academic unit at this time. To not do so would put in peril current program initiatives, preclude the campus from increased research and student resources as well as limit the opportunities for UCSB to participate in its traditional interdisciplinary way in some of the most important intellectual discussions of the day. Approving the proposals would make this important academic area of research and knowledge available to a broader student base, attracting outstanding student applicants from UCSB, other UC campuses and beyond. I therefore, fully support the creation of an MTM degree for this new population of full-time graduate students with a focused and professional interest in technology business management. I would welcome the opportunity to teach the proposed TMP 442 (Strategy and Value Creation), TMP 491A-B (the two quarter Interdisciplinary Team Project), and a seminar on "Sustainable Innovation" as well as mentor TMP graduate students and to represent TMP on faculty committees.

In closing, my commitment is as follows. Assuming approval of both proposals, provision of required and requested FTE to both the unit and the degree program, and the appointment of other appropriate social science and business research faculty whose leadership and involvement in TMP and MTM are vital for the success of both ventures, I am prepared -- with necessary approvals – to shift my full FTE to the TMP unit and to teach full time in the new MTM degree program.

Sincerely,



Gary S. Hansen

BREN SCHOOL OF
ENVIRONMENTAL SCIENCE & MANAGEMENT
UNIVERSITY OF CALIFORNIA, SANTA BARBARA

November 16, 2011

Robert A. York
Director, Technology Management Program
Professor, Electrical & Computer Engineering
University of California, Santa Barbara
Santa Barbara, CA 93106

Dear Bob,

I am writing to you in support of the proposals for a Professional Master's degree in Technology Management (MTM) at UCSB.

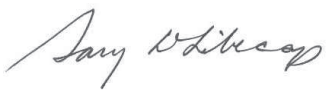
As you know, the collaboration between the Bren School of Environmental Science and Management and the existing Technology Management Program (TMP) is critical for students pursuing all specializations in the Master of Environmental Science and Management offered by the Bren School. The key competitive advantages of the Bren School relative to our major competitors at Yale, University of Michigan, and Duke are our business related courses offered by Bren and TMP as well as the Eco-Entrepreneurship focus (Eco-E). Eco-E is also the outcome of a joint collaboration between the Bren School and TMP. The other schools are considering or have adopted similar programs, but they do not have the richness and depth that we have developed through our UCSB relationship.

Bren students from all specializations—Coastal and Marine Resource Management, Corporate Environmental Management, Conservation Planning, Economics and Politics of the Environment, Energy and Climate, Pollution Prevention and Remediation, and Water Resource Management—generally are engaged in the fundamental business courses offered through TMP and rely on TMP courses to gain an understanding of core business concepts, which often are critical not only for job placement in corporate sustainability departments and other corporate job opportunities but in working with firms while in government, consulting, or NGO positions. In addition, a growing portion of each incoming Masters class at Bren chooses Eco-Entrepreneurship. This selection involves pursuing an Eco-Entrepreneurship Project for their master's thesis, and students must take coursework that integrates the Graduate Program in Management Practice (GPMP) curriculum offerings into their Bren education. Accordingly, especially for Corporate Environmental Management (typically Bren's largest specialization) and Eco-E students, I believe that the Professional Master's degree will be very attractive companion degree to help them meet their career goals in business and in creating new environmental ventures.

Before coming to the Bren School, I was a faculty member for more than twenty years at the University of Arizona, Tucson, where I taught business, law, economics, and entrepreneurship

courses. As a former business school professor and director of the Entrepreneurship Program at the University of Arizona, as well as a faculty member in Corporate Environmental Management at the Bren School, I fully endorse the creation of the MTM degree at UCSB. This new degree will fill an unmet need for students in a unique way. This program will provide students with a management background, like an MBA, and will allow them to apply business concepts in a more meaningful way, as a complement to their primary degree focus in the environment, engineering, and other disciplines at UCSB. Because UCSB is only one of two UC campuses without a business school, this new degree program is especially critical for our students to fulfill areas that currently are not adequately addressed.

Sincerely,



Gary D. Libecap
Distinguished Professor, Corporate Environmental Management
Bren School of Environmental Science and Management
Professor, Economics Department
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Research Associate, National Bureau of Economic Research.
Sherm and Marge Telleen Research Fellow, Hoover Institution

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DEPARTMENT OF SOCIOLOGY

SANTA BARBARA, CALIFORNIA 93106-9430
(805) 893-3630 FAX (805) 893-3324

January 22, 2012

Dear Bob:

Thanks for sending me the proposal for the Masters of Technology Management Program. It is great to see this coming together. I think it's a wonderful idea for several reasons. For one thing, it makes a great deal of sense to capitalize on the power and reputation of the UCSB School of Engineering to enter this obviously important educational arena by providing practical, managerial and business training for young engineers. The program will also provide a huge bump-up in preparedness for our own UCSB engineering students, many of whom are entering careers where this kinds of training will be invaluable. And, finally, the program will provide an occasion and a site for various scholars from across the campus who have intellectual interests in the area of management science and organizational behavior to come together in a common endeavor, to train students and to share an intellectual base-camp.

It is this last reason in particular that I want to highlight here. Because UCSB lacks a business school or school of management there is no central place on campus where faculty with teaching and research interests in management science and organizational studies can come together. Thus although there are many of us with these interests here on campus (scattered across departments such as economics, communication, political science, religious studies and sociology) and many of us know one another informally, still there is no organized cross-disciplinary venue (or occasion) for mixing together. I believe the Masters of Technology Management Degree Program can fill that need.

As an organizational sociologist, my research has focused for many years now on studies of organizational behavior and, especially, on issues concerned with the way that organizational environments are transformed over time. Over the years I have taught a number of courses at both the graduate and the undergraduate level that (I believe) would be a good match to the pedagogical needs of the program.

If the TMP degree program is approved I would be happy to coordinate my teaching in this area with the needs of the TMP graduate training program. This means I would be willing to coordinate my teaching schedule, cross-list my classes and I would also be interested in team-teaching courses with faculty from across the campus who are affiliated with the TMP degree

program. I would also be willing to serve on an advisory committee or otherwise help out with program management issues as needed.

Congratulations again. It is an excellent proposal. As a member of Graduate Council for a number of years (I served both as a member of Council and also in an ex-officio capacity during my years as Associate Dean of the Graduate Division) I have seen a number of these kinds of proposals come before the Council but rarely have I seen a proposal that strikes me as being as timely and strategic and broadly of interest to scholars across the campus as this one. I support it completely.

Sincerely,

John Mohr
Professor, Department of Sociology
Director UCSB Social Science Survey Center
Associate Director Institute for Social, Behavioral & Economic Research, UCSB
University of California, Santa Barbara, CA 93106-9430

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DEPARTMENT OF COMMUNICATION SANTA BARBARA, CALIFORNIA 93106-4020

January 13, 2012

Robert A. York
Director, Technology Management Program
Professor, Electrical & Computer Engineering
UC Santa Barbara
Santa Barbara, CA 93106

Dear Bob:

I am writing in support of the proposed Technology Management Program (TMP) and the Masters in Technology Management (MTM) degree. The new academic program and graduate degree take advantage of UCSB's world-renowned engineering programs with some of the best social scientists in the country, enabling the TMP and MTM programs to link the rapidly expanding sectors of technology with the human processes crucial in developing successful business. The TMP program already serves a large number of undergraduate and graduate students who recognize that leading a successful technology company involves more than technical skills alone. Their careers can be enhanced by learning skills needed to manage business processes and inspire workers and other stakeholders. By adding a professional degree program to TMP, the programs are poised for growth and exciting opportunities in the future. In addition, it will further enhance the international reputation of UCSB as a center of new technology and innovative entrepreneurship and leadership.

As well as offering much needed professional training to students, the TMP and MTM would draw the interest of researchers across the campus. Many faculty members welcome the opportunity to make connections in other areas of research to take advantage of interdisciplinary funding. The TMP and MTM programs would attract faculty who are interested in working with bright engineering and science students to assist them in developing business understanding and professional management skills.

I would be very pleased to have the opportunity to teach a marketing course for the TMP and MTM programs. My marketing education and background in management as a business owner allows me to share my knowledge and also personal experiences with students. As a communication scholar, I also focus on communication issues both in marketing products and services, but also to guide students as they market themselves and their ideas. In addition, I am drawn to the program because of my research interests in organizational communication. As a researcher, I investigate socialization of individuals into STEM studies and careers. This is a chance to develop a closer relationship with faculty and students in STEM areas on the UCSB campus. Interdisciplinary research such as this should offer many opportunities for external funding from a variety of funding agencies. Because I believe so strongly in the mission of

the academic unit and degree program, I am interested in exploring other means of involvement such as an affiliated appointment or participation on steering committees to ensure the TMP and MTM programs' future success.

Please consider this my strong endorsement.

Sincerely,

Karen K. Myers
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UCSB
UNIVERSITY OF CALIFORNIA, SANTA BARBARA

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January 23, 2012

Robert A. York
Director, Technology Management Program
Professor, Electrical & Computer Engineering
UC Santa Barbara
Santa Barbara, CA 93106
rayork@ece.ucsb.edu

Dear Director York:

I am pleased to provide my very strongest support for the Proposal for a Program of Graduate Studies for the Master of Technology Management.

I have been informally associated with the current Technology Management Program for several years now. During that time it's been obvious that the TMP program in general serves a very important need at UCSB and in society. That is, understanding and managing the interactions among technology, design, human factors, organizations, business, manufacturing, leadership, and society (e.g., see Proposal Figure 1). We simply cannot focus solely on the technical or financial aspects of new technologies. Both in order to have successful innovations, as well as to understand how to integrate them within existing needs and norms, and how to avoid rejection and negative consequences. I also know that past students have been exceptionally satisfied with the courses and opportunities for working with real companies and on real projects.

This topic is particularly relevant to me. I have taught a Master's course on Social Aspects of Implementing Information Systems at prior universities and, as a visiting professor, at business schools. I am currently teaching an upper-division Communication major course on Diffusion of Innovations. And I have conducted considerable research on these issues for over 30 years, including several books specifically on the topics:

- Rice, R. E. & Cooper, S. (2010). *Organizations and unusual routines: A systems analysis of dysfunctional feedback processes*. Cambridge, UK: Cambridge University Press.
- Katz, J. E. & Rice, R. E. (2002). *Social consequences of Internet use: Access, involvement and interaction*. Cambridge, MA: The MIT Press.
- Johnson, B. & Rice, R. E. (1987). *Managing organizational innovation: The evolution from word processing to office information systems*. New York: Columbia University Press.

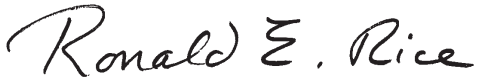
- Rice, R. E. & Associates. (1984). *The new media: Communication, research and technology*. Beverly Hills, CA: Sage.

In order to provide the important context, courses, research and project opportunities, and business and management education in and for the technology sector, we need the new Master of Technology Management, especially in a stable, funded, and innovative form. The Proposal notes the very supportive recommendations by the External Review Committee in 2010. The developers of the TMP program, and this Master's program, are by now extremely knowledgeable (after more than a decade's work) about the necessary components, the audiences and stakeholders, the appropriate content, and what it takes to start up and continually improve a major degree program. The proposal, for example, clearly identifies funding mechanisms, a detailed budget, the need for recruitment as well as placement processes, faculty (including industry experts and visiting faculty), and staff. Further, it leverages the extensive experience with the Technology Management Program, though which this Master's will be administered. It also complements the Long-Range-Development Plan for UCSB in terms of increasing graduate students, and has been part of the Campus Academic Plan since 2005. The Proposal also clearly identifies the unique aspects of the proposed Master's, in relation to business schools, other UC campuses, the emphasis on technology management, and business and societal needs. It also clearly notes that UCSB has been slow to respond to the need for programs in technology and engineering management.

I believe that the proposed Master's could also be a valuable resource to other programs on campus, providing opportunities for some project collaboration. Because of my duties as Co-Director of the Carsey-Wolf Center, the unmet teaching and administrative needs of the Department of Communication, and my ongoing graduate advising, I would not personally be able to commit to a regular teaching role. I can imagine, however, providing guest presentations, and, possibly occasionally a course on social aspects of implementing information/communication systems. Further, I could continue being an occasional advisor and commenter in TMP meetings.

Apart from my own possible involvement, I want to re-emphasize my very strongest support for the proposed Program of Graduate Studies for the Master of Technology Management.

Sincerely,



Ronald E. Rice

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DEPARTMENT OF COMMUNICATION
SANTA BARBARA, CALIFORNIA 93106-4020

Telephone: (805) 893-4479
www.comm.ucsb.edu

January 19, 2011

Professor Bob York
Director, Technology Management Program
College of Engineering
Campus

Dear Bob:

I write to express my full support for the proposal for the Technology Management Program (TMP) as a formal academic unit, as well as the proposal for the Master of Technology Management graduate degree. Below I comment on the strengths and benefits of each proposal, how my teaching and research commitments align with those of the degree and the unit proposed, and the participation I envision if both are approved.

Please permit me to begin with some background that may offer reviewing agencies a context for my relationship with TMP to date, and why I am enthusiastic about these two proposals as "next steps" in the progression I have witnessed. I was among a group of faculty and administrators from across campus that created the Graduate Program in Management Practice (GPMP) in 1997. GPMP participants include, on average in any year, 40-50 UCSB graduate students who are pursuing advanced degrees at UCSB (90% in COE or MLPS), are in good standing, but who wish additional education in management and entrepreneurship courses should they choose to pursue non-academic careers and/or seek to commercialize their technologies. Students receive a UC-recognized certificate after they successfully complete five courses and either a 160 hour internship or participation in the New Venture Competition. I became the second director of GPMP in 2000 and have continued in that role for more than eleven years. I also have taught two different courses in the GPMP curriculum over that time – typically one per year and as an overload. My GPMP administration and teaching roles over these nearly twelve years have been in addition to my full-time research, teaching, and service commitments to the Department of Communication.

During the first five years, GPMP functioned loosely under the umbrella of the Graduate Division. It had no budget, and survived based on overload or in-kind teaching by faculty and lecturers from the Division of Social Sciences, Bren, and COE (with varying levels of decanal support). Since 2006, I have directed GPMP in connection with the emergent Technology Management Program (as an agreement in 2005 among then Dean Li of the Graduate Division, then Dean Tirrell of COE, and then Associate Dean and Director of TMP Gary Hansen). GPMP has been immeasurably better since joining forces with TMP. Enrollments have increased commensurate with added resources from COE (although we continue to have as many as 10 percent of students from outside the

sciences and engineering – mainly from the social sciences). GPMP students now have deeper program support from TMP in the form of a vibrant lecture series each term, the exciting annual business plan competition, some placement assistance, a web of interdisciplinary affiliations among more faculty on campus, close ties with students in the Eco-Entrepreneurship track in Bren, and a network of entrepreneurs from the South Coast who aid with internships and the New Venture Competition, among other TMP initiatives. Indeed, more graduates have successfully launched their own ventures than before GPMP joined with TMP, and many more have gone on to prestigious MBA programs (e.g., Harvard, Michigan, UCLA). Most important, the classes that GPMP graduate students complete are more rigorous than at any time in the past, yet they also more relevant to their interests in management education and in commercializing new technologies. It is those types of classes and required experiences that the proposal for a formal, 42-unit graduate degree program (taught and supervised by ladder faculty) would expand -- and would make available to a wider student base, with applicants from UCSB and far beyond. *I therefore fully support the MTM degree proposal for this new population of full-time graduate students with a focused and professional interest in technology management. I would welcome the opportunity to teach the proposed TMP 421 (Organizational Processes and Effectiveness), TMP 491A-B (the two quarter Interdisciplinary Team Project), a seminar on Managing for Innovation, and workshops.*

With regard to the proposal for TMP as an academic unit, within which the MTM degree would be the central pedagogical mission, it is easy to point to current and potential benefits of the program: (1) its role in training students in ways they seek but that other programs at UCSB do not; (2) its popularity among graduate students – many of whom have expressed an interest in a joint program in which they could complete the PhD in their technical specialty *and* the proposed MTM degree; (3) partnerships it has fostered with potential employers; (4) the existing infrastructure of TMP faculty, professionals and staff, who would enable and sustain further program development in co-curricular and non-curricular areas; (5) the ways in which the TMP classes and activities interface with other COE needs and initiatives (especially the Institute for Energy Efficiency, and the Corporate Affiliates Program's sponsored research); (6) the increased revenues to campus from the professional fees for the MTM degree; (7) its history in responding to needs and opportunities that led to the development of quite similar technology management programs on other UC campuses and at other prominent universities; and (8) strong support from donors, among others.

Although the benefits of TMP in place and envisioned above are important, they are not the most significant justification for formalizing TMP as an academic unit. Another benefit is more important at this research university. As an academic unit with full standing, TMP could be a locus of interdisciplinary *research* excellence at UCSB and beyond. Strong scholars already on the UCSB faculty (identified in the proposal) have expressed interest in collaborating with or affiliating with the unit in order to realize research opportunities and external funding goals that are not now possible in their own units or in TMP as it currently functions. By ensuring that the new FTE noted in the proposal also are acclaimed scholars, strength would be added to academic strengths already found across campus. Numerous possibilities would emerge.

For example, issues that are central to TMP (innovation and new product development, management structures and multidisciplinary teams, technical and administrative leadership,

commercialization of technologies, investor and customer response) and issues that are key in the social sciences (organization evolution and decline, team composition and performance, leadership processes and effectiveness, network structure and the diffusion of innovations, stakeholders and organizational dynamics) have the potential to *intersect* in specific research projects that are important to both groups (and with data not normally accessed by social scientists at UCSB). Recent conversations between faculty from both groups surfaced questions with implications for research and practice: (1) Concerning leadership in tech firms, founding scientists rarely "survive" to become long-term CEO's of their companies. Among those that do, what characteristics are associated with their tenure and with organizational effectiveness? (2) In the area of team composition and productivity, product development teams in, for instance, pharmaceutical companies are comprised of people from very different disciplines but who are "dedicated" to a product or product line. What organizational processes and structures are predictive of strong collaboration and high performance? (3) Regarding the life cycle of management structures, especially in life science companies with new technologies, are certain management approaches and practices more effective than others, and must they change as the company becomes larger and more successful? (4) And with regard to stakeholders and start-up firms, can angel investors (a growing class of investors in seed/early stage companies) fill the gap left by the lessened activity of venture capital groups in early stage, research-based companies? What is the track record of angel investors in technology and in life science investments? Are there certain types of life science technology investments that are more appropriate for angel investors? The findings from such projects would, in turn, inform and improve the delivery of classes in the MTM curriculum.

A research area of great potential in this regard is the perspective that scholars at UCSB who specialize in network theory/analysis and diffusion of innovation (see proposal for these faculty) would add to important concerns -- in the technology management literature and in the social sciences -- concerning whether and how collaborative structure influences the invention and diffusion of breakthroughs. While collaborative inventors apparently create more novel and useful combinations on average, how such collaboration occurs is disputed. Social scientists disagree about the creative benefits of collaborative brokerage – which occurs when an individual (viewed as the hub or the "focal" inventor in network terms) bridges persons who are not connected. The alternative to brokerage, cohesion or closure, occurs when all of the inventor's collaborators work with one another in the absence of the focal inventor. Campus researchers could explore evidence by Fleming, formerly at Harvard and now at UCB, that brokerage enhances the generation of innovation but, at the same time, diminishes the probability of its diffusion and adoption. He finds that brokering other inventors may afford the hub inventor first access to and control of information, so that individual can create more new combinations. Yet this structure makes it more difficult for the focal inventor's collaborators to understand the idea in order to critique, develop, and transfer it to others. Hence brokers generate more new combinations – but those new combinations are less likely to be picked up and developed by other inventors. Research like this at UCSB would simultaneously study the generation *and* diffusion of an invention.

Studies such as those above align with my lines of research on organizational innovation and modification; on influence processes in teams, organizations, and social networks; on the role of communication in enactment of key management functions; and on members' use of collaboration technologies in decision making and team tasks. Indeed, I have been collaborating with researchers at

the University of Illinois and Northwestern University on an NSF-funded project concerning the development of advanced technology tools that reduce the task of studying large group dynamics (such as those involved in start-up firms) to manageable proportions. The New Venture Competition in TMP would serve as a useful test bed for demonstrating the feasibility of the technologies instrumented thus far (the focus of NSF's Cyber-Enabled Discovery and Innovation Initiative) and for providing insight into large dynamic group systems (understudied by social scientists, who have tended to focus on either small groups or large organizations). If TMP were formally approved, I would have the *assurance* of a context for studying theses processes long term as well as a network of *local* researchers to conduct research that I now need to undertake elsewhere.

TMP thus could be a research center for scholars from across campus who currently study and teach organizational theory and research, and who could join together around scholarship and pedagogy related to *organizational science and management science* (major journals bear those names). Beyond the joint funding proposals that they could spawn, exciting is the possibility of unifying these UCSB faculty and their doctoral students – together with engineering and sciences faculty and graduates students interested in technology firms – by means a multidisciplinary *doctoral emphasis* in Organizational Science and Technology Management (distinct from the current Technology and Society doctoral emphasis). In this way, TMP could recruit established scholars to fill the proposed FTE and to teach in the proposed MTM degree program by enabling access to doctoral students from allied departments without needing a doctoral program of its own at first.

In closing, my commitment is as follows. Assuming approval of both proposals, provision of required and requested FTE and resources to both the unit and the degree program, and commitment by other faculty on campus whose leadership and involvement in TMP and MTM are vital for the success of both ventures, *I am prepared – with necessary approvals -- to shift my full FTE to the nascent TMP unit and to teach full time in the new MTM degree program.* I joined UCSB twenty years ago with four goals: to help create a top-ranked PhD program in organizational communication, to take my turn as chair of the Department of Communication, to participate meaningfully in campus governance in ways I had not been able to do at Illinois, and to carry forward my ties with the management unit on that campus by building a structure for management education at UCSB. The first three goals have been met in full and beyond my highest hopes. Related to the last goal, my work with GPMP has been productive but limited to a certificate program and I have been divided between that initiative and the Department of Communication. I seek to use the remainder of my career to contributing to a strong technology management unit and degree program at UCSB, and to do so on a full-time basis as a 1.0 FTE member of TMP.

Sincerely yours,

David R. Seibold
Professor, Department of Communication,
Division of Social Sciences, College of Letters & Science
Director, Graduate Program in Management Practice,
Technology Management Program, College of Engineering

February 22, 2012

Robert A. York
Director, Technology Management Program
Professor, Electrical & Computer Engineering
UC Santa Barbara

Dear Professor York:

I am writing to endorse the College of Engineering's proposal to establish the Technology Management Program (TMP) and a Professional Master's Degree in Technology Management (MTM). I believe that the establishment of such a program with a professional MA will enhance the campus' interdisciplinary breath, as it relates to an "emphasis on technology commercialization, operations, organization behavior/management, economics, and ethics" that will help us provide training to a new generation of technology managers and entrepreneurs.

The Division of Social Sciences is excited to be a part of this endeavor. We have a core of faculty that are experts in the organizational sciences and economics that find this program an exciting addition to their teaching at UCSB. And, I am personally pleased that we have been able to forge strong connections and interactions with you as the Director and at the Dean level that will facilitate the involvement of faculty from the Division of Social Sciences in the program. I believe we can go forward and negotiate appropriately so that faculty can make the contributions to TMP and the MTM in ways that are mutually supportive of both units mission and responsibilities. I am more than willing to discuss FTE transfers, either temporary or permanent, that you need to kick start your program. This may require the exchange of FTEs, but that is all part of a negotiation that I am more than happy to enter into. This will be a great boon to our campus, and I wholeheartedly endorse it.

Sincerely,

Melvin L. Oliver
Sage Sara Miller McCune Dean and
Professor of Sociology

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DONALD BREN SCHOOL OF ENVIRONMENTAL SCIENCE & MANAGEMENT
STEVEN D. GAINES, DEAN

SANTA BARBARA, CA 93106-5131
http://www.bren.ucsb.edu/

August 27, 2012

To: Professor Robert York
Director, Technology Management Program

From: Dean Steven Gaines
Bren School of Environmental Science and Management

Re: *Establishment of the Master of Technology Management Degree and Related Academic Unit*

On behalf of the Bren School of Environmental Science and Management, I am pleased to write a letter in enthusiastic support for a new professional master's degree in Technology Management and establishment of a Technology Management Program (TMP) academic unit.

The Bren School and TMP have a strong relationship developed around the concept of nurturing exceptional and innovative leaders. The Bren School's Eco-Entrepreneurship (Eco-E) program began as a joint initiative between the Bren School and TMP, and the Eco-E program is now flourishing as a focus within the Master of Environmental Science and Management (MESM) degree at the Bren School. Eco-E students pursue coursework and activities that provide them with skills and support to launch new ventures, products and technologies to address environmental and resource problems. A vibrant TMP is key to the success of this effort.

As noted in the TMP proposal, the TMP master's degree "will leverage existing strengths in engineering and technology innovation at UC Santa Barbara" to educate and train technology leaders. The Bren School faculty and students understand the need and appreciate TMP's unique strengths in developing a successful program in this area. We believe that the proximity of this program to the Bren School, both literally and figuratively, will facilitate continued cross-fertilization and benefit MESM students. It will also help offset the challenge we face in recruiting students who are seeking dual degrees in environmental management and business.

In its May 7, 2012 memo to Senate Chair Henning Bohn, the Faculty Executive Committee (FEC) of the Bren School endorsed the creation of the TMP academic unit and establishment of

PHONE: (805) 893-7363 • E-MAIL dean@bren.ucsb.edu • FAX: (805) 893-7612

the TMP degree program, noting that the program is complementary to our Eco-E program and will likely expand course offerings for MESM students. The Bren School FEC also offered several valuable suggestions for implementation of the program.

I strongly support the establishment of the TMP academic unit and master's program. These changes will have broad benefits for students in the College of Engineering, College of Letters & Science, and the Bren School. We are excited about continuing to expand our leadership in training environmental entrepreneurs, and these new programs on campus will greatly enhance this goal through vibrant partnerships with TMP. Thank you for the opportunity to comment.

Copy: Dean Rod Alferness
Bren School FEC Chair James Frew

September 19, 2012

To: Professor Robert York
Director, Technology Management Program

From: Dean Pierre Wiltzius
Division of Mathematical, Life and Physical Sciences
UC Santa Barbara

Re: *Establishment of the Master of Technology Management Degree and New Affiliated Academic Unit*

Dear Bob,

On behalf of the Division of Mathematical, Life and Physical Sciences, I am pleased to write a letter in support of a new professional master's degree in Technology Management and establishment of a Technology Management Program (TMP) academic unit.

MLPS and the College of Engineering have long had, and will continue to enjoy, a symbiotic relationship in our respective research and teaching missions. We share a strong interdisciplinary culture of collaboration aimed at advancing knowledge and preparing young scientists and engineers for productive careers. In the spirit of those goals I strongly endorse the new unit and degree program on campus. This new degree will provide a valuable training for technical students, enabling them to compete more effectively in an increasingly competitive global workforce. This new program should enhance our core strengths in sciences and engineering training at UCSB.

In its memo dated May 14, 2012 to Senate Chair Henning Bohn, our Letters & Science Faculty Executive Committee endorsed the creation of the TMP degree program and academic unit, noting "The FEC has a favorable view of both proposals, and believes that the program will provide a unique, innovative, and valuable degree for people who wish to combine technical expertise with the ability to promote and market their ideas". I concur.

Thank you for the opportunity to comment.

cc: Dean Rod Alferness

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DEPARTMENT OF COMPUTER SCIENCE SANTA BARBARA, CALIFORNIA 93106-5110

Sept 10, 2012

Robert A. York
Director, Technology Management Program
Professor, Electrical and Computer Engineering
University of California Santa Barbara, CA 93106

Dear Bob:

I am writing to strongly support the proposal to establish TMP has an academic unit, and to create a Professional Master's degree program.

I believe there is a growing need, and a role, for entrepreneurship in research universities today, especially in engineering. In fact, some of most celebrated technology brands in the world, including Microsoft, Google, Facebook and Cisco, began life in academia, whose young founders were blessed with an uncanny combination of technical vision and entrepreneurial skills. In the Computer Science department at UCSB, several of my colleagues have started and led highly successful companies (Citrix, Appfolio, Ask/Teoma, Eucalyptus, LastLine, to name a few), and many continue to do so today. As the Internet and software-based technologies continue to lower the cost and barriers to entrepreneurial activities, we can expect to see a growing demand for these skills and formal training.

Against this backdrop, a technology management program that trains our students in team building, organizational behavior and management, marketing and communication, basic economics, personnel and project management, accounting and finance seems most appropriate and urgently needed. Many students in the Computer Science department have benefited from the TMP courses over the years, and there have been multiple student-initiated start-ups that have emerged from TMP. Yet there is a clear need for a more structured and formal program. Several faculty of the department have a strong desire to see such a program established, to participate in it, and to make it a world-class entity.

In short, a formal Program in Technology Management will be a great addition to UCSB, and will add a unique and powerful component to our engineering program. I strongly support this proposal.

Sincerely,

Subhash Suri
Professor and Chair
Department of Computer Science

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DEPARTMENT OF ELECTRICAL AND
COMPUTER ENGINEERING

SANTA BARBARA, CALIFORNIA 93106-9560

September 7, 2012

To: Bob York, Director
Technology Management Program

From: Jerry Gibson, Chair
Electrical and Computer Engineering

Re: Establishment of the Technology Management Program and the Master of Technology Management degree

I am pleased to endorse enthusiastically the proposal to establish the Technology Management Program as an academic unit and to offer the Master of Technology Management degree. Students in the Department of Electrical and Computer Engineering often take Technology Management program courses without credit to gain exposure to financial, management, and entrepreneurial principles that will enhance and facilitate their careers. The elevation of the program to an academic unit and the offering of a professional master's degree will provide opportunities for the Department of Electrical and Computer Engineering to incorporate some of the course offerings into our degree programs and will bring professionals to campus, thus expanding opportunities for our students. I expect both our undergraduate and master's level graduate curricula to develop options that would include TMP courses. These options will provide career preparation that will augment the strong technology component currently in our degree programs.

I hope to become involved in the Technology Management Program as it develops in the future.

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Tresa M. Pollock
ALCOA PROFESSOR
MATERIALS DEPARTMENT
COLLEGE OF ENGINEERING

SANTA BARBARA, CALIFORNIA 93106-5050
(805) 893-7851
(805) 893-8486 FAX
pollock@engineering.ucsb.edu

September 4, 2012

To: Professor Bob York
Director, Technology Management Program

From: Tresa Pollock
Chair, Materials Department
College of Engineering

Tresa M. Pollock

Re: Technology Management Program

On behalf of the Materials Department I would like to express our support of the proposals to establish the professional Master's degree in Technology Management and the establishment of the Technology Management Program as an academic unit.

The Materials Department strongly believes that entrepreneurial enterprises are important for the local and state economy and for national competitiveness. Materials Department graduate students have been enthusiastic participants in TMP courses offered to date. These courses have filled an important gap in the educational process in the absence of a Business School on our campus.

We support the TMP proposals and believe that the campus could further benefit from a more comprehensive Technology Management curriculum with greater depth. The goals of the program to build upon our strengths in engineering and technology and develop professionals with skills in management, leadership, and entrepreneurship are appropriate. We anticipate greater participation of the local materials community as this program develops and we look forward to the new educational opportunities that it will provide for our students.

August 13, 2012

TO: Robert York, Director
Technology Management Program

FR: Kimberly Turner, Chair
Mechanical Engineering

RE: Formalization of the Technology Management Program

I am writing this letter in support of the proposals for the creation of the Technology Management Program. I am writing this support letter in my capacity as Chair of the Mechanical Engineering Department, a role I have held for 4 years.

All of the departments in the College of Engineering are very highly ranked, by many different ranking systems. In addition, our faculty are very entrepreneurial as evidenced by the numerous faculty-derived startup companies that have sprung out of UCSB over the past 2 decades. In addition, the greater Santa Barbara area has become a technology hub for the central coast, having significant activity in software, infrared, defense, and microsystems. There is a significant need for ongoing business education with a technology focus. The formalization of the Technology Management Program would lead to additional course offerings, an actual graduate degree program as well as seminars and events which would appeal to many of our students.

Such a program could definitely draw from the success stories of our entrepreneurial faculty, while at the same time adding new capability and expertise. Strategic hiring would be key to the success of such a program. In order to be successful, FTE would need to be available for this program while not compromising the FTE in the existing COE academic departments. Without ample resources, it will be difficult to implement a standout program.

I support the formalization of the Technology Management Program at UC Santa Barbara. I feel that if done properly, it will be an asset to our College of Engineering as well as our campus as a whole. If we continue on in the way we have been, we risk falling behind, as without a business school and strong technologically based training in entrepreneurship, we are at a serious disadvantage.

Please do not hesitate to contact me for additional information.

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LEE FLEMING
DIRECTOR, COLEMAN FUNG INSTITUTE FOR ENGINEERING LEADERSHIP
PROFESSOR, INDUSTRIAL ENGINEERING & OPERATIONS RESEARCH
UNIVERSITY OF CALIFORNIA
COLLEGE OF ENGINEERING
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BERKELEY, CA 94720-5580

TELEPHONE: (510) 664-4586

November 15, 2011

Professor Robert A. York, Chair
Director, Technology Management Program
Professor, Electrical & Computer Engineering
UC Santa Barbara
Santa Barbara, CA 93106

Dear Bob,

On behalf of the Coleman Fung Institute for Engineering Leadership, I am pleased to express my support for the creation of a Master of Technology Management degree at UCSB.

The call to educate new engineering leaders, particularly graduates of master's programs, is resounding across the engineering profession. The National Academy of Engineering has called for stepped-up efforts to educate engineers with "such traits as strong analytical skills, creativity, ingenuity, professionalism and leadership." Business schools, often focusing on financial management and consulting, are poorly equipped to provide this education. Santa Barbara's TMP program will produce graduates who will have these skills, equipped to lead the way in translating science and technology breakthroughs more quickly and surely into benefits for society.

I think your proposal is very good and can only offer a few bits of feedback:

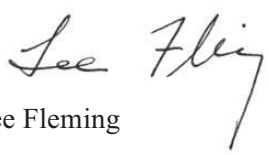
1) You may want to strengthen your project-based experience. I've found over the years that getting these projects up and running is very challenging but that once initiated, they provide wonderful learning opportunities. I might consider beginning the projects in the Fall quarter, or at the very least, getting teams assigned and introduced to their advisor/sponsor.

2) There are an increasing number of competitors in this space, so I would emphasize that you focus on creating a small, elite program. Also, I would focus on your engineering strengths, in photonics, EE, CS, and Bio-medical engineering.

The Fung Institute will be generating new pedagogy in a variety of methods, including case studies, electronic and physical simulations, team assignments, and database analyses. We would hope to share and collaborate in the development of these materials with UCSB.

I welcome and endorse the UCSB TMP program, and give it my full support.

Sincerely,



Lee Fleming

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Marc Mangel,
Distinguished Professor, Applied Mathematics and Statistics
Jack Baskin Endowed Chair, Technology and Information Management
Director, Program in Technology and Information Management

831 234 2970
http://www.soe.ucsc.edu/~msmangel/

6 January 2011

Prof R. York
ECE
UCSB
Via email

Dear Professor York

I am writing to enthusiastically support the proposal for a *Program of Graduate Studies for the Master of Technology Management*. This is an area whose time has come and in which each UC campus can make enormous contributions, and there are more than enough students for us all (see below). Your MTM is similar to the Management of Technology (MoT) track that we have in the MS program in Technology and Information Management here.

The arguments in the proposal are very compelling, but I still wish to highlight a few things that I find especially strong. For simplicity, I will do this following the pagination: a) the intersection that you identify (pg 3) is, of course, what has made Apple Computer so successful, but it is also relevant to a wide range of other areas including air traffic control, medical technology, and the use of drones by the military; b) the projected enrollment is absolutely appropriate (again see below); c) the list of participating faculty is wonderfully diverse and impressive (especially the number of very senior people)

I do have two suggestions. First, I think that there is too much material to be effectively covered in TMP 441 and that you either teach a course on introduction to optimization I business (like our TIM 204, which can find at http://reg.ucsc.edu/catalog/html/programs_courses/timCourses.html) or an introductory course in statistical methods such as regression and time series. Second, over the last year, I have been engaged with a variety senior individuals (e.g. the Chairman of the Varian Corporation, the Director of the McKnight Foundation, the leader for IBM-Academic relations) in the Silicon Valley about our own programs. To a person, they have emphasized the importance of weaving ethics into all courses, so I offer that to you as a suggestion.

We have recently conducted a marketing survey for our own professional MS program in the Silicon Valley. This survey has not yet been released but my Dean has given me permission to share it with you, and Senate colleagues at UCSB. Please treat it as confidential. I also attach a recent report by the McKinsey company on the need for individuals who can deal with 'big data'; this may be of interest to you as well.

Once again, congratulations on a wonderful proposal, which I hope will be speedily endorsed by Senate colleagues at UCSB.

Sincerely yours

Marc Mangel

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Erik Rolland, Ph.D.
Professor of Technology Management

School of Engineering, University of California – Merced
5200 N. Lake Rd.
Merced, CA 95343
Phone: (805) 280-5050,
E-Mail: erolland@ucmerced.edu

The Future Home of The Ernest & Julio Gallo School of Management

January 24, 2012

Professor Bob York
Technology Management Program
University of California
Santa Barbara, CA 93106

RE: Proposal for a Graduate Program and an Academic Unit of Technology Management

It is a pleasure to write this letter of support for the UCSB's proposals for a graduate degree program in Technology Management, as well as the plans for an academic unit for Technology Management within the College of Engineering. These plans are both bold and innovative, and are addressing current needs observed in both academia and in industry. My own experience includes over 20 years of serving as a full-time business school professor and management researcher at UC Riverside, The Ohio State University, and Shanghai Jiao Tong University. Since January 2012 I am a Professor of Technology Management in the School of Engineering at UC Merced, the first Management hire at UC Merced, and responsible for building up the Gallo School of Management at UC Merced.

While the current Technology Management Programs at UCSB already have had some impact on the campus and the community, the formalization of a graduate program and an academic unit enables the university now to take their programs to the next level, and develop national and global academic leadership in the area of Technology Management

The strength and high quality of the collaborating schools and units on the UCSB campus will help secure UCSB's position as a leader in Technology Management. In fact, the TMP's relationship with other schools is a differentiating factor between UCSB's efforts and those of other "competing" universities. Further, as other UC schools continue to develop offerings that cross-fertilize engineering, science, technology and management, there will definitely be opportunities for UCSB to contribute its strengths to collaborative UC efforts in this area.

I have communicated several times over the past year with Professor York on the program proposal and the department proposals, and I am positively encouraged by the collective, cross-functional, visionary, and detailed planning effort put forth by the UCSB faculty.

Please contact me on the coordinates above should you have further questions.

Sincerely,

Erik Rolland

Appendix B – Operational Budget Forecast and Assumptions

Budgetary Assumptions:

- We propose an initial Professional Degree Fee (PDF) of $30,000 for in-state residents and $22,000 for out-of-state residents, increasing at 5% per year after that. This proposed fee structure is similar to that used at UC Berkeley. Assuming existing UC tuition/fees continue to increase at 5% annual rate, the total tuition+fees for the first year of the program would be approximately $43,230 for in-state residents and $49,226 for out-of-state residents (see peer-group comparison chart below).

- The initial breakdown of in-state vs. out-of-state students is initially assumed to be a 50-50 split (50% in-state). This estimate mirrors the anticipated applicant pool at program inception. Unlike regular campus admissions, the proposed fee structure encourages the admission of CA residents.

- All supplemental fee revenue flows directly to the Program, with the following assessments: return-to-aid of 33% of revenue is set-aside as per UC Regents Policy 3103 "Policy on Professional Degree Supplemental Tuition"; a Non-State-Funded Administrative Services fee (NSFAS) of 8% is assessed on all expenses associated with the professional degree program; a similar 2.5% UCOP assessment is also applied. The remaining 56.5% of revenue will be available for the exclusive use by the Program at the discretion of faculty leadership and under the oversight of the Associate Dean for Professional Programs in the College of Engineering (new position).

- Staff salaries and faculty stipends are assumed to increase annually at a 3% rate. Other expenses generally increase at a 10% annual rate unless otherwise specified.

- Staff benefits are calculated according to guidelines provided by the Assistant Chancellor and Director of Budget & Planning, as follows: An annual "headcount" cost of $12,376 per person is assumed (comprised mostly of health-care costs), increasing at 10% per year. In addition, a 26.64% payroll assessment is applied which includes mandatory UC retirement contributions (12.68% after July 1, 2013), social-security (6.2%), medicare (1.45%), workers comp. (1.47%), OPEB (3.31%), Unemployment insurance (0.6%), and Liability insurance (0.93%) etc.

- Program-specific instructional support costs are anticipated in the form of materials/supplies/equipment provided directly to professional students, budgeted initially at $750/student/year. This is intended to *augment* other basic instructional resources provided by the campus, not provide a substitute for them.

- Adverting costs are expected to be largest in the first year preceding the arrival of students to raise awareness of the program, beginning at $100,000 and tapering to $50,000/year in maturity.

- Library resources: a core set of important new databases and journal subscription have been identified and included in Appendix E. Costs are phased in gradually over the first five years of the program and would be expected to increase at a rate of 5% per year thereafter.

- Costs associated with space are budgeted at $550,000 in the year preceding the arrival of the first cohort as follows: $58,000 is budgeted for renovation of 6,000 ASF requested for faculty/staff/student offices; $17,000 for installation of new wireless infrastructure; $475,000 is budgeted for renovation of a ~2,000+ ASF classroom for case-study-based instruction and associated A/V infrastructure. Annual maintenance costs of $25,000/year are assumed after the initial renovations are completed. Any renovation costs in excess of the budgeted amounts are anticipated to be funded from private giving.

Tuition Comparison:

The table below summarizes data on tuition for comparable professional degree programs, e.g. "Masters of Engineering Management", or other similar professional degree programs targeting technical students and focused on business and management skills. The table includes both public and private institutions. Some (but not all) public institutions have different tuition & fee structure for residents and non-residents, so the table considers each case separately. The Projected data for 2014-15 is based on preceding annual rate of increase of 5%/year, a trend that is expected to continue for some time. The proposed fee structure for the MTM degree at UCSB is included in the table for comparison.

	2010-11 Actual	2011-12 Actual	2014-15 Projected
Residents			
MIT (private)	$80,542	$84,569	$93,899
Stanford (private)	$59,174	$62,133	$71,927
Carnegie Mellon (private)	$55,350	$58,118	$67,279
Univ of Southern Cal (private)	$41,720	$43,806	$50,711
UC Berkeley - College of Eng (public)	n/a	$42,000	$48,621
University of Texas, Austin (public)	$37,000	$38,850	$44,974
University of Michigan, Ann Arbor (public)	$37,000	$38,850	$44,974
UC Santa Barbara – College of Eng (public)	n/a	n/a	$43,230
Georgia Tech (public)	$31,200	$32,760	$37,924
University of Illinois (public)	$31,200	$32,760	$37,924
Public Average for Residents	***$34,101***	***$35,806***	***$41,450***
Nonresidents			
MIT (private)	$80,542	$84,569	$93,899
Stanford (private)	$59,174	$62,133	$71,927
Carnegie Mellon (private)	$55,350	$58,118	$67,279
University of Michigan (public)	$53,861	$56,554	$65,469
Univ of Southern Cal (private)	$41,720	$43,806	$50,711
UC Berkeley - College of Eng (public)	n/a	$46,695	$54,055
UC Santa Barbara – College of Eng (public)	n/a	n/a	$49,226
University of Texas, Austin (public)	$37,000	$38,850	$44,974
University of Illinois (public)	$31,200	$32,760	$37,924
Georgia Tech (public)	$31,200	$32,760	$37,924
Public Average for Nonresidents:	***$38,316***	***$40,232***	***$46,574***

Detailed Operational Budget for TMP

PROJECTED DIFFERENTIAL FEE REVENUE	Year 1	Year 2	Year 3	Year 4	Year 5
Expected Enrollment FTE	-	40	60	80	100
Annual PDF California Resident	$ -	$ 30,000	$ 31,500	$ 33,075	$ 34,729
Annual PDF Non-Resident	$ -	$ 22,000	$ 23,100	$ 24,255	$ 25,468
Total PDF Revenue (assuming 50% in-state):	**$ -**	**$ 1,040,000**	**$ 1,638,000**	**$ 2,293,200**	**$ 3,009,825**
PROJECTED COSTS					
A. Existing TMP Unit Expenses, funded by COE**					
TMP Faculty Director/Chair (stipend)	$ 21,500	$ 21,500	$ 21,500	$ 21,500	$ 21,500
GPMP Faculty Director (summer ninth & stipend)	$ 23,989	$ 23,989	$ 23,989	$ 23,989	$ 23,989
TMP Program Manager, Specialist	$ 110,000	$ 113,300	$ 116,699	$ 120,200	$ 123,806
GPMP Coordinator, SAO II (0.5 FTE @ $50,828/yr)	$ 25,414	$ 26,176	$ 26,962	$ 27,771	$ 28,604
TMP Business Officer (Analyst IV)	$ 74,440	$ 76,673	$ 78,973	$ 81,343	$ 83,783
Admin Asst, Course Management	$ 40,116	$ 41,319	$ 42,559	$ 43,836	$ 45,151
Lecturers (TEC & GPMP, 2.0 net FTE @ $70,000/yr)	$ 140,000	$ 144,200	$ 148,526	$ 152,982	$ 157,571
TA & Reader Expenses (TEC & GPMP)	$ 48,499	$ 49,954	$ 51,453	$ 52,996	$ 54,586
Benefits	$ 122,487	$ 124,484	$ 126,542	$ 128,662	$ 130,845
S&E Allocation	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Subtotal Part A:	$ 626,445	$ 641,597	$ 657,203	$ 673,277	$ 689,834
B. MTM Degree Program Expenses,to be funded by the PDF revenue					
Salaries					
Associate Dean for Professional Programs (stipend)	$ 21,500	$ 21,500	$ 21,500	$ 21,500	$ 21,500
Executive Director, Specialist	$ 55,000	$ 110,000	$ 113,300	$ 116,699	$ 120,200
Career Placement Prof Dev. SAO III	$ -	$ 58,000	$ 59,740	$ 61,532	$ 63,378
Marketing/Recruiting Specialist	$ 35,000	$ 72,000	$ 74,160	$ 76,385	$ 78,676
Admin support and Communications	$ -	$ 42,000	$ 43,260	$ 44,558	$ 45,895
Visiting professor (0.33 FTE @ $175,000/yr)	$ -	$ -	$ 58,275	$ 60,023	$ 61,824
Faculty Stipends & Overload Compensation	$ -	$ 70,000	$ 95,000	$ 105,000	$ 110,000
Lecturers (0.33 FTE @ $70,000/yr)	$ -	$ 21,000	$ 21,630	$ 22,279	$ 22,947
TA & Reader Expenses (MTM)		$ 25,000	$ 25,750	$ 26,523	$ 27,318
Benefits (see budget model assumptions)	$ 36,352	$ 124,629	$ 131,833	$ 139,600	$ 141,991
Supply and Expense Costs					
Computers	$ 15,000	$ 15,000	$ 15,000	$ 20,000	$ 25,000
Computer Support (servers, printers, software, etc)	$ 10,000	$ 10,000	$ 10,000	$ 12,500	$ 15,000
Advertising	$ 100,000	$ 75,000	$ 50,000	$ 50,000	$ 50,000
Career support/placement ($1000/student)	$ -	$ 40,000	$ 60,000	$ 80,000	$ 100,000
New Library Subscriptions	$ 50,000	$ 75,000	$ 100,000	$ 125,000	$ 125,000
Copier Purchase/Rental agreement	$ 10,000	$ 1,500	$ 1,500	$ 1,500	$ 1,500
General S&E	$ 15,000	$ 20,000	$ 22,500	$ 25,000	$ 30,000
Network/Technology Infrastructure surcharges	$ 1,500	$ 2,500	$ 3,000	$ 3,500	$ 4,000
Admissions Expenses (net of additional application fees)	$ 10,000	$ 12,500	$ 15,000	$ 20,000	$ 30,000
Travel & Recruitment Expenses	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Special events (e.g. guest lectures)	$ -	$ 25,000	$ 50,000	$ 75,000	$ 75,000
Instructional Support ($750/student)	$ -	$ 30,000	$ 45,000	$ 60,000	$ 75,000
Other equipment (projectors, A/V, etc)	$ 25,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Facilities (renovation, maintainance)	$ 550,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000
Other Indirect Costs					
Return to aid (33% of fee revenue)	$ -	$ 343,200	$ 540,540	$ 756,756	$ 993,242
NSFAS (8% of expenses)	$ 74,628	$ 69,930	$ 83,196	$ 93,608	$ 99,818
UCOP Assessment (2.5% of expenses)	$ 23,321	$ 21,853	$ 25,999	$ 29,252	$ 31,193
Subtotal Part B:	$ 1,052,301	$ 1,330,612	$ 1,711,182	$ 2,071,215	$ 2,393,483
Total Program Expense	**$ 1,678,746**	**$ 1,972,209**	**$ 2,368,385**	**$ 2,744,492**	**$ 3,083,317**
NET FISCAL IMPACT TO COLLEGE OF ENGINEERING					
Incremental Cost of new unit and MTM Degree*	$ 1,052,301	$ 1,330,612	$ 1,711,182	$ 2,071,215	$ 2,393,483
Revenue from Professional Differential Fee	$ -	$ 1,040,000	$ 1,638,000	$ 2,293,200	$ 3,009,825
Surplus (Deficit)	**$ (1,052,301)**	**$ (290,612)**	**$ (73,182)**	**$ 221,985**	**$ 616,342**

* Incremental cost of adding new degree program does not include existing expenses itemized in Part A.

** Does not include expenses funded by outside sponsors/donors (e.g. New Venture Competition, Lecture Series)

Reviewed and Approved By:

Juli Pippin
Asst. Dean for Budget & Administration, College of Engineering — Signature — Date: 3/26/12

Rod Alferness
Dean, College of Engineering — Signature — Date: 3/26/2012

Todd Lee
Asst. Chancellor, Office of Budget and Planning — Signature — Date: 3/26/2012

Appendix C – Resource Memorandum from the Dean of Engineering

College of Engineering
University of California, Santa Barbara

March 28, 2012

To: Gene Lucas
Executive Vice Chancellor

From: Rod C. Alferness
Dean, College of Engineering

Re: Endorsement of TMP proposals for new academic unit and for Professional Master's degree

Herein I wish to convey my full support for the enclosed proposals to establish a new academic unit within the College of Engineering called the "Technology Management Program" (TMP), including a new Professional Master's degree called the "Master of Technology Management" (MTM). As articulated in the proposals, the creation of a formal academic unit and a new degree program in Technology Management has been a priority for the College for many years, beginning well before my appointment as Dean in 2011, but it is a strategic plan that strongly resonates with my own experiences and vision for the College.

Engineering students graduating from UCSB today will enter a global workforce that has changed dramatically over the past two decades. Having spent most of my professional career in industry as CTO and Chief Scientist of Alcatel-Lucent Bell Labs (formerly known as AT&T Bell Laboratories), I have witnessed first-hand the need for better training in business fundamentals for young engineers and scientists. The need for a new breed of technical graduate is now recognized by several prominent professional organizations such as the National Academy of Engineering (of which I am an active member) as well as the American Society for Engineering Education. To insure that our graduates are well equipped to compete in the global workforce we must adapt our educational curriculum to include basic training in business and management education. TMP will be central to this initiative in the College of Engineering, and the proposals represent a key first step in: 1) establishing TMP as a formal academic unit, with 2) an initial Professional Master's degree.

The two proposals (and accompanying operational budget forecast reflected in their respective Appendix B) spell out the required resources to create the new unit and professional degree program. The College of Engineering is fully committed to providing the resources to meet and sustain the aims of this proposal. The supplied budgetary information documents that CoE has been providing approximately $626,000 annually for the support of TMP in its current form, and will naturally continue to do so. Expenses associated with the new unit and degree program will ultimately be sustained largely by fee revenue, but I recognize that there will be an initial period

when this is not possible, and I am committed to working with the EVC to insure that TMP receives the necessary startup costs to insure a viable and successful program. The following sections provide additional detail on the critical CoE commitments, roughly in the order they appear in the budget document, and my understanding is that a separate letter will follow detailing any commensurate support from your (EVC) office.

Faculty FTE

In addition to Prof. Gary Hansen (who is expected to transfer 100% of his FTE from Mechanical Engineering to TMP following approval of the new unit), a net of five additional new faculty appointments is expected over the first two years after program approval. One of these FTE has already been approved and a search is underway. Pending a successful recruitment for this position and Academic Senate approval of this proposal, we are expecting at least two additional new faculty hires for the program from the CoE inventory (of course, final approval for these searches will still be sought through the normal campus processes.) Anonymous private giving to the College of Engineering has already secured $1.25M set aside for a potential endowed chair for this program. The remaining two FTE could involve either new hires or joint appointments of other faculty in the Social Sciences, but the source of FTE will ultimately be from the College of Engineering inventory. As the program matures, some of the funding for faculty compensation will be paid directly from fee revenue as described in the budget in Appendix B, but until that point I am committed to providing additional FTE and other resources as needed and working with Dean Oliver in the Division of Social Science with regards to mitigating the impact on his Division that would arise from possible joint appointments and teaching contributions from faculty in Social Science. In fact Dean Oliver and I have already begun initial discussions about this program, and his letter of endorsement clearly conveys his similar commitment.

Staff

It is important to recognize that the staffing needs associated with a professional fee-bearing program are somewhat different than a traditional academic department, and with this in mind I concur with the recommendations of the proposal for four new staff for TMP. In program maturity most of these new staff positions will be funded by new fee revenue to the program, but we are committed to provide initial seed funding in the first few years to begin the necessary staff recruitment and hiring following approval of the new unit. Specifically, TMP anticipates that it must immediately augment its existing staff with two positions to be filled sometime in the first year: an Analyst-level position to lead the initiative for new student recruitment and admissions, and a Specialist-level appointment that would handle most of the administrative burden associated with a professional fee-bearing program including building off-campus relationships with employers. Following that, two more positions will be needed (an SAO-level appointment for student advising, and an admin assistant for clerical support). We anticipate that some of the new administrative burdens in the new program will be absorbed into the existing CoE staff infrastructure; in fact this has

already begun this year as one of our CoE staff (Julie Luera) has taken over the financial/accounting responsibilities associated with the program. Other existing CoE staff (Cathy Pollock) will likely handle most of the academic personnel & human resource needs of the new unit, and we will look for other similar operational efficiencies within the College to assist TMP as it grows; for example, any new activity involving contracts & grants processing for new faculty could be accommodated within one of our existing engineering departments. Furthermore, in recognition of the unique needs of this new initiative and the potential for related opportunities, I am prepared to create and fund a new Associate Dean position in the College (Associate Dean for Professional Programs) to help oversee the program and its interactions on and off campus.

Teaching Assistants
CoE will continue to allocate Teaching Assistant FTE and Reader support to existing TMP instruction according to our internal allocations practices, which are linked to enrollment. Fee revenue is expected to provide TA and Reader resources for the new MTM degree coursework, but CoE is committed to maintaining the necessary support for all existing instruction.

Marketing/Advertising Expenses
The nature of this program and the fact that it represents a rather new direction for our College and campus will require an active external marketing and advertising effort to make prospective students aware of our new program. While the College has some staff who can help in this regard, it is likely that the advertising expense in the first few years could be substantial. The proposal calls for the advertising expense to be highest in the first year ($100k), tapering gradually to an annual expense of $50k/year. The College is committed to providing the necessary staff and funds to insure a successful advertising campaign and a highly qualified first cohort of students.

Library
The proposal calls for increased library and database support for both faculty and student research in TMP to be phased in over a period of time. Some new acquisitions will be made in the first year, and additional acquisitions and subscriptions will be increased gradually as the program grows and fee revenue increases. CoE is committed to provide the initial $50,000/year base allocation for library resources in the startup phase of the program, with the understanding that the fee revenue will gradually replace this base funding. Additionally, we expect that TMP will work with not only the UCSB library but with other UC libraries to explore lower-cost options in joint acquisitions or leasing of appropriate databases and online periodical support.

Other Administrative Expenses and Equipment
In the first year the budget anticipates this expense to be roughly $50k, which includes supplies, travel & recruitment, some computer support, and new admissions expenses

associated with recruiting the first cohort of students. In addition, approximately $25k in instructional equipment is expected in the first year. CoE is committed to provide the necessary resources and will increase its allocation in proportion to the growth of faculty and staff in the first few years of the program until fee revenue is sufficient to sustain the recurring administrative costs of the program.

Space

The College of Engineering is committed to finding the necessary space for this program. As stated in the proposal, there is a need for an additional 6,000 ASF for faculty, staff and student office space, when the program reaches maturity. We envision a phased-in approach utilizing existing resources and working closely with you and your staff to determine what space is most appropriate for this endeavor. Since the program will ramp up over a number of years, this gives us time to identify the specific requirements and needs based on the uniqueness of the faculty and program. The key new space resource will be a modern 2,000+ ASF horseshoe-shaped and raked (tiered) instructional facility. This will require substantial renovation of some existing space on campus. I agree with the argument in the proposal that this is critical for the success of the program, and I am committed to finding resources to support this renovation immediately following program approval. A member of my staff (Chris LaVino) has worked with Prof. York on developing an initial estimate of the cost of the proposed space renovations, and those estimates have been accurately reflected in the initial budget forecast for Year 1. The costs associated with space renovation account for approximately half of the initial startup costs for this program, and I anticipate working closely with your office to insure that we meet the space and renovation needs of the program in a timely fashion.

Forward Planning and Development

With respect to academic planning, faculty recruitment, the setting of curriculum plans and the commitment of staffing and other relevant resources, it is important to note that CoE has already managed the TMP program as a *de facto* department (albeit a very small one) over the last eight years. This has included a commitment of effort among CoE Development staff to raise funds to achieve and enhance further the Technology Management Program wherever possible. Our anticipation is that approval of the new unit and degree program is a much-needed next step that will facilitate new private giving to TMP and the College.

Conclusion

It should be clear from this memo that the College of Engineering unequivocally supports the excellent plan embodied in the accompanying proposals and commits to every possible effort toward its successful realization.

Appendix D – Information on Existing TMP Certificate Programs

TECHNOLOGY MANAGEMENT

UNIVERSITY OF CALIFORNIA | SANTA BARBARA

The Technology Management Program (TMP) is a unique educational program within one of the world's leading colleges of engineering at UC Santa Barbara. The program is designed to give students of all disciplines, through coursework, mentoring, and hands-on experience, an improved understanding of cutting edge business practices and entrepreneurship in technology-based companies.

Curriculum

The TMP undergraduate curriculum complements the UCSB degree-granting programs with additional areas of study in business management. Course offerings:

ENGR 111	Opportunities and Perspectives in Technology, Business and Society
ENGR 120	Business Strategy & Leadership Skills
ENGR 122	Entrepreneurship
ENGR X130A	Entrepreneurial Marketing (Offered through UCSB Extension)
ENGR X130B	New Venture Finance (Offered through UCSB Extension)
ENGR X130C	Leadership of Teams & Talent (Offered through UCSB Extension)
ENGR 130	Managing Operations
ENGR 131	Patents and Intellectual Property
ENGR 132	Business Planning for New Ventures
ENGR 134	Selling High Tech Products
ENGR 135	New Product Development
ENGR 145	Entrepreneurial Opportunities in IT and Telecom
ENGR 146	Critical Issues in Early Stage IT & Telecom Companies

For more information, contact us:

Technology Management Program
Phelps 1332
email: tmp@engineering.ucsb.edu
phone : (805) 893-5133

www.tmp.ucsb.edu

UC SANTA BARBARA engineering

TECHNOLOGY MANAGEMENT
UNIVERSITY OF CALIFORNIA | SANTA BARBARA

Technology Entrepreneurship Professional Certificate

The Technology Entrepreneurship Professional Certificate Program provides students with a solid foundation in business fundamentals and entrepreneurship as it applies to new technologies and technology-oriented companies. Students gain an understanding of the wide range of concepts and business principles considered during start-up, growth, and operation of technology-oriented companies.

The program gives students access to many professionals familiar with the challenges of starting new businesses as well as running existing companies. Students will be able to directly apply their knowledge gained from the program courses to operate effectively in the business environment or launch a new venture.

Requirements

In order to receive certificate credit for the courses taken, students must earn a B average or better in the courses required for the certificate, with no grades for any courses below a C letter grade. The program may be completed in as short as three (3) quarters; however, it may be more realistic to spread the coursework over two (2) academic years.

The program consists of 7 required courses, resulting in 16 units and a combination of regular campus courses and extension courses:

ENGR 111	Opportunities and Perspectives in Technology, Business, and Society, 2 units (2 quarters)
ENGR 120	Business Strategy & Leadership Skills, 4 units
ENGR 122	Entrepreneurship, 4 units
ENGR X130A	Entrepreneurial Marketing, 2 units
ENGR X130B	New Venture Finance, 2 units
ENGR X130C	Entrepreneurial Leadership of Teams & Talent, 2 units

UC Santa Barbara undergraduate student must:

- have upper division standing
- complete Writing 2 with a minimum grade of B-
- complete Writing 50 or equivalent with a minimum grade of B-
- complete Economics 1 or 3A with a minimum grade of B- (ENGRX 130B New Venture Finance course only)

$150 Certificate application fee
$250 per unit for courses taken through Extension (X130A, X130B, X130C)

For UC Santa Barbara students seeking degree or unit credit, petitions must be filed with the appropriate UC Santa Barbara College or School prior to enrollment in the extension courses.

Students in the Technology Entrepreneurship Certificate Program enroll through UC Santa Barbara Extension online at: extension.ucsb.edu

For more information, contact us:
Technology Management Program
Phelps 1332
email: tmp@engineering.ucsb.edu
phone : (805) 893-5133

www.tmp.ucsb.edu

UC SANTA BARBARA engineering

TECHNOLOGY MANAGEMENT

UNIVERSITY OF CALIFORNIA | SANTA BARBARA

Technology Management for Graduate Students

The Technology Management Program Graduate curriculum provides master's and PhD candidates at UCSB a sound introduction to the fundamentals of entrepreneurship and business-management in technology-driven organizations. The program is designed to give students from all disciplines, through coursework, mentoring, and hands-on experience, an improved understanding of cutting edge business practices and entrepreneurship in technology-based companies.

TMP helps prepare graduate students to enter the technology business world with knowledge of balance sheets, income statements, discounted cash flows, capital budgeting, opportunity recognition, market segmentation, target marketing and sales, IP management, business planning, presentation skills, team work, and leadership.

In addition to the broad palette of coursework, TMP students have a unique opportunity to meet an exceptional group of local, regional and national leaders in technology management and entrepreneurship as a basis of a strong social network. Many of these leaders serve as mentors, lecturers and advisors within the program.

TMP is committed to providing a variety of resources for learning, teaching, networking and research in entrepreneurship and innovation management. TMP students are encouraged to take advantage of the many real-world activities offered by the program, such as:

Featuring a mix of prominent academic researchers, distinguished business professionals, and successful entrepreneurs.

Giving students an opportunity to learn business skills by developing an idea through the entrepreneurial process.

Providing small group mentoring and networking for students with experienced executives and entrepreneurs.

For more information and a full list of courses offered, contact us:

Technology Management Program
Phelps 1333
email: tmp@engineering.ucsb.edu
phone : (805) 893-2729

www.tmp.ucsb.edu

UC SANTA BARBARA engineering

TECHNOLOGY MANAGEMENT
UNIVERSITY OF CALIFORNIA | SANTA BARBARA

Graduate Program in Management Practice (GPMP)

For highly motivated graduate students across the UCSB campus seeking a structured and diploma-enhancing business education, the Technology Management Program offers a UC-wide recognized graduate certificate.

Certificate Program Structure

The progression of classes emphasizes, first, the business FOUNDATION needed in a business/entrepreneurial environment. Second, a student selects one of two emphases, entrepreneurial or corporate, focusing on the CONTEXT of his/her career expectations beyond campus. Finally, the GPMP requires a meaningful experience putting these ideas into PRACTICE, where students choose one of the following: an Internship or participation in the New Venture Competition.

Certificate is open to all graduate students who have been admitted to other departments on campus and are pursuing an advanced degree. Requires completion of 18 units. Students must have at least a 3.0 GPA overall to enroll in TMP courses.

Certificate Course Requirements

Foundation

- ENGR 240 Business Strategy & Leadership, 4 units
- ENGR 241 Managing Innovation, 4 units
- ENGR 244 Entrepreneurial Marketing, 3 units
- ENGR 246 New Venture Finance, 3 units

Context

- ENGR 242 Entrepreneurship, 4 units
  OR
- ENGR 255 New Product Development, 4 units

Practice

- Internship
  OR
- New Venture Competition

Class	Title
ENGR 240	Business Strategy & Leadership
ENGR 242	Entrepreneurship
ENGR 246	New Venture Finance
ENGR 251	Patents & Intellectual Property
ENGR 255	New Product Development
ENGR 265	Entrepreneurial Opportunities in IT & Telecom

For more information, contact us:

www.tmp.ucsb.edu

To Apply

Please download and complete the GPMP enrollment form found at:

http://www.tmp.ucsb.edu/academics/graduate.html

UC SANTA BARBARA engineering

Appendix E – Library Resource Assessment

Critical library resources for TMP will include a combination of academic journals/publications and professional on-line databases for in-depth analyses of industries/markets and individual companies. Many of the academic journals are already available through databases that the UCSB library currently subscribes to or has access to through system-wide subscriptions. These include Business Source Complete, ACM Digital Library, Academic Search Complete, Management and Organizational Studies, Proquest Statistical Insight, Web of Science, and Lexis Nexis.

Working with UCSB Library staff TMP has identified a set of *new* resources to add to campus holdings/subscriptions. These are listed below in two charts: one for industry analytical databases, and one for academic journals/publications. In each case the charts are separated into "must haves" (to be purchased early in the program) and other resources to be phased-in gradually as the revenue base grows to support them. The "must haves" total ~$43,000/yr; these would be purchased with the $50,000 base allocation requested in the proposal, with the balance used for books/monographs. As the revenue base for the program grows, some of the other resources will be gradually phased in.

TMP Library Resource Assessment: Analytical Databases

Database/Subscription	Link	Annual Cost	Comments
New "Must Have" Databases			
Hoover's on-line	http://www.hoovers.com	3,000	An absolute necessity for performing company and industry analyses
First Research	http://www.firstresearch.com/		(Bundled with Hoovers for $3k/yr)
eMarketer	http://www.emarketer.com/	12,500	Digital marketing intelligence. A must for understanding industries and markets
MarketResearch.com (Academic)	http://academic.marketresearch.com/	7,175	
Advertising Age	http://adage.com/	500	
MarketLine Advantage	http://www.marketline.com/	7,364	Provides company, industry, country, and financial data and analysis for every major world market. Includes public and private company overviews (hundreds with SWOT analyses), industry profiles (with "Five Forces" analyses), case studies, financial deals data, country analyses (with PEST insights), news, and "Country Statistics" (both historical and forecast) and "Market Data Analytics" databases.
Possible Additions to be Phased In Over Time			
Frost & Sullivan	www.frost.com	30,000	US & International industry analysis & market research.
Mergent Online	http: //www.mergentonline.com/	15,000	A leading provider of business and financial data on global publicly listed companies
IBIS World	http://www.ibisworld.com/	17,000	Full-text, fully searchable U.S. industry analyses, covering nearly 800 industries at the 5-digit NAICS level—more than 97% of the U.S. economy. Each report includes industry statistics, current conditions, key growth trends, market segmentation, major players, market share, and covers very niche markets. (Includes specialized reports)
Standard & Poor's NetAdvantage	www.netadvantage.standardandpoors.com	18,995	Provides full text access for the following S&P publications: Bond Guide; Corporation Records; Dividend Record; Earnings Guide; Industry Surveys; Mutual Fund Reports; The Outlook; Register of Corporations, Directors and Executives; Security Dealers of North America; Stock Guide; and Stock Reports.
	Total: Must Haves	**30,539**	
	Total: All	111,534	

TMP Library Resource Assessment: Academic Journals/Publications

(Must-haves in blue/boldface; others to be phased-in later)

Publication Title	Current Electronic Availability	Print Availability	Annual Cost	Format
Academy of Management Journal	**v.6(1963)- Last 5 years unavailable (JSTOR)**	**v.11 (1968)-v.37 (1994)**	**$ 206**	**print + online - current year w/1 yr. rolling access**
Academy of Management Perspectives	**2006 only**	**N/A**	**$ 173**	**print + online - current year w/1 yr. rolling access**
Accounting Review	v.1(1926)- Last 5 years unavailable (JSTOR)	v.65 (1990)-v.84 (2009)	$ 420	online - all with current. Access to content varies by title, most content from 1998-current. Subscribers lose access once subscription lapses. Access is for single site. Multi-site access must be ordered directly from publisher.
Business ethics quarterly	v.1(1991)- Last 5 years unavailable (JSTOR)	N/A	$ 470	online
Business history	v.39(1997)- v.51(2009) (Taylor & Francis)	v.11 (1969)- v.49:no.4(2007)	$ 1,153	online - current year including archives: v.1-current
Emerging markets finance & trade	v.38(2002)- Last 5 years unavailable (JSTOR)	N/A	$ 1,290	online - all with current
Information Systems Research	**v.1(1990) - Last 4 years unavailable(JSTOR)**	**N/A**	**$ 421**	**online - access from 1998-current**
International journal of advertising	**N/A**	**N/A**	**$ 876**	**premium online - as of 2011, premium subscriptions now include access dating from January 2000**
International journal of electronic commerce	**v.1(1996)- Last 5 years unavailable (JSTOR)**	**N/A**	**$ 795**	**online - perpetual access to paid content**
International journal of market research	**N/A**	**N/A**	**$ 948**	**premium online - access to content includes a rolling backfile of 5 years. Subscriber loses all access once the subscription lapses.**
Journal of advertising research	v.43(2000)- v.45(2005) (Cambridge)	v.1 (1960)-v.22 (1982)	$ 625	premium online - as of 2011, premium subscriptions now include access dating from January 2000
Journal of business-to-business marketing	**N/A**	**N/A**	**$ 505**	**online - access includes content from 1997 to current for most journals. A few journals include older content. Perpetual access to paid content.**
Journal of Business & Industrial Marketing	**N/A**	**N/A**	**$ 800**	**online**
Journal of business and psychology	**v.1(1986)- Last 3 years unavailable (JSTOR)**	**N/A**	**$ 991**	**enhanced online access - subscription includes content from 1997 to present where available. Customer has perpetual access without a maintenance fee for 2 years. Afterwards, maintenance fee must be paid if the customer does not have any other SpringerLink subscription**
Journal of Finance	**v.1(1946)- Last 3 years unavailable (JSTOR)**	**v.1(1946)- v.59(2004)**	**$ 479**	**online - includes access to current plus 4 years backfile. Perpetual access to paid content only**
Journal of International Business Studies	**v.1(1970) - Last 3 years unavailable (JSTOR)**	**N/A**	**$ 800**	**online - access includes current year plus 4 year rolling backfile. Perpetual access available to paid content for an annual access fee.**
Journal of international marketing	**v.1(1993)- Last 5 years unavailable (JSTOR)**	**N/A**	**$ 245**	**online - current subscription allows access to all available content. Content range accessible at Atypon is typically 2000 to current.**
Journal of Marketing Research	**v.1(1964)- Last 5 years unavailable (JSTOR)**	**v.1(1964)- v.46(2009)**	**$ 390**	**online - current subscription allows access to all available content. Content range accessible at Atypon is typically 2000 to current.**
Journal of public policy & marketing	v.2(1983)- Last 5 years unavailable (JSTOR)	N/A	$ 142	online - current subscription allows access to all available content. Content range accessible at Atypon is typically 2000 to current.
Management Science	**v.1(1954) - Last 4 years not available (JSTOR)**	**v.1(1954)- v.55(2009)**	**$ 853**	**online - current subscription grants access from 1998-current. Remote access for institutions requires additional charge. No charge for institutions subscribing to 9 or more INFORMS titles. Lapsed subscribers do not retain access to content for paid year(s).**
Marketing Science	**v.1(1982)- Last 4 years not available (JSTOR)**	**v.7 (1988)-v.13 (1994)**	**$ 429**	**online - current subscription grants access from 1998-current. Remote access for institutions requires additional charge. No charge for institutions subscribing to 9 or more INFORMS titles. Lapsed subscribers do not retain access to content for paid year(s).**
MIS Quarterly	**v.1(1977)- Last 5 years not available (JSTOR)**	**N/A**	**$ 1,000**	**online - all with current. Online contains more content than print.**
MIT Sloan Management Review	**N/A**	**(1998/1999)-v.49 (2007/2008)**	**$ 284**	**online - all with current. Access is entire web archive. A subscription includes perpetual electronic access to full text of articles for the term of the subscription, based on IP range recognition. Access ends when subscription expires.**
Quantitative marketing and economics	N/A	N/A	$ 454	online - subscription includes content from 1997-present where available. Customer has perpetual access without a maintenance fee for 2 years. Afterwards, maintenance fee must be paid if the customer does not have any other SpringerLink subscription
Review of agricultural economics - title change: now called Applied Economic Perspectives and Policy	**v.13(1991)- v.31(2009) (JSTOR & Oxford)**	**N/A**	**$ 266**	**print + online - subscription includes access from 1996-current. Perpetual access to paid content.**
Review of Financial Studies	v.1(1988)- Last 2 years unavailable	v.1 (1988)-v.17 (2004)	$ 665	print + online - institutions: subscription includes access from 1996-current. Perpetual access to paid content.
Small business economics	**v.1(1989)- Last 3 years unavailable (JSTOR)**	**N/A**	**$ 1,557**	**enhanced online access - subscription includes content from 1997 to present where available. Customer has perpetual access without a maintenance fee for 2 years. Afterwards, maintenance fee must be paid if the customer does not have any other SpringerLink subscription.**
Supply Chain Management	**N/A**	**N/A**	**$ 800**	**online - access includes content to some backfiles.**

Total: Must Haves	***$ 12,818***
Total: All	$ 18,037

Appendix F – Proposal for a New Academic Unit: The Technology Management Program

Note: the following proposal originally included the same Appendices A-E that appear earlier in this proposal, so they have been left out of the package.

TECHNOLOGY MANAGEMENT

UNIVERSITY OF CALIFORNIA | SANTA BARBARA

Proposal for a new Academic unit:

The Technology Management Program

Revised: September 14, 2012

Proposed Effective Date: July 1, 2013

Proposed by: Bob York, Professor, ECE
Dave Seibold, Professor, Communication
Gary Hansen, Professor, ME
John Bowers, Professor, ECE
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UC SANTA BARBARA engineering

UCSB

Table of Contents

Section 1. Introduction

1.1 Description of the New Unit

A formal academic unit is proposed in the College of Engineering (COE) at UC Santa Barbara, the "Technology Management Program" (TMP) supplanting an existing initiative that has operated under the same name since 2004. As depicted in Figure 1, the field of Technology Management aims to bring many technological, business, and social disciplines together in a coordinated, interdisciplinary program. The "new" TMP will encompass teaching and research activity in the management of technological innovations and technology businesses, bridging a gap between traditional business & management programs and the core disciplines in engineering and science.

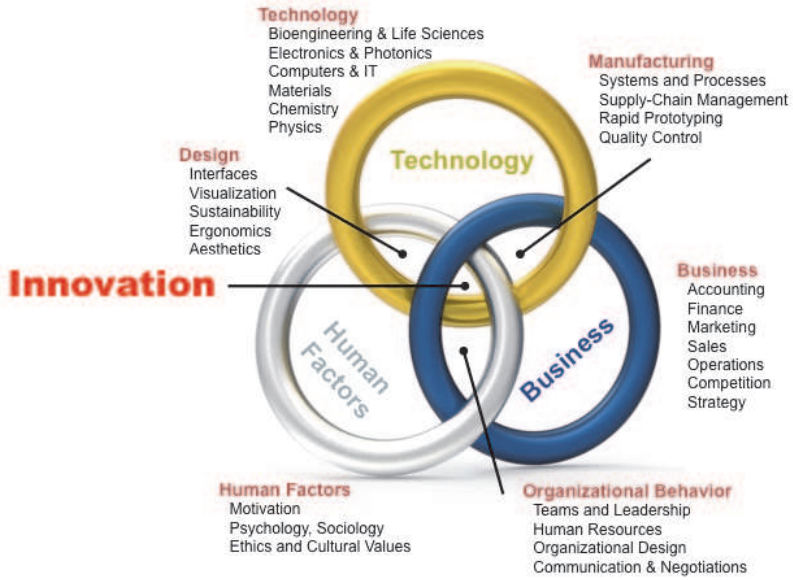

Figure 1 – Technology Management is focused on translating new technical ideas into marketable innovations, and successful innovation occurs at the nexus of Technology, Business, and Human Factors. TMP brings these elements together in an interdisciplinary program.

The new TMP will retain the existing curricular and extra-curricular activities in Technology Management in the COE (currently open to all majors on campus) and will add an interdisciplinary graduate professional degree-granting component. This initial degree program will be a professional Masters in Technology Management (MTM), with a Professional Degree Fee (PDF), described briefly in Section 2 and in more detail in a separate proposal submitted and evaluated concurrently.

The origins of TMP on campus trace back more than a decade, first with the establishment of a Graduate Program in Management Practice (GPMP) in 1998, and separately with the establishment of the Center for Entrepreneurship and Engineering Management (CEEM) in the COE slightly earlier. The TMP has since grown to serve over 600 undergraduates and 80-100 graduate students annually (existing enrollment data can be found in Section 1.6. It offers a nationally-recognized curriculum of undergraduate and graduate coursework, the GPMP graduate certificate program, a Technology Entrepreneurship elective program for undergraduates, an annual New Venture Competition currently in its 14th consecutive year of operation and enjoying annual external sponsorship of $80k+, and a successful lecture series that is consistently featured on local cable networks and has recorded over 7 million individual on-line views on UC-TV.

During this evolutionary period at UCSB the broader fields of technology management and entrepreneurship have become well-established scholarly disciplines elsewhere, and there now are several programs within the UC and at peer institutions (described in more detail in section 1.4) offering baccalaureate, masters, and doctoral degrees in these areas. UC Santa Barbara is well positioned to be a leader in this area with the combination of excellence in engineering research and entrepreneurship within

the COE, and additional strengths in organizational behavior and quantitative social sciences within the Departments of Sociology, Communication, Economics, and elsewhere. The proposed unit will bring those strengths together, and if approved, TMP would become the first academic unit on campus to bridge the COE and the Division of Social Sciences (DSS), with joint faculty appointments anticipated across these colleges. Potential faculty members are described in Section 4.

The resources required to formally establish TMP as an academic unit are comparatively low, for two reasons. First, the existing TMP already is structured, in effect, as a Program and it has been since 2004, and hence the associated operating costs for existing staff and faculty/lecturer/TA support are already factored into the College of Engineering budget and has been for some time. Indeed the continued support of the campus and the COE during a period of shrinking budgets is a clear indication of the value placed on the TMP mission. Second, a proposed supplemental fee structure for the new Master degree will ultimately sustain the recurring costs. New resource requirements are summarized in Section 5, and a detailed budget forecast and assumptions are provided in Appendix B.

1.2 Rationale for the New Unit and Mission

University science and engineering programs have traditionally designed their educational curricula and research efforts to focus on the fundamental skills required to *create* new innovations, but transitioning those new discoveries into products or services that *benefit* society at large requires a much broader and more diverse set of skills than those that led to the new invention. These include team building and understanding of organizational behavior and management, marketing and communication, basic economics, personnel and project management, accounting and finance. Recognizing this, the National Academy of Engineering (NAE) and American Society for Engineering Education (ASEE) have both issued calls for greater emphasis on business fundamentals, leadership & management training, and entrepreneurial thinking in engineering curricula.[1,2] Many universities have already responded with new departments and degree programs (Section 1.4); a number of those evolved on the respective campuses from initiatives quite similar to the existing UCSB TMP.

The College of Engineering at UC Santa Barbara has long intended for TMP to evolve into an academic unit and degree program. An initial set of proposals to accomplish this were completed in late 2008 and submitted to the Academic Senate and Executive Vice Chancellor's office in early 2009. Soon after, the senate and campus leadership requested a formal external academic review of the existing Technology Management Program to help justify an expanded program. An Ad Hoc Review Committee was formed to coordinate the review; the site visit took place in Spring 2010. A key outcome was the clear articulation by the External Review Committee (ERC) of the important and critical role that TMP will play on campus and within the COE in particular. The highly regarded members of the ERC each emphasized that entrepreneurial thinking and leadership education have steadily become an imperative for engineering

[1] See *Educating the Engineer of 2020: Adapting Engineering Education to the New Century,* and also *Engineering Research and America's Future: Meeting the Challenges of a Global Economy*, National Academies Press, 2005.

[2] *Creating a Culture for Scholarly and Systematic Innovation in Engineering Education: Ensuring U.S. engineering has the right people with the right talent for a global society*, report of the American Society for Engineering Education, 2009

schools, echoing the aforementioned calls by NAE and ASEE. As one ERC member[3] noted during the exit interview, "if UCSB did not already have a TMP it would soon have to create one." Noting an abundance of opportunities for collaborative research in organizational science and management at UC Santa Barbara, the ERC encouraged the campus to devise a strategy for TMP to evolve a rigorous graduate program and graduate research component, building on significant pockets of expertise scattered among the faculty in the College of Letters and Science, College of Engineering, Bren School of Environmental Management, and the Graduate School of Education.

Following the external review, Executive Vice-Chancellor (EVC) Lucas submitted a summary report endorsing the ERC recommendations. New space in Phelps Hall was allocated to the program, and new leadership in TMP was appointed in July 2010 to facilitate additional programmatic reforms and implement the recommendations of the review committee. After consultation with the Academic Senate, numerous faculty, and campus administrators, the original proposals were withdrawn and a new strategy was developed to pursue formal academic unit status and add a professional masters degree. In his summary report the EVC also approved the renewal of a previously suspended faculty search in COE to assist in the expansion of TMP and suggested reserving two additional FTE in the current COE inventory for subsequent near-term hires pending successful formation of the new academic unit (of course, approved searches for these two positions will be sought through the normal campus processes.)

During extensive post-review consultation it became clear that there is wide faculty and administrative support for a new TMP; ladder faculty with potential involvement are summarized in Section 4. Anchoring the program by creating a formal academic unit is essential to engage faculty from multiple departments and divisions, especially in the teaching role demanded of a graduate degree program. Indeed many of the curricular challenges that TMP has faced in its early years trace to the lack of a mechanism for formal academic appointments of ladder faculty, leading in the past to an over-reliance on professional lecturers.

Thus the rationale for the new unit and degree program is threefold: 1) it is an imperative for our future engineering programs, a view supported by the National Academy of Engineering, American Society for Engineering Education, and evidenced by the emergence of similar departments and programs at peer institutions; 2) there is significant interdisciplinary faculty interest across campus, particularly within the COE and Division of Social Sciences; and 3) the plan to anchor and expand the program emerged as a result of the successful external review conducted by the UCSB Academic Senate.

The broad mission of the new TMP will be to foster new interdisciplinary research activities in the understanding and management of technological innovations and entrepreneurship, and to provide a tightly integrated Master of Technology Management curriculum in fundamentals of business and organizational behavior for technology-oriented students who are intending to pursue non-academic careers. The MTM degree hosted by the new unit will provide a compelling alterative to a conventional MBA program, building on many core academic strengths at UC Santa Barbara.

[3] Prof. Tom Byers, Department of Management Science and Engineering, Stanford University, and co-director of the Stanford Technology Ventures program.

1.3 Relationship to Campus Academic Plan and Existing Programs

Adding a new academic unit and degree-granting program in the area of Technology Management was anticipated in the formative years of TMP and has been a part of the Campus Academic Plan since 2005. This was and continues to be a high priority in COE, with a greater sense of urgency now in view of the aforementioned recommendations by the NAE and ASEE. As mentioned in Section 1.2, an original set of proposals to establish a new unit and degree program were previously submitted in 2008, but evaluation of those proposals was suspended pending an external review, completed in Spring 2010. This revised proposal resumes the original campus plan.

The proposed professional degree program is a unique offering relative to other departments and programs on campus, and it is not expected to compete with these programs. In fact the program is expected forge new collaborative efforts between the College of Engineering and the Division of Social Sciences, particularly the Departments of Economics, Communication, and Sociology. The focus on professional training and a fee-bearing structure will help minimize any adverse impact on resources. Collaborative opportunities also abound with the Bren School of Environmental Science and Management, and at present, Bren students interested in the Eco-Entrepreneurship program (roughly a third of the Bren student population) already participate in the GPMP Certificate program and associated coursework offered through TMP. It is anticipated that certain faculty in the Departments of Economics, Communication, and Sociology could also contribute in a teaching role in the program via joint appointments or other compensation incentives (Section 4). Participation of such faculty in TMP will likely lead to new and innovative research and to activities spanning multiple disciplines.

1.4 Comparison to Other Programs Within UC and Elsewhere

All other UC campuses now have significant research and degree activities in the areas of Technology Management and Entrepreneurship, and UCSB is now the ONLY campus in the UC system that does not offer either a professional MBA or some other formalized management curriculum (Table 1). Seven of the ten UC campuses now have professional schools of business or management. UC San Francisco offers an MBA through a partnership with the University of San Francisco. Of the two remaining, UCSB stands alone without an academic department or degree program in this area. UC Santa Cruz has recently established a new program called "Technology and Information Management" within its Baskin School of Engineering, and now offers traditional masters and doctoral degrees in that discipline (with some similarity to the unit and degree proposed herein). UC Berkeley has just launched a new set of fee-bearing professional degree programs under the title of "Master of Engineering", and several UC campuses are reportedly planning similar degree programs within their respective engineering programs, with UC Irvine's version currently in the midst of the approval process.

Outside of the UC system the situation is similar (Table 2). The universities with professional business/management schools typically leverage that resource to form new collaborative degree programs with engineering schools or other campus departments, but even in those cases (notably Stanford) there are now departments and degree programs created that exist independent of the business schools. This emphasizes the strong demand for alternatives to conventional MBA programs. Some of the universities mentioned in Table 2 have long had professional engineering degrees, but have seen a surge of interest in

the newer Masters degree in Engineering Management (MEM).[4,5] The number of applicants to Dartmouth's program, for example, have quadrupled in the past decade; Duke's program graduated 137 students in 2009, up from 13 in its first class of 1997. Stanford, Cornell, Dartmouth, Northwestern, and Duke have recently teamed up to form the Masters of Engineering Management Programs Consortium (MEMPC) to raise awareness of these degree programs in academia and corporations.

Table 1 — Comparison Programs within the UC

Campus	Business School	MBA	Other Management Programs: Degree U-Grad	Degree Grad	Certificate U-grad	Certificate Grad	Comments
Berkeley	Haas School of Business	✓	✓	✓		✓	Regent approval in Nov 2010 for new Professional Masters program in Engineering. Joint Management of Technology (MOT) Certificate between Haas and UCB Engineering.
Los Angeles	Anderson School of Management	✓	*	✓			Price Center for Entrepreneurial Studies, geared mostly towards MBA students and practicing professionals.
San Diego	Rady School of Management	✓	✓	✓	*		Management degrees offered through business school. Von Liebig Center within Jacobs School of Engineering (similar to TMP) offers certificate through extension.
Irvine	Paul Merage School of Business	✓	✓	✓			Don Beall Center for Innovation and Entrepreneurship within the business school, open to Merage students only. New Masters of Engineering Management degree is in approval pipeline
Riverside	School of Business Admin.	✓	✓	✓			Business School offers a BS with concentration in Entrepreneurship. Joint degree program with Engineering in "Business Informatics".
Davis	Graduate School of Management	✓	*			✓	Center for Technology Entrepreneurship within business school. Business Development Certificate for graduate students in engineering and science.
Merced	Ernest & Julio Gallo School of Management	*	✓				E&J School nearing completion. Undergraduate Management program housed in School of Social Science (some links with Economics)
San Francisco	—	*	NA		NA		Joint DDS-MBA Program with USF
Santa Cruz	—		✓	✓			Technology and Information Management Program in School of Engineering. Also Business Management major in Economics
Santa Barbara	—				*	✓	Undergrad certificate is approved by COE but not the broader campus, and offered in partnership with UCSB Extension.

Note: asterisks imply offerings that are limited in scope, approval status, or level of student participation

[4] P. Patel, "The Other MEMs: The Master of Engineering Management Degree", *IEEE Spectrum*, Feb 2011

[5] R. Knight, "Rise of the Business-Savvy Engineer", Financial Times, July 26, 2010

Table 2 — Related Programs Outside of UC

Institution	Program/Department	Description
†Stanford	Department of Management Science and Engineering (MS&E)	Housed in the School of Engineering, offers B.S., M.S., PhD, and minor in MS&E. A hybrid Industrial Engineering and Management curriculum. 32 faculty, 27 lecturers, 17 staff. Also operates the Stanford Technology Ventures Program as a center within MS&E
USC	Office of Masters & Professional Programs	Housed in Viterbi School of Engineering, offers numerous professional engineering degrees including Masters of Engineering Management.
MIT	System Design and Management	Cosponsored by the MIT School of Engineering and the MIT Sloan School of Management, offers a 1+ year Professional Masters in Engineering and Management. Strong Systems Engineering focus, open only to experienced professionals with engineering degrees.
U. of Michigan	Dept. of Industrial and Manufacturing Systems Engineering	Offers M.S. in Engineering Management. 36 credit-hour program open to students with an undergraduate engineering degree and 5 years working experience, or students with a previous graduate degree in engineering.
†Cornell	School of Engineering	Cornell offers 15 different professional MEng degrees including a Masters of Engineering Management.
†Dartmouth	Thayer School of Engineering	Offers professional Masters of Engineering Management, a joint program between Thayer School of Engineering and Tuck School of Business.
U. Penn	Jerome Fisher Program in Management and Technology	A joint program between Penn Engineering and Wharton School of Business. Offers Executive Masters in Technology Management, also dual-degree (Economics and Engineering) for undergraduates.
†Northwestern	Dept. of Industrial and Systems Engineering	Offers a one-year professional Masters of Engineering Management
U. of Texas, Austin	Center for Lifelong Education	The Center operates professional degree programs for the Cockrell School of Engineering. Offers two-year professional M.S. in Engineering Management, combines engineering & management coursework.
†Duke	Dept. of Engineering Management	Housed in Pratt School of Engineering, offers Masters in Engineering Management that combines management & engineering coursework. Some faculty participation from both the Duke Fuqua School of Business and Pratt
U. of Illinois	Dept of Industrial & Enterprise Systems Engineering	Offers joint engineering and MBA program with U. of Illinois College of Business.
Johns Hopkins	Department of Engineering Management	Housed in Whiting School of Engineering. Offers M.S. in Engineering Management combining management & engineering coursework. Some coursework offered through Center for Leadership Education

†*Denotes members of a newly created Masters of Engineering Management Programs Consortium (www.mempc.org)*

While UC Santa Barbara has been slow to establish a new department and degree program in engineering management, this also presents an opportunity to distinguish ourselves in this area with a differentiated program that take advantage of the unique combination of campus academic strengths and the regional entrepreneurial ecosystem. As mentioned in section 1.5, most comparable graduate programs at our sister institutions are either similar to conventional MBA programs, or are hybrid engineering+MBA programs. The proposed TMP degree will be focused exclusively on technology management and will be geared towards students with strong technical or quantitative backgrounds, but will differ from an MBA program by having a stronger emphasis on technology commercialization, operations, organization

behavior/management, economics, and ethics, building on a UCSB's strengths and specifically targeting gaps in the training of most science and engineering students. Whereas most programs across the country focus exclusively on either business majors or engineering majors with significant prior industry experience, our program will be accessible to a more diverse group of younger students at the early stage of their career. In short, we believe the absence of a traditional business school at UC Santa Barbara can be turned to an advantage, allowing us to create a unique management program that would be difficult to replicate elsewhere.

1.5 Interaction with Other Campus Units

The new TMP unit would interact primarily with selected departments within the Division of Social Science including Economics, Communication, and Sociology—those whose faculty have research interests in organization science and related teaching interests in management theory—as well as the Engineering Departments within the COE and selected faculty from the Bren School for Environmental Science and Management. As mentioned earlier, some joint faculty appointments are anticipated between these departments and TMP. Of course the new academic unit would also maintain its ongoing interactions and service to other campus units with regards to the graduate (GPMP) and undergraduate (TEC) certificate programs that are currently open to all majors on campus (see Appendix D for details on existing certificate programs). TMP has recently partnered with UCSB Extension to implement a new joint certificate program (following a model used at UC San Diego), and this will ultimately replace the existing Technology Entrepreneurship Certificate program that TMP offers to undergraduates.

The new TMP unit will have a strong interdisciplinary research connection with a number of other programs on the UCSB campus including the Global & International Studies Program (GISP), the Center for Information Technology in Society (CITS), the Institute for Energy Efficiency (IEE), the Institute for Collaborative Biotechnologies (ICB), and the Materials Research Lab (MRL). The existing TMP already has some ties and interactions with these units, but we anticipate new research activities in areas of organizational science/management theory that involve selected faculty from these programs as outlined in Section 4. In addition, a strong focus on ethics in the professional degree program suggests some potential for interaction with the Capps Center for Ethics, Religion, and Public Life.

Within the COE the creation of a formal unit could provide expanded curricular options for engineering students. As mentioned earlier, national engineering societies such as NAE and ASEE have called for integrating business/management/entrepreneurship coursework within the core engineering degree programs. Our prior experience clearly demonstrates that the business/management coursework in TMP functions as a crucible within which students from many disciplines that do not normally overlap have an opportunity to learn from each other and develop productive teams or partnerships. Following approval of the unit TMP plans to work more closely with the existing engineering departments to explore collaborative opportunities at the graduate and undergraduate level.

1.6 Projected Enrollments

The new unit will retain existing undergraduate electives and graduate certificate program and associated coursework, and a glance at the historical enrollment growth in these programs is helpful to understand and support the projected enrollments in the program.

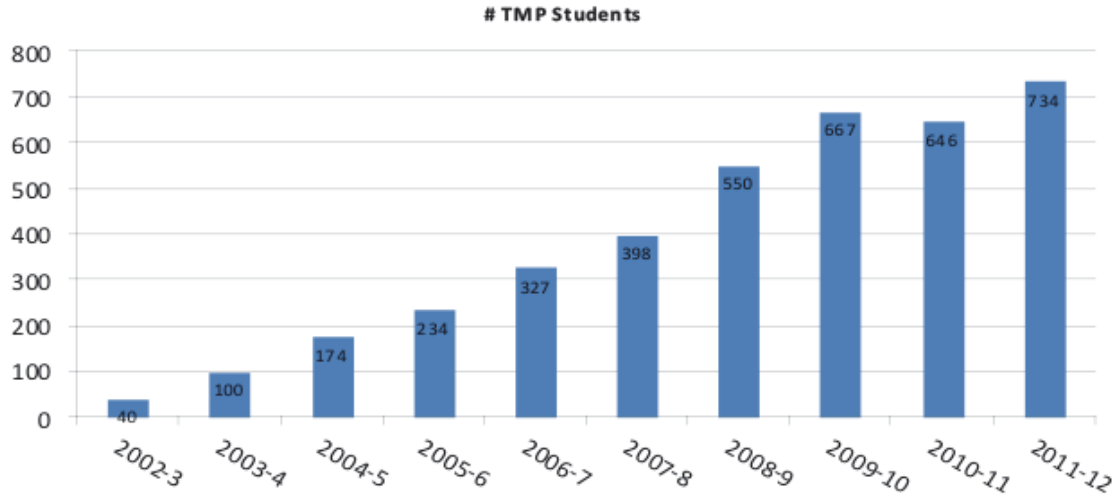

Figure 2 — Historical Enrollment growth in TMP (combined graduate and undergraduate, using unique individual headcount where students are not counted more than once if enrolled in multiple courses.)

Over the past 10 years the demand for TMP courses has grown steadily (Figure 2) and is now limited by the available instructional resources in the program and self-imposed caps on class size (almost every TMP course is oversubscribed). The program historically has done little or no internal marketing, and there are still UCSB faculty and students that are unaware of its existence, making the enrollment growth even more remarkable. The existing program is open to all majors, and a breakdown of student participation by College/Division at the undergraduate and graduate levels are shown in Figure 3. Participation at the undergraduate level is skewed towards social science students, largely from Economics, Communication, and Sociology; this reflects the campus enrollment statistics. Additionally, students from engineering and MLPS often have difficult lab-oriented classes with fewer opportunities for extra coursework of free electives. Participation at the graduate level is skewed towards science and engineering; these are generally students who are nearing completion of their degree and are interested in commercializing inventions from their research and/or anticipating non-academic employment.

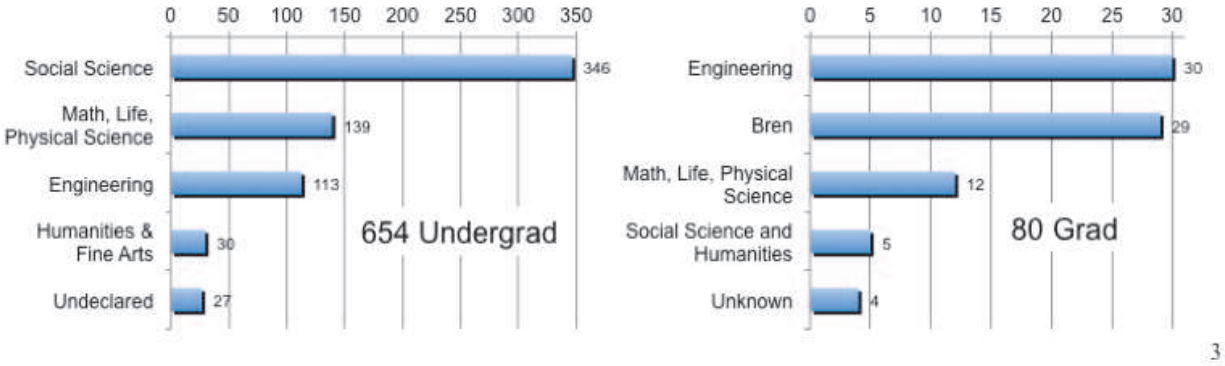

Figure 3 — Typical breakdown of enrollments by College/Division (2011-12 data)

The anticipated enrollment growth (headcount) in the new TMP over the first 5 years is charted in Table 3, which includes future enrollments in the new degree program as well as projections for the ongoing Elective/Certificate enrollments in programs that will continue in the new unit; additional information on these certificate programs can be found in Appendix D). Our plan calls for limiting the undergraduate participation to 300, a significant decrease in population from current levels (655 in 2011-2012). This

reduction is an anticipated consequence of new changes that TMP leadership is implementing beginning in 2011-2012 to add more rigorous admissions criteria for TMP courses. We also anticipate the number of elective/certificate enrollments at the graduate level to decline slightly as some students opt to pursue the Professional Masters program instead (anecdotally, many GPMP students have indicated a preference for a formal degree program).

Table 3 — Projected Enrollments in *all* TMP programs for the first 5 years

	Year 1	Year 2	Year 3	Year 4	Year 5
Existing Offerings					
Undergrad	300	300	300	300	300
Grad	80	80	70	60	60
New MTM Degree	**-**	**< 40**	**<60**	**<80**	**<100**

We are planning for an initial cohort of up to 40 students for the Professional Masters program, eventually growing to 100 in maturity (two cohorts of roughly 40-50 students). This planned growth is meant to be illustrative; the actual rate of increase will be carefully controlled in the early years to insure successful delivery of the curriculum with the resources available to the program. Reflecting our desire for this program to be differentiated by a highly selective admissions process and elite graduating class, we do not expect to host more than two cohorts simultaneously. The target applicant pool for this degree includes a subset of recent science & engineering graduates from across the country, and possibly some students that are enrolled and nearing completion of other masters and doctoral degrees on campus. The interest among existing graduate students is evidenced in the enrollment numbers shown in Figure 3, and those data only include students already matriculating in other degree programs at UC Santa Barbara.

Section 2. Academic Degree Programs

A new professional degree program, the MTM, is under review concurrently and would be hosted by the new TMP academic unit. Herein the term "professional degree" is meant to distinguish the MTM from other academic degrees (e.g. M.S. or M.A.) in that: 1) it is intended primarily for students interested in non-academic careers; 2) it has a stronger focus on practical training as opposed to theory; and 3) it will include a PDF. However, the majority of faculty involved in the program will be regular ladder-faculty supporting doctoral research programs in their areas of specialty, with likely joint appointments from units in the College of Letters and Science. Detail on the MTM is documented in the accompanying proposal, so only a brief description is provided here.

Traditional MBA programs are not adequately preparing their graduates for, nor sending them to, careers in businesses that make actual, tangible products or provide useful technical services. "Finance" is frequently the most popular curricular track, and in some elite business schools up to 75% of all MBA graduates go into investment banking, financial services or consulting.[6] Technology companies, which *do* make products, need different skills that include both management and technical training, needs that are not well served by the typical MBA program. In addition, business schools typically do not admit science or engineering students without many years of prior managerial experience. Indeed, as former Harvard

[6] Geoff Gloeckler, "MBA Pay: the $3.6 Million degree", Business Week, June 13, 2011

Business School professor Fleming[7] points out, "…the top business schools seem to have a bias against the technical applicant, possibly because such applicants are thought to lack communication skills and managerial talent...or perhaps the school's mission does not include the education of technical managers". TMP will introduce a new graduate degree that is an alternative to a traditional MBA, targeting a special group of students with strong technical backgrounds, and focusing specifically on managing technical innovations.

Admission to this program will be highly selective and based on a combination of academic achievement in a core discipline of science or engineering, distinctive experiences outside of academia, and evidence of leadership qualities in extracurricular activities. The program will build on the core strength of UC Santa Barbara in science and engineering (now ranked #9 among public universities in the U.S. in the popular press, and #5 by National Research Council rankings of Doctoral programs nationwide), the highly entrepreneurial culture of its faculty (over 30% of the engineering faculty have participated in the formation of a new venture), the common commitment to organizational science/management theory and practice among more than a dozen faculty from Letters and Science (several of whom have held affiliated appointments with management schools at other universities), and the attractive and centralized location of campus along the California coast between Silicon Valley and Los Angeles. Students admitted to this highly prestigious program can continue to advance their knowledge in science & engineering while also studying modern practices of marketing, finance, intellectual property issues, organizational structures, and management skills specifically aimed at transitioning new discoveries and technologies to the marketplace. Unlike business schools that generally require several years of work experience for admission, MTM will target recently matriculated undergraduate and graduate students.

Section 3. Structure

3.1 Administrative Structure Including Committees

The existing TMP is already structured as a program, with curricular and associated outreach activities supported by a staff of 3.5 FTE, one "permanent" faculty (Hansen), and 6 Professional lecturers (a net of approximately 1.33 lecturer FTE annually since most teach only one or two courses per year). Existing staff positions include a full-time Business Officer, a full-time accounts/course management assistant, a full-time Program Manager for student programs, outreach and community-engagement activities, and a half-time academic coordinator.

The current TMP faculty Director (York) is a ladder faculty in ECE. This position reports to the Dean of Engineering and is responsible for overseeing all curricular and outreach activities. The proposed unit could modify this administrative structure slightly by adding an Associate Dean position in COE to manage the new professional degree program as well as assuming responsibility for many of the existing TMP outreach activities (e.g. New Venture Competition, Lecture Series). The proposed Associate Dean position would likely be filled in the near term by an existing faculty member. The professional degree program may also require an administrative director, which has been budgeted for in Appendix B. In addition to these positions we anticipate adding other staff for career counseling and placement, marketing/advertising, and some additional clerical support for faculty and administrators. Wherever

[7] L. Fleming, W. Yang, and J. Golden, "Science and Technology Entrepreneurship for Greater Societal Benefit: Ideas for Curricular Innovation." *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*, vol. 21, 167-184, 2010

possible the new TMP will explore opportunities to make use of existing resources in the College of Engineering. For example, future faculty research contracts could be managed by one of the existing COE departments; some marketing activities may also piggy-back on existing COE resources. Academic Personnel and Human Resource needs can also be absorbed by existing staff in COE. Financial and accounting needs in the program are already handled by a COE staff member and this would likely continue in the new unit.

In terms of academic and curricular issues we anticipate two administrative committees within the Program: 1) a curriculum committee charged with design/integration of curricular content of degree and certificate programs, and 2) a long-range planning committee. There is an existing Faculty advisory board for TMP that includes a number of faculty and administrators from across campus, but some additions and subtractions will be required once the new unit is formed in view of potential joint appointments involving current advisory board members.

3.2 Advising and Mentoring Structure

Advising of students in TMP will be managed in a two-tiered administrative structure. At one level will be a staff position(s) to handle routine procedural issues (course petitions, degree requirements, and general curricular guidance). Staff in advising roles will be trained and monitored by the College of Engineering Office of Undergraduate Studies. More in-depth mentoring and advising will be partitioned among a subset of ladder faculty appointed annually by the program chair/director.

Section 4. Faculty

A large number of faculty on campus have expressed an interest in becoming more actively involved in TMP when it becomes a formal academic unit and a degree-granting program. Below is a break down of potential involvement of existing campus ladder faculty, listed in two categories: 1) potential joint-appointments (teaching role and research interest); 2) research interest only. The future role of adjunct faculty and lecturers is also discussed.

4.1 Faculty with potential teaching and research involvement in TMP

(In alphabetical order; letters of support in Appendix A)

Prof. Divy Agrawal, Dept. of Computer Science (Prof. VII): Ph.D. in Computer Science, SUNY at Stony Brook, NY, 1987; B.E.(Hons) in Electrical Engineering, Birla Institute of Technology and Science, 1980. Teaching and research interests in the areas of Analytics, Business Intelligence, and Data Mining in the context of Information-driven Enterprises; modeling information propagation and marketing campaigns on social media and online social networks; data and information security and privacy; scalable information infrastructures for distributed enterprises. Potential joint appointment.

Prof. Kevin C. Almeroth, Dept. of Computer Science (Prof. VI): B.S. (1992), M.S. (1994), and Ph.D. (1997) degrees in Computer Science from the Georgia Institute of Technology. Dr. Almeroth is the Associate Director of the Center for Information Technology and Society (CITS), a founding faculty Member of the Media Arts and Technology (MAT) Program, Technology Management Program (TMP), and the Computer Engineering (CE) Program. He also serves on the boards of directors and/or advisory

boards of several startups. Dr. Almeroth has also served as an expert witness in a number of interesting patent cases.

Prof. John Bowers, Fred Kavli Chair in Nanotechnology, Departments of Electrical & Computer Engineering and Materials, (Prof. Above Scale): B.S. Physics, U. of Minnesota, 1976; M.S. & Ph.D. in Applied Physics, Stanford University, 1981. From 1982-1987 Prof. Bowers was a member of the technical staff at AT&T Bell Laboratories, and subsequently joined the faculty at UCSB. Prof. Bowers is one of the founders of CEEM/TMP on campus and a serial entrepreneur, founding Calient Networks, Terabit Technology (acquired by Ciena), Aerius Photonics (sold to FLIR in 2011), and Aurrion, an independent company in Santa Barbara employing 25 people. Has taught courses in Entrepreneurship and New Product Develop in CEEM/TMP since 2002. Prof. Bowers currently serves as the Director of the Institute for Energy Efficiency. Probable joint appointment.

Prof. Gary Charness, Dept. of Economics (Prof. IV): Ph.D. in Economics, UC Berkeley. Teaching and Research interests in Micro/behavioral economics, with specialty in negotiation, bargaining, conflict management. Potential joint appointment.

Prof. Harry (Ted) Frech, Dept. of Economics (Prof. IX): B.S. Industrial Engineering, U. of Missouri, M.A., Ph.D. in Economics, UCLA. Primary teaching and research interests in Industrial Organization, microeconomics, business and property law, with research application to health organizations. Directed the professionally-oriented MA-level program in Economics.

Prof. Gary Hansen, Dept. of Mechanical Engineering (Assoc. Prof. III): MBA and Ph.D. in Business Administration, 20 years on the faculty at University of Washington School of Business, research and teaching emphasis in corporate strategy, entrepreneurship and technology management. Would move 100% into TMP pending approval of the new academic unit.

Prof. Gary Libecap, Bren School of Environment Management & Dept. of Economics (Prof. IX?): Specialist in economics and social entrepreneurship. Taught for years in the Eller School of Business at the University of Arizona. Since joining UCSB, has worked with Professor Gary Hansen to forge closer connections between TMP and the Eco-Entrepreneurship and Corporate Entrepreneurship tracks in Bren.

Prof. John Mohr, Dept. of Sociology (Prof. VI): 1992 Ph.D. Sociology, Yale University; 1983 M.A. Sociology, Yale University; 1979 M.A. Comparative Culture, UC Irvine; 1978 B.A. Philosophy, UC Irvine. Expert in organizational theory, and experienced with network analysis and other quantitative methods and statistical analyses. Research in Organizational Sociology is focused on how to theorize and measure the characteristics of organizational fields. Prof. Mohr's work as a methodologist (in archival methodologies and quantitative content analysis) is well known and well regarded. Prof. Mohr has served as Associate Dean in the Graduate Division at UCSB and also as the director of the Alliance for Graduate Education and the Professoriate (AGEP) UCSB Program on Graduate Diversity in STEM Disciplines (NSF sponsored Campus Transformation Initiative) and also the Director of the UC-Diversity Initiative for Graduate Study in the Social Sciences (UC-DIGSSS) UCSB Program (NSF sponsored Campus Transformation Initiative) and (also) Director of the UCSB Social Science Survey Research Center. Possible joint appointment.

Prof. Karen Myers, Dept. of Communication (Assoc. Prof. I): 2005 Ph.D. Arizona State University; 2001 M.A. University of New Mexico; 1985 B.S. Business Administration Arizona State University (with emphasis in Marketing). Conducts research on socialization in organizations, and has published

studies of women and minority assimilation into STEM disciplines. 2011 Plous Award recipient in L&S. After receiving her B.S. in Marketing Myers launched a successful publishing company. Myers developed and implemented the organization's marketing plans, and served as the primary marketer for the business. After 12 years, Myers sold the business to enter graduate school where she focused on organizational communication. Myers' research and teaching continue to be related to marketing. She maintains expertise in the latest advances in marketing and especially trends in Internet-based social media marketing. Myers has taught marketing courses on the UC, Santa Barbara campus including Marketing Communication (COMM 160MA and COMM 166) and Marketing Management (ENGR 210). Possible joint appointment.

Prof. Ron Rice, Dept. of Communication (Prof. Above Scale): Ph.D. [and M.A.] Stanford; B.A Columbia. Endowed chair in Communication (Rupe Chair [in the Social Effects of Mass Communication]). Specialist in information systems and information, network analysis, new media, organizational theory and organizational change in new organizational forms, and diffusion of innovations. Very strong quantitative research skills. Co-director of the Carsey-Wolfe Center [drop: for Film, Television, and New Media]; affiliated appointment in Bren; and affiliate of the Center for Information Technology and Society (CITS). Taught technology managers at AT&T [and MacQuarie University (Australia)] while he was a professor at Rutgers. Possible joint appointment..

Prof. Dave Seibold, Dept. of Communication (Prof. Above Scale): 1975 Ph.D. Michigan State University; 1972 M.A. University of Michigan; 1971 B.A. Iona College (Summa Cum Laude). Specialist in teams in organizations, communication and organizational change, and innovation management. Helped found the Graduate Program in Management Practice in 1999, and has served as its director since 2000. Extensive research and technical assistance in corporations, including technology firms, during the past 30 years. Seibold joined the Department of Communication as a Professor in 1990, and served as Department Chair from 1998-2004. Formerly he was a faculty member at Purdue University (1975-1976) and the University of Illinois at Urbana-Champaign (1976-1990). He also has been a distinguished visiting professor and lectured at more than two dozen universities worldwide. He is an elected Fellow of the International Communication Association and an elected Distinguished Scholar in the National Communication Association. Prof. Seibold's research and teaching interest fall into four categories: communication and interpersonal influence processes (persuasion, compliance-gaining, motivation); group interaction (decision making processes, problem-solving techniques, and team development dynamics); organizational communication (participation structures and processes, temporality in workgroups, innovation and organizational change, management and strategic communication); and applied communication (bridging theory and practice, organizational training and development, evaluation of programs). Prof. Seibold teaches ENGR 241/285E (Management of Innovation) in TMP annually. Possibly would shift 100% to TMP if the new academic unit is approved.

Professor Bob York, Dept. of Electrical & Computer Engineering (Prof. VIII): Ph.D. In Electrical Engineering, Cornell University, 1991; M.S. in Electrical Engineering, Cornell University, 1989; B.S in Electrical Engineering, University of New Hampshire, 1987. Currently serving as Director of TMP, served as chair of Ad Hoc Review Committee in 2009-2010 that organized external PRP-like review of TMP. Prof. York's research interests are in RF/wireless electronics and antennas and novel electronics materials. Prof. York co-founded AgileRF Inc. in 1999, and has served as an advisor or consultant for several other companies in California. Prof. York holds numerous patents, several of which are under active licensing agreements. Likely to assume an administrative role in COE during transition and implementation of new professional degree program.

4.2 Faculty with potential research involvement

(In alphabetical order)

- Prof. Rich Appelbaum, Sociology, Global & International Studies
- Prof. Ted Bergstrom, Economics
- Prof. Bruce Bimber, Political Science
- Prof. Jim Blascovich, Psychology
- Prof. Bob Deacon, Economics & Bren
- Prof. Andrew Flanagin, Communication
- Prof. Noah Friedkin, Sociology
- Prof. Roland Geyer, Bren
- Prof. Diane Mackie, Psychology
- Prof. Brad Paden, Mechanical Engineering
- Prof. Matthew Potoski, Bren
- Prof. Rene Weber, Communication and Psychology
- Prof. John Yun, Education

4.3 Adjunct/Visiting Faculty and Lecturers

Professionally qualified adjunct faculty or lecturers often play a role in many business and management programs, and indeed TMP has historically benefited from the active participation of business leaders and entrepreneurs as important lecturers in the classrooms, notably as guest speakers in seminars, or as instructors in entrepreneurship, finance, project management, etc. Certain topics (e.g. managerial accounting and finance) lend themselves naturally to adjunct faculty involvement, because although such coursework *could* be taught in some cases by existing ladder faculty, the faculty may lack specific research activities in these areas, and consequently the perspectives of corporate practitioners are often more valuable to the student. Nevertheless, the formation of a new unit will allow TMP to increase ladder faculty participation and consequently *reduce* its historical reliance on lecturers. Only extremely well-qualified professionals, preferably with PhDs and years of service in leadership roles, will be considered for involvement in the new unit (note that TMP already employs such people as lecturers). In the early start-up years of the program, we anticipate that visiting faculty from peer institutions could help address potential instructional deficiencies until full-time faculty can be hired, and in fact could be an effective way of identifying potential future hires for the program.

Section 5. Resource Requirements

A detailed operational budget forecast is given in Appendix B, and structured to indicate the anticipated fiscal impact on the College of Engineering over the first 5 years following program approval. The following summarizes some of the key resource requirements and rationale for the new unit and degree program that are embodied in the detailed budget; additional budgetary assumptions are listed in Appendix B.

5.1 Faculty FTE

Instruction in the *existing* TMP is conducted by one dedicated ladder faculty (Hansen), two ladder faculty teaching on an overload basis (Bowers, Seibold), and 6 professional lecturers (note: most lecturers in TMP conduct two courses per year and hence contribute 2/9 FTE each for a total of 1.33 net lecturer FTE for the program). If approved, the new unit would seek to add ladder faculty through a combination of new hires and joint appointments, with some appointments of temporary visiting ladder faculty in the near term. A total of six (6) faculty FTE and two (2) lecturer FTE will be required to sustain the existing TMP curriculum and the new degree program in maturity.

A preliminary strategy for building faculty FTE is as follows: after approval and establishment of the new academic unit, Prof. Hansen of Mechanical Engineering is expected to immediately transfer 100% to TMP. The five additional faculty FTE will be comprised of new hires and possible joint appointments with existing faculty in the College of Engineering and Division of Social Sciences. It is anticipated that at least one FTE could be associated with the 100% transfer of one existing faculty member on campus[8]. In addition, a search for a new hire is already underway; this is the aforementioned renewal of a suspended search that was approved by the EVC following the successful program review. Pending a successful recruitment for this position and Academic Senate approval of this proposal, the EVC has also formally allocated an FTE to COE for a new TMP hire in 2013-2014 (of course, final approval for these searches will still be sought through the normal campus processes.) Thus the program already has a clear path to adding four of the six required FTE as soon as the program is approved. The program plans to have five full-time faculty on campus before the arrival of the first cohort of students and the start of instruction. The last (sixth) FTE will be sought for a new hire by Year 4 of the program; prior to that point we anticipate hosting a visiting faculty member to assist with teaching responsibilities, and this has been factored into the budget in Appendix B. Anonymous private giving to the College of Engineering has already secured $1.25M set aside for a potential endowed chair for this program, expected to be used for one of the first new hires.

Table 4 — Projected Faculty FTE

	Year 1	Year 2	Year 3	Year 4	Year 5
Faculty FTE	3	5	5	6	6
Lecturer FTE	1.33	1.33	1.67	1.67	2

The anticipated faculty and lecturer FTE growth is summarized Table 4. The faculty FTE will largely support the new degree program, whereas most of the lecturer FTE will continue to support the existing certificate programs. Some additional support from lecturers/practitioners and visiting faculty will help staff the curriculum, particularly in certain areas (such as Accounting, Finance, Law, & Sales) that are inherently practice-oriented subjects. But at least 70% of the instruction in the coursework associated with the new graduate degree program will be taught by ladder faculty, with a maximum of 30% taught by professional practitioners or adjunct faculty. Some faculty teaching engagement from the Division of Social Science may also be sought through overload compensation (typically via summer ninths), depending on the wishes and circumstances of the individual faculty and their departments; for example,

[8] Note that this process can only be initiated after the new unit is approved and established, but Deans Alferness and Oliver have already begun discussions to facilitate a possible resource exchange (see letters from Deans in Appendix A)

some faculty and chairs from heavily impacted departments have expressed a preference for this option as opposed to joint appointments in order to better manage teaching loads in their departments. Ergo the budget in Appendix B includes an allocation for possible overload compensation.

5.2 Staff FTE

Existing curricular and outreach activities are currently supported by a staff of 3.5 FTE in COE, with outreach activities funded entirely by TMP's own fundraising activities. A net increase of 4 staff FTE will be required by the time the first cohort of students arrives (Year 2), with subsequent hiring as needed based on student enrollments. This staffing projection reflects some particular needs associated with a professional degree program that may not be required in other academic units, including more specialized marketing expertise and support for admissions and job placement activities. A Graduate Program Assistant (listed as SAO in the budget) will be hired to provide student advising. Anticipated growth of staff FTE is shown in Table 5. The budget in Appendix B documents specific staff positions envisaged in the new program.

Table 5 — Projected Staff FTE

	Year 1	Year 2	Year 3	Year 4	Year 5
Total Staff FTE	4.5	7.5	8	8	8+

There are synergies with some existing staff in the College of Engineering that will be exploited and are built into these staff resource projections. For example, staff in the College of Engineering already handle most of the financial/accounting responsibilities for the program, and we anticipate that the existing Academic Personnel staff will handle all AP/HR responsibilities associated with faculty/staff in the new program. Any contract & grant support that is required by new faculty in TMP will be channeled through the relevant support staff in existing COE departments (note that some of the faculty participants TMP already have appointments in these departments, and we anticipate that some new hires will as well).

5.3 Space and Other Capital Facilities

The existing TMP faculty and staff reside in offices in Phelps Hall; the program currently occupies 2,400 ASF that is part of the College of Engineering inventory. Assuming this space carries over to the new unit on a continuing basis, most of the additional space requirements will be associated with offices for new faculty and staff hires, and offices for the new graduate students. Assuming an assignable square footage (ASF) of 140 per faculty/staff and 50 ASF per graduate student (standards currently used by the College of Engineering for space allocations), approximately 6,000 ASF of additional office space will be needed. The Program will also require a dedicated classroom space in or near Phelps that will be renovated to create a professional seminar room (estimated to require over 2,000 ASF) to accommodate approximately 60 students; this is a "horseshoe" shaped seating plan that is commonly used in discussion-based instruction to facilitate classroom/group interactions. This resource could be made available to other campus programs but scheduling would be under the control of TMP.

5.4 Equipment

Equipment needs are anticipated to be associated primarily with administration (e.g. copy/fax/scanner system) and instruction (Audio/visual equipment for the new classroom). Some of these are requested as part of the initial seed funding for the program, with most other recurring equipment needs paid for by fee revenue in later years.

5.5 Computing Costs

Campus computational resources that are currently used in the existing TMP should be sufficient for the early years of the Program, exclusive of personal computers of which we anticipate one new computer for each new faculty/staff hire. Subsequent needs will be paid for by resources generated by the program.

5.6 Library Acquisitions

Key subscriptions for business and management-related databases and publications have been identified and summarized in Appendix E. These new acquisitions will be phased-in gradually over the first five years of the program. An initial annual allocation of $50,000 is included as part of the seed funding in early years to begin adding the most critical library resources (listed as "must haves" in Appendix E). Additional library acquisitions will be added in subsequent years as needed and as funding permits. To acquire all of the resources listed in Appendix E would require up to $125,000/year; we have therefore shown the library allocation gradually increasing from $50,000/year to $125,000/year in the proposed budget (Appendix B). It should be clear from the budget that all new library acquisitions will eventually be funded entirely by fee revenue when the program reaches maturity. The actual rate at which library resources will be added will depend critically on the actual pace of enrollment and revenue growth.

5.7 Other Operating Expenses

Aside from salaries and benefits for faculty and staff, operating expenses will include marketing/advertising, office supplies, course materials (books, case studies, etc.), staff development, telecommunications, and travel/entertainment. In addition, UC Regents policy for professional programs requires a Non-State-Funded Administrative Services fee (NSFAS) assessed at 8% of expenses. These and other indirect costs are detailed in Appendix B. Advertising is anticipated to be most significant in the early years of the program. In maturity many of the operational expenses will be absorbed by the professional fee structure. Operating expenses associated with External Student programs such as the New Venture Competition and Lecture Series will continue to be supported by external sponsorship until the new degree revenue is sufficient to cover those expenses.

5.8 Summary of Projected Budgetary Needs

Under the enrollment assumptions described earlier, the mature program will require at least 6 ladder faculty FTE, 2 lecturer FTE, and 8 staff FTE, representing net increases of 5 faculty FTE and 4.5 staff FTE beyond what is currently allocated to TMP. The program requests at least 8,000 ASF of additional space, of which 6,000 ASF will be used for office space, and 2,000+ ASF will be used for a new instructional facility. Other operational costs are summarized in Appendix B, with detail on new library resources in Appendix E. Funding for some of the increased lecturer and staff positions will ultimately come from revenue generated by the supplemental fees once the program reaches maturity, hence we do not anticipate any long-term impact on existing campus programs. In the near term the program will of course require seed funding from the College of Engineering to finance some of the early hiring and to engage existing faculty from outside of the college in order to successfully launch the program. As documented in the budget of Appendix B, seed funding totaling roughly $2M is anticipated for the program to reach a break-even point.

December 19, 2012

RUTH MULNARD, CHAIR
COORDINATING COMMITTEE ON GRADUATE AFFAIRS

Re: UCI Request to Change the Name and Degree Title of the Pharmacology and Toxicology Graduate Program to the Pharmacological Sciences Graduate Program

At the December 6, 2012 meeting of the Graduate Council (GC), members reviewed the Request to Change the Name of the Pharmacology and Toxicology Graduate Program to the Pharmacological Sciences Graduate Program and approved the name change to the program as well as to the degree and major title. This action is being sent to CCGA for review as a simple change and is not associated with a fundamental change of the program.

If you have any questions or concerns, please do not hesitate to contact me.

On behalf of the Graduate Council,

Jutta Heckhausen, Chair

C: Eric Zarate, CCGA Analyst, Systemwide Academic Senate
Jill Kato, Graduate Council Analyst, Academic Senate

December 19, 2012

GEOFFREY W. ABBOTT, DIRECTOR
PHARMACOLOGY AND TOXICOLOGY GRADUATE PROGRAM

Re: Request to Change the Name of the Pharmacology and Toxicology Graduate Program

At the December 6, 2012 meeting of the Graduate Council (GC), members reviewed and approved the request to change the name and major and degree title of the Pharmacology and Toxicology Graduate Program to Pharmacological Sciences. Please note that the request will be forwarded to the Coordinating Committee on Graduate Affairs for their approval.

If you have any questions or concerns, please do not hesitate to contact me.

On behalf of the Graduate Council,

Jutta Heckhausen, Chair

C: Frances Leslie, Dean, Graduate Division
Oana Abrudan, Academic Program Director, Graduate Division
Leslie O'Neal, University Editor, Academic Affairs
Pamela J. Bhalla, Chief Administrative Officer, Pharmacology
Jill Kato, Graduate Council Analyst, Academic Senate

October 26, 2012

MARY C. GILLY, CHAIR
ACADEMIC SENATE

RE: Proposed Name and Degree Title Change for the Pharmacology and Toxicology Graduate Program

As reporting academic Dean for the graduate Pharmacology and Toxicology Program, I strongly support the proposed change of the program name and degree title to Pharmacological Sciences. As stated in the proposal, as of July 1, 2012, faculty from both the Pharmacology and Toxicology department in the School of Medicine, and the Pharmaceutical Sciences department, participate in the expanded Pharmacology PhD program. In order to more accurately represent the participating faculty as well as the broader range of scientific disciplines in which the expanded group of faculty are engaged, "Pharmacology" is too specific a term to accurately represent the program, and "Toxicology" is no longer suitable as no participating faculty member in the program performs toxicology research per se. "Pharmacological Sciences" is more all-encompassing and better defines the expanded program and research areas of the faculty involved.

I also agree with the program faculty that the name change will positively impact the program as it better describes the disciplines represented within the program, and will likely also have a resulting positive impact on student recruitment.

Sincerely,

Frances Leslie

Frances M. Leslie
Graduate Dean

C: Jutta Heckhausen, Graduate Council Chair
Geoffrey W. Abbott, Program Director
Louisa Crespo, Executive Director, Academic Senate
Ruth Quinnan, Director of Graduate Academic Affairs
Jill Kato, Graduate Council Analyst

Request for Approval to Modify Graduate Degree Requirements

Program: Pharmacology and Toxicology Graduate Program
Department/Academic Unit/School: Pharmacology/School of Medicine
Date: 10/02/12
Proposed Effective Date: Fall Qtr. 2013
Faculty Contact Person: Dr. Geoffrey W. Abbott, **tel**: x4-3269, **email**: abbottg@uci.edu

Prepared by: Pamela J. Bhalla, **Telephone**: x4-6772, **E-Mail**: pamela.bhalla@uci.edu

Proposed Modification(s)(please check all that apply)

____ Admission requirements
____ Course requirements
____ Unit requirements
____ Examination requirements
____ Time-to-degree
_X__ Other (please describe) Name change of Graduate Program

1. **In a cover letter from the Dean, Associate Dean, Chair, or Program Advisor as appropriate, briefly describe the proposed modifications and provide a justification for the request.**

2. **Existing Program Requirements** **Proposed Revisions**

Existing: Pharmacology and Toxicology Graduate Program	Proposed: Pharmacological Sciences Graduate Program

3. **Relationship to competitive programs:**

This name change does not step on anyone's toes in terms of encroaching on other existing programs at UC Irvine. As the program was originally titled "Pharmacology and Toxicology", we are not aiming to indicate an increase in scope of the Program that would increase perceived overlap with disciplines covered by existing programs. Rather, we are better defining what the new joint Program scope is, while keeping a simple program title.

In terms of relationship to other similar programs in other Universities, we did not want to put off potential Pharmacology students by a radical change in title, but wanted to acknowledge that our joint program encompasses many different elements of Pharmacology - a broad discipline - hence, "Pharmacological Sciences".

4. **Impact on TTD:**

The name change should have no impact on TTD.

5. **Expected impact on quality of the program:**

The name change itself is expected to positively impact the program in that it best describes what the new joint program will encompass, while having a more modern feel than "Pharmacology and Toxicology". Therefore, we feel we will be more likely to attract students who are a good fit for what the joint program truly offers - a broad, rounded training in cutting-edge pharmacological research. This is likely to improve the program long-term.

6. **Expected impact on employment prospects:**

Having a more modern Program title that reflects a broader training in Pharmacology is likely to have a positive impact rather than a negative one, if there is any impact at all on employment prospects of the graduating students.

7. **Expected impact on recruitment:**

The name change itself is expected to positively impact recruitment because, as described above, it more accurately describes what the new joint program will encompass, while having a more modern feel than "Pharmacology and Toxicology".

8. **Will current students be permitted to switch to take advantage of the revisions? If so, what will be the approval process?**

Any students currently in the Program are expected to have the proposed Program name on their final degree certificate if the name-change is approved in time for their graduation.

9. **Faculty vote ---- Include total number of eligible faculty, number voting, and date**

Twenty-seven faculty were eligible to vote. Summary of vote attached. Vote request sent out via e-mail on 10/3/12. Voting period was open from 10/3/12-10/10/12, with three follow-up e-mails sent to faculty who had not yet responded.

Signatures (as appropriate)- Please type name(s), sign, and date

Program Director	Geoffrey W. Abbott, Ph.D.
Department Chair	Olivier Civelli, Ph.D.
Associate Dean	Susan Coutin, Ph.D.
Dean	Frances M. Leslie, Ph.D.

Required Appendices:

Revised and Dated Program Summary
Revised Catalogue Copy
Revised Website Copy
Revised/New Course Action Forms
Letter(s) of Support

DEPARTMENTAL VOTE

PROPOSED NAME CHANGE OF OUR JOINT GRADUATE PROGRAM
FROM: PHARMACOLOGY & TOXICOLOGY
TO: PHARMACOLOGICAL SCIENCES

RANK	ELIGIBLE TO VOTE	YES	NO	ABSTAIN	ABSENT
Professor	14	12	0	0	2
Assoc. Professor	9	7	0	0	2
Asst. Professor	4	4	0	0	0
Total	**27**	**23**	**0**	**0**	**4**

CURRENT PROGRAM SUMMARY

Pharmacology and Toxicology Ph.D. Graduate Degree Program Summary

Degree Program:	Ph.D. in Pharmacology and Toxicology
Degree Objective:	Ph.D.
Degree Title:	Doctor of Philosophy in Pharmacology and Toxicology
Degree Concentration:	None
Degree Program Code:	646
Specialization or Emphasis:	None
Academic Unit:	Department of Pharmacology School of Medicine
Date Authorized:	June 1972
Last Updated:	April 2010 (Approved July 1, 2010)
Last Program Review:	March 2009
Next Scheduled Program Review:	2014
Normative Time:	Five years
Application Deadlines:	Fall: December 15 Winter: Applications not accepted this quarter Spring: Applications not accepted this quarter

Admission Requirements: A background in the physical and biological sciences is required for admission to work for an advanced degree in pharmacology and toxicology. Prerequisites for admission include a background in the physical and biological sciences, including courses in mathematics, physics, chemistry, and biochemistry, including laboratory experience. The Graduate Record Examination and Subject Test in Biology or Chemistry are required.

Advising: Doctoral students receive academic advising from the Graduate Advisor during the first two years in the program. In addition, a different research advisor will be assigned during each quarter of the first year during rotations through thee laboratories. Students select a Doctoral Thesis Advisor during the second year to provide academic advising for all subsequent years in the program.

Residence Requirements: Residence requirements are those established by the University.

Language/Alternate Skills Requirement: None

Teaching Requirements: Students will have opportunities to teach in graduate courses under faculty supervision.

CURRENT PROGRAM SUMMARY

Coursework and Examination Requirements (year 1): The Pharmacology Department requirements include the following:

Graduate Pharmacology (Pharm 241)
Neurotransmitters and Drug Receptors (Pharm 252)
Introduction to Pharmacology (Pharm 254)
Chemical Transmission (Pharm 255)
Experimental Design for Pharmacologists (Pharm 256)
Ethics in Research (Pharm 257)
Seminar (Pharm 298)
Research (Pharm 299)
Introduction to Medical Physiology (P&B 206 A-B) – optional elective course
Medical Biochemistry (Biochem 210 A-B) -requirement of this course is determined by the Graduate Program Director/Advisor
Chemical Neuroanatomy (Pharm 210) -optional elective course

Coursework and Examination Requirements (years 2-5): The Pharmacology Department requirements for years 2-5 include the following:

Seminar (Pharm 298)
Research (Pharm 299)

Each candidate for the Ph.D. degree must pass the Comprehensive Exam at the end of their second year.

Advancement to Candidacy: Upon completion of most course requirements, with the exception of Pharm 299, in order to be recommended for candidacy, each student will take a written qualifying examination set by the faculty of the department to determine competence in pharmacology. After completing this requirement successfully, the student will complete an oral qualifying examination in accordance with Graduate Council procedures.

Dissertation: A three member Doctoral Committee is formed from the Advancement to Candidacy to Committee to guide the student's progress toward completion of the dissertation. When the student's research advisor and Doctoral Committee members determine that a sufficient body of original research has been completed, the student will prepare the dissertation for a public defense before the Doctoral Committee.

Final Examination: Upon completion of the dissertation the student will take an oral examination on the content of his or her dissertation or related topics. The examination will be conducted by the student's doctoral committee.

Gateway Programs:
Interdepartmental Neuroscience Program (INP) Students: All INP Students must take the Foundations of Neuroscience course (currently N&B 202 A-B-C; subject to change). INP students must complete one course from three of the four areas of modern neuroscience: Molecular (M), Cellular (C), Systems (S), and Cognitive (X). These courses include:

Systems Neuroscience (N&B 208A and A&N 210A) (S)
Molecular Neuroscience (N&B 206A) (M)
Psychology (P 260A&B) (X)
Molecular, Cellular & Developmental Neurobiology (DC 231D) (M)
Cellular Neuroscience (N&B 207) (C)

Neurotransmitters and Drug Receptors (Pharm 252) (C) (M)
Physiology of Ion Channels (P&B 232) (C)
Chemical Neuroanatomy (Pharm 210) (S)
Chemical Transmission (Pharm 255) (S) (C) (M)
Developmental Genetics (DC 210) (C) (M)
Behavioral Neuroscience (N&B 209) (X)

For students who are admitted to Pharmacology's Graduate Program through the Interdepartmental Neuroscience Program (INP) Gateway, all first and second year course requirements are waived except for Seminar (Pharm 298) and Research (Pharm 299) which are to be taken from the second year on.

Medicinal Chemistry and Pharmacology (MCP): All MCP program participants must take a one-quarter course in Medicinal Chemistry (PharmSci 277), as well as a three-quarter series of seminars in Current Topics in Pharmaceutical Sciences (PharmSci 250). A course in Ethical Conduct of Research is also part of the program requirements (Special Topics in Organic Chemistry (Chem 251) or Ethics in Research (Pharm 257). Laboratory Rotations are an integral part of the training provided by the MCP program. Students must participate in at least two quarters of laboratory research (one quarter in each of two different departments).

The MCP Gateway program was designed to provide a broad background in the three core disciplines of pharmaceutical sciences: **C**hemical, **P**harmacological, and **B**iological. To fulfill the requirements of the program, a student must successfully complete one course from each of the three categories (C,P,B). Four additional courses, chosen in consultation with their advisor, in any category or mixture of categories must also be successfully completed.

Protein Structure & Function (MB&B 204) (B)
Structure & Biosynthesis of Nucleic Acids (MB&B 203) (B)
Regulation of Gene Expression (MB&B 206) (B)
Organic Reaction Mechanisms (Chem 201) (C)
Introduction to Proteomics (MB&B 208) (B)
Organic Synthesis II (Chem 205) (C)
Medical Pharmacology & Therapeutics (Pharm 241) (P)
Organic Spectroscopy (Chem 203) (C)
Chemical Neuroanatomy (Pharm 210) (P)
Methods in Pharmacology (Pharm 254) (P)
Organic Synthesis I (Chem 204) (C)
Chemical Transmission (Pharm 255) (P)

For students who are admitted through the Medicinal Chemistry and Pharmacology (MCP) Gateway Program, all first and second year course requirements are waived except for Introduction to Pharmacology (Pharm 254). In addition, Seminar (Pharm 298) and Research (Pharm 299) are to be taken from the second year on.

Last update: April 27, 2010 (Approved July 1, 2010)

REVISED PROGRAM SUMMARY

Pharmacological Sciences Ph.D. Graduate Degree Program Summary

Degree Program:	Ph.D. in Pharmacological Sciences
Degree Objective:	Ph.D.
Degree Title:	Doctor of Philosophy in Pharmacological Sciences
Degree Concentration:	None
Degree Program Code:	646
Specialization or Emphasis:	None
Academic Unit:	Department of Pharmacology School of Medicine, and Department of Pharmaceutical Sciences (free standing department)
Date Authorized:	June 1972
Last Updated:	April 2010 (Approved July 2010)
Last Program Review:	March 2009
Next Scheduled Program Review:	2014
Normative Time:	Five years
Application Deadlines:	Fall: December 5 Winter: Applications not accepted this quarter Spring: Applications not accepted this quarter

Admission Requirements: A background in the physical and biological sciences is required for admission to work for an advanced degree in pharmacological sciences. Prerequisites for admission include a background in the physical and biological sciences, including courses in mathematics, physics, chemistry, and biochemistry, including laboratory experience. The Graduate Record Examination and Subject Test in Biology or Chemistry are required. Students admitted into the one-year INP or MCP gateway programs, and who complete all requirements of these programs, may transfer into the Pharmacological Sciences PhD program at the end of their first academic year.

Advising: Doctoral students receive academic advising from the Graduate Advisor during the first year in the program, or from the appropriate advisors in the respective gateway programs. In addition, a different research advisor will be assigned during each quarter of the first year during rotations through thee laboratories. Students select a Doctoral Thesis Advisor at the beginning of the summer before their second year to provide academic advising for all subsequent years in the program.

Residence Requirements: Residence requirements are those established by the University.

REVISED PROGRAM SUMMARY

Language/Alternate Skills Requirement: None

Teaching Requirements: Students may have opportunities to teach in graduate courses under faculty supervision and students will have the opportunity to hold Teaching Assistantship (TA) appointments.

Coursework and Examination Requirements (year 1): New students admitted directly by the Pharmacology Department are subject to the first year requirements listed below.

Students who complete all requirements of the one-year INP or MCP gateway programs may qualify to transfer into the Pharmacological Sciences PhD program at the end of their first academic year. These gateways have different first year requirements (see below).

Graduate Pharmacology (Pharm 241)
Neurotransmitter and Drug Receptors (Pharm 252)
Introduction to Pharmacology (Pharm 254)
Chemical Transmission (Pharm 255)
Experimental Design for Pharmacologists (Pharm 256)
Ethics in Research (Pharm 257)
Journal Club/Seminar (Pharm 298)
Research (Pharm 299)
Introduction to Medical Physiology (P&B 206 A-B) – optional elective course
Medical Biochemistry and Molecular Biology (Biochem 210 A) -requirement of this course is determined by the Graduate Program Director/Advisor
Chemical Neuroanatomy (Pharm 210) -optional elective course

Coursework and Examination Requirements (years 2-5): The Pharmacological Sciences PhD program requirements for year two include the following:

Seminar (Pharm 298)
Research (Pharm or PhrmSci 299)

Each candidate for the Ph.D. degree must pass the Comprehensive Exam or equivalent by the end of their second year.

Advancement to Candidacy: Upon completion of most course requirements, with the exception of Pharm/PhrmSci 299, in order to be recommended for candidacy, each student will take a written qualifying examination set by the faculty of the department to determine competence in pharmacological sciences. After completing this requirement successfully, the student will complete an oral qualifying examination in accordance with Graduate Council procedures.

Dissertation: A three member Doctoral Committee is formed from the Advancement to Candidacy Committee to guide the student's progress toward completion of the dissertation. When the student's research advisor and Doctoral Committee members determine that a sufficient body of original research has been completed, the student will prepare the dissertation for a public defense before the Doctoral Committee.

Final Examination: Upon completion of the dissertation the student will take an oral examination on the content of his or her dissertation or related topics. The examination will be conducted by the student's Doctoral Committee.

REVISED PROGRAM SUMMARY

Gateway Programs:

Interdepartmental Neuroscience Program (INP): All INP Students participate in the Foundations of Neuroscience course (currently Neurbio 202 A-B; subject to change) during the fall and winter quarters.

INP was designed to provide a broad background for students. Core courses from three major areas of modern neuroscience, **Molecular- (M)**, **Cellular- (C)**, and **Systems- (S)** are available. To fulfill the requirements of the program, a trainee must successfully complete one course from each of the categories. Those courses that carry more than one designation can only be counted as fulfilling one of the three category requirements for any given trainee. These courses include:

Systems Neuroscience (Neurbio 208A-B and Anatomy 210A-B) (S)
Molecular Neuroscience (Neurbio 206A) (M)
Cellular Neuroscience (Neurbio 207) (C)
Neurotransmitter and Drug Receptors (Pharm 252) (C) (M)
Physiology of Ion Channels (Physio 232) (C)
Chemical Neuroanatomy (Pharm 210) (S)
Chemical Transmission (Pharm 255) (S) (C) (M)
Advanced Development Genetics (Dev Bio 210) (C) (M)
Responsible Conduct of Research (M&MG 250)

For students who are admitted to the Pharmacological Sciences Graduate Program in their second year through the Interdepartmental Neuroscience Program (INP) Gateway, all first year INP requirements are substituted for the Department of Pharmacology first year requirements listed above except for Seminar (Pharm 298) and Research (Pharm 299) which are to be taken from the second year on.

Medicinal Chemistry and Pharmacology (MCP): All MCP program participants must take a one-quarter course in Medicinal Chemistry (PhrmSci 277), one-quarter course in Biological Macromolecules (PhrmSci 223), as well as a three-quarter series of seminars in Current Topics in Pharmaceutical Sciences (PhrmSci 250A-B-C). A course in Ethical Conduct of Research is also part of the program requirements (Special Topics in Organic Chemistry (Chem 251) or Ethics in Research (Pharm 257). Laboratory Rotations are an integral part of the training provided by the MCP program. Students must participate in at least two quarters of laboratory research (one quarter in each of two different departments).

The MCP Gateway program was designed to provide a broad background in the three core disciplines of pharmaceutical sciences: Chemical (C), Pharmacological (P), and Biological (B). To fulfill the requirements of the program, a student must successfully complete one course from each of the three categories (C,P,B). Four additional courses, chosen in consultation with their advisor, in any category or mixture of categories must also be successfully completed.

Protein Structure & Function (Mol Bio 204) (B)
Nucleic Acid Structure and Function (Mol Bio 203) (B)
Organic Reaction Mechanisms I (Chem 201) (C)
Graduate Pharmacology (Pharm 241) (P)
Organic Spectroscopy (Chem 203) (C)
Chemical Neuroanatomy (Pharm 210) (P)
Introduction to Pharmacology (Pharm 254) (P)
Organic Synthesis I (Chem 204) (C)

REVISED PROGRAM SUMMARY

Organic Synthesis II (Chem 205) (C)
Chemical Transmission (Pharm 255) (P)
High-Resolution Structures: NMR and X-ray (Mol Bio 211) (B).
Regulation of Gene Expression (M&MG 206) (B)
Signal Transduction and Growth Control (Biochem 212) (B)

Successful completion of the Medicinal Chemistry and Pharmacology (MCP) gateway program fulfills all first year requirements towards the PhD in Pharmacological Sciences, substituting for the Department of Pharmacology first year requirements listed above, according to the previously approved MCP gateway agreement. Likewise, the required Current Topics in Pharmaceutical Sciences (PhrmSci 250) course, which culminates in a presentation by each student of a comprehensive project covering the principles learned in the MCP courses during the first year, is accepted as the equivalent of the Comprehensive Exam administered to PhD students admitted directly into the Department of Pharmacology.

Last update: October 11, 2012

Penelope Maddy, *UCI Distinguished Professor of Logic and Philosophy of Science and of Mathematics*
Louis Narens, *Professor of Cognitive Sciences*
Alan Nelson, *Professor Emeritus of Philosophy*
Riley Newman, *Professor Emeritus of Physics*
Robert Newsom, *Professor Emeritus of English*
Terence D. Parsons, *Professor of Philosophy, UCLA*
A. Kimball Romney, *Professor Emeritus of Anthropology*
Michael R. Rose, *Professor of Ecology and Evolutionary Biology*
Jonas Schultz, *Professor Emeritus of Physics*
Brian Skyrms, *Director of the Minor in the History and Philosophy of Science and UCI Distinguished Professor of Logic and Philosophy of Science and of Economics*
Norman M. Weinberger, *Research Professor of Neurobiology and Behavior*
Peter Woodruff, *Professor Emeritus of Philosophy*

The minor in the History and Philosophy of Science is intended for students who wish to study the history of science, the philosophical foundations of scientific inquiry, and the relationship between science and other fields. The history of science explores how science is actually done and how it has influenced history. This may involve tracking down an idea's source or its influences, evaluating the cultural forces at work in the generation of a scientific theory or the reaction of culture to science, or taking a detailed look at the work of a particular scientist or movement within science. The philosophy of science is concerned with determining what science and mathematics are, accounting for their apparent successes, and resolving problems of philosophical interest that arise in the sciences. Philosophy of science courses cover such topics as the role of logic and language in science and in mathematics, scientific explanation, evidence, and probability. These courses may also cover work that has been done on the philosophical problems in specific sciences—for example, the direction of time in physics, the model of mind in psychology, the structure of evolution theory in biology, and the implications of Gödel's incompleteness theorems for mathematics.

The minor is available to all UCI students. Course descriptions may be found in the academic department sections of the *Catalogue*.

Requirements for the Minor

Completion of seven courses as follows: (1) two courses selected from Logic and Philosophy of Science 31, 40, History 60; (2) two courses selected from History 135B, 135C, 135D, 135E, Philosophy 110–115 (when topic is science), Psychology 120H; and (3) three courses selected from Linguistics 141, 143, Logic and Philosophy of Science 106, 108, 140, 141A, 141B, 141C, 141D, 142, 143, 145, 146, 147.

Minor in Native American Studies

https://eee.uci.edu/clients/tcthorne/idp/

Participating Faculty

Rachel O'Toole, *Assistant Professor of History*
Justin B. Richland, *Associate Professor of Criminology, Law and Society*
Jaime E. Rodríguez, *Professor Emeritus of History*
Gabriele Schwab, *UCI Chancellor's Professor of Comparative Literature and English*
Patricia Seed, *Professor of History*
Tanis Thorne, *Lecturer in History*
Steven C. Topik, *Professor of History*

The minor in Native American Studies is an interdisciplinary, interschool program which focuses on history, culture, religion, and the environment. The three core courses serve as an introduction to the Native American experience from the perspective of different historical periods and frameworks of analysis. The research and teaching interests of faculty from different departments enrich study in the minor.

The minor is open to all UCI students. Advising information is available from the undergraduate counseling offices in the Schools of Humanities and Social Sciences.

Course descriptions are available in the academic department sections and at http://eee.uci.edu/clients/tcthorne/idp/.

Requirements for the Minor

Core courses: History 12 (Native American Religion and the Environmental Ethic); History 15A (Native American History); and Sociology 65 (Cultures in Collision: Indian-White Relations Since Columbus; same as Anthropology 85A).

Four upper-division courses selected from Anthropology 121D (Cross-Cultural Studies of Gender), 135A (Religion and Social Order), 162A (Peoples and Cultures of Latin America); Art History 175 (Studies in Native and Tribal Art); Criminology, Law and Society C158 (U.S. Law and Native Americans); Education 124 (Multicultural Education in K–12 Schools); History 161A (Indian and Colonial Societies in Mexico); Social Science 175B (Ethnic and Racial Communities); Women's Studies 156A (Race and Gender), 158B (Defining Women of Color).

Students may also select from the following courses when the topics presented relate to Native American Studies: Anthropology 149 (Special Topics in Archaeology), 169 (Special Topics in Area Studies); Comparative Literature 105 (Comparative Multiculturalism); English 105 (Multicultural Topics in Literature in English); History 169 (Topics in Latin American History); Sociology 149 (Special Topics: Structures), 169 (Special Topics: Age, Gender, Race, and Ethnicity).

GRADUATE STUDY

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Graduate Program in Pharmacology and Toxicology

Graduate Student Affairs: (949) 824-1239
http://www.pharmsci.uci.edu

The Department of Pharmaceutical Sciences and the Department of Pharmacology join forces to offer an interdisciplinary program leading to a Ph.D. degree in Pharmacology and Toxicology. The Ph.D. degree prepares students for careers in academia, research institutions, and the pharmaceutical industry by providing a research-intensive approach to the study of pharmaceutical sciences.

Faculty research programs in Pharmaceutical Sciences that are available through this program currently include organic, medicinal, and bioorganic chemistry; structural biology; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery. Information about the Department of Pharmaceutical Sciences faculty and their research programs is available at http://www.pharmsci.uci.edu/faculty.php.

Faculty research programs in Pharmacology that are currently available through this program include molecular and cellular pharmacology, neurosciences, gene regulation, circadian rhythms, epigenetic modifications, neuropharmacology, psychopharmacology, and cardiovascular pharmacology. Emphasis is placed on providing an integrated understanding of drug receptors: their structure, location, and function; molecular aspects of drug action; receptor signaling mechanisms; structure-activity relationships and drug design; and the role of receptors and drugs in development and aging, plasticity, reinforcement and drug abuse, neural disorders, and cardiovascular physiology and disease. Information about the

CURRENT COPY - CONTINUED

Department of Pharmacology faculty and their research programs is available at http://www.pharmacology.uci.edu/index.asp?p=154.

Prerequisites for admission include a bachelor's degree in one of the core disciplines of the pharmaceutical sciences, namely a physical science (including computer science), a biological science, biochemical or biomedical engineering, or allied field. Non-biological sciences majors must have passed a minimum of two quarters (or one semester) of introductory biology. In addition, courses in biochemistry, pharmacology, protein structure and function, biophysics or related fields would be a plus regardless of major. The general Graduate Record Examination is required for admission; subject GRE exams are optional but can provide valuable additional information to the admissions committee in marginal applications.

The graduate program requires a diverse group of classroom courses selected by the student in consultation with the Graduate Advisor. The departmental requirements leave the student a great deal of latitude in choosing an area of emphasis. In keeping with this principle and the highly interdisciplinary nature of pharmaceutical science, and subject to the approval of the Graduate Advisor, students may take graduate courses in allied fields outside the department such as Biological Sciences, Physical Sciences, Engineering, or Computer Science. Similarly, up to eight units of graduate courses taken through UCI University Extension and/or UCI upper-division undergraduate classes can be counted toward the elective course requirements with prior written approval from the Graduate Advisor. In addition, two lab rotations of one quarter in length are required.

Sample Program — Ph.D. in Pharmacology and Toxicology

FALL	WINTER	SPRING
Year 1		
Phrm 254 (Methods in Pharmacol)	PhrmSci 250B PhrmSci 277 (Med Chem)	PhrmSci 250C Phrm 255 (Chem Transm)
PhrmSci 223 (Bio Macromol)	PhrmSci 260 (Computnl Bio)	PhrmSci 274 (Biopharmceu)
PhrmSci 250A	PhrmSci 280 or Phrm 299 (Research, Rotation)	PhrmSci 399 (Teaching)
PhrmSci 280 or Phrm 299 (Research, Rotation)		
Year 2		
PhrmSci 280 (Research)	PhrmSci 280 (Research)	PhrmSci 280 (Research)
Phrm 298 (Seminar)	Phrm 298 (Seminar) PhrmSci 399 (Teaching)	Phrm 298 (Seminar)
Year 3		
Advancement Exam (Orals)	PhrmSci 280 (Research)	PhrmSci 280 (Research)
PhrmSci 280 (Research)	Phrm 298 (Seminar)	Phrm 298 (Seminar)
Phrm 298 (Seminar)		
Years 4–5		
PhrmSci 280 (Research)	PhrmSci 280 (Research)	PhrmSci 280 (Research)
Phrm 298 (Seminar)	Phrm 298 (Seminar)	Phrm 298 (Seminar)

For course descriptions, see the Department of Pharmaceutical Sciences, page 434, and the Department of Pharmacology, page 425.

Advancement to candidacy for the Ph.D. normally takes place in the third year and is based on an oral and written exam assessing overall performance and progress in the program. Students may also receive the M.S. degree after completion of appropriate requirements. The main additional requirement for the Ph.D. is the satisfactory completion and oral defense of a written dissertation based on original research carried out under the guidance of a faculty member. All candidates for the Ph.D. degree are required to engage in research activities throughout the course of their academic programs. This requirement applies to all students whether or not they are compensated for such services. An appointment as a graduate student researcher is awarded on the basis of scholarship and not as compensation for services rendered.

The normative time for advancement to candidacy is three years, and all requirements for the Ph.D. degree should be completed within five years (the maximum time permitted is seven years). For more information, contact the Graduate Program Director/Advisor, Department of Pharmaceutical Sciences.

Graduate Program in Networked Systems

(949) 824-1755
http://www.networkedsystems.uci.edu
Gene Tsudik **(Director)**
Athina Markopoulou **(Co-Director)**

Faculty

Animashree Anandkumar, Ph.D. Cornell University, *Assistant Professor of Electrical Engineering and Computer Science* (statistical signal processing, information theory, and networking with a focus on graphical models)

Ender Ayanoglu, Ph.D. Stanford University, *Professor of Electrical Engineering and Computer Science* (next generation wireless, broadband, and optical communications)

Pai Chou, Ph.D. University of Washington, *Associate Professor of Electrical Engineering and Computer Science* (hardware and software co-design, power-aware and adaptive embedded systems, system synthesis, and embedded instruments)

Magda El Zarki, Ph.D. Columbia University, *Professor of Computer Science, Informatics, and Electrical Engineering and Computer Science* (telecommunications, networks, wireless communication, video transmission)

Hamid Jafarkhani, Ph.D. University of Maryland, *UCI Chancellor's Professor of Electrical Engineering and Computer Science* (communication theory, coding, wireless networks, multimedia networking)

Scott Jordan, Ph.D. University of California, Berkeley, *Professor of Computer Science and of Electrical Engineering and Computer Science* (pricing and differentiated services in the Internet, resource allocation in wireless multimedia networks, and telecommunications policy)

Athina Markopoulou, Ph.D. Stanford University, *Assistant Professor of Electrical Engineering and Computer Science* (network, reliability, security, multimedia networking, measurement and control)

Amelia Regan, Ph.D. University of Texas, Austin, *Professor of Computer Science* (operations research, network optimization, data mining)

Gene Tsudik, Ph.D. University of Southern California, *Director of Networked Systems and Professor of Computer Science* (security and applied cryptography, mobile/ad-hoc networks and distributed systems)

Nalini Venkatasubramanian, Ph.D. University of Illinois at Urbana-Champaign, *Professor of Computer Science* (parallel and distributed systems, multimedia, internetworking, high-performance architectures, resource management)

The graduate program in Networked Systems is administered by faculty from two academic units: the Department of Computer Science (CS) in the Donald Bren School of Information and Computer Sciences, and the Department of Electrical Engineering and Computer Science (EECS) in The Henry Samueli School of Engineering. The program offers M.S. and Ph.D. degrees in Networked Systems.

The Networked Systems program provides education and research opportunities to graduate students in the areas of computer and telecommunication networks. Networked Systems include telephone, cable TV networks, wireless, mobile, ad hoc, and cellular phone networks, as well as the Internet. Networked Systems, as a field, is inherently interdisciplinary since it combines technology in software, hardware, and communications. As a result, it transcends traditional departmental boundaries. Networked Systems draws primarily from Computer Science, Computer Engineering, and Electrical Engineering. At UCI, these areas are housed in two departments: CS and EECS. The Networked Systems program unites the respective strengths of these two departments and provides integrated M.S. and Ph.D. degrees in this area.

REVISED COPY

UCI General Catalogue Copy – Interdisciplinary Studies (to replace current information under heading 'Graduate Study', pages 381-382)

GRADUATE STUDY

Graduate Program in Pharmacological Sciences

Graduate Student Affairs: (949) 824-7651 (Administered by the Department of Pharmacology)
Geoffrey W. Abbott, Graduate Program Director/Advisor
http://www.pharmacology.uci.edu and http://www.pharmsci.uci.edu

Graduate Program Faculty – Pharmacology

Geoffrey W. Abbott: Biology and pharmacology of voltage-gated potassium channels, voltage-independent potassium channels, and ion transporters
Emiliana Borrelli *(Joint)*: Dopamine signaling and drugs of addiction; mouse models of neurological and neuropsychiatric disorders.
Olivier Civelli: Molecular biology of G protein-coupled receptors; discovery of novel neuropeptides; functional characterization of novel neuropeptides, discovery of active components of traditional Chinese medicines
Frederick J. Ehlert: Muscarinic receptor coupling mechanisms; functional role of muscarinic receptor subtypes; pharmacological methods of analysis; analysis of drug receptor interactions
Pietro R. Galassetti *(Joint)*: Physiological and altered adaptive responses to stress in healthy and dysmetabolic children and adults; non-invasive monitoring of metabolic variables through analysis of exhaled gases
Kelvin W. Gee: Pharmacology of allosteric modulators of the GABAA receptor, selective modulation of GABAA receptor subtypes; novel molecular targets for neuropharmacological agents and drug discovery
Naoto Hoshi: Physiological role and regulation of the M-channel, molecular biology, electrophysiology and live cell FRET imaging
Frances M. Leslie: Addiction, drugs of abuse and brain development
Z. David Luo *(Joint)*: Molecular mechanisms of pain transduction; study gene regulation and signaling pathways in chronic pain processing using animal models, and molecular biology techniques
Daniele Piomelli *(Joint)*: Lipid-derived signaling, special emphasis on endogenous cannabinoids; role in pain, mental health and inflammation. Cellular and system pharmacology and medicinal chemistry are used to identify pharmacological agents that interfere with the functions exerted by endocannabinoids and other signaling lipids
Zhou, Qun-Yong: Pharmacology and physiology of prokineticins and prokineticin receptors
Xiaolin Zi: *(Joint):* Cancer prevention and treatment using novel naturally occurring compounds and the study of their underlying molecular mechanisms; Secreted Wnt antagonists in cancer growth and metastasis

Graduate Program Faculty – Pharmaceutical Sciences

Bruce Blumberg: Molecular embryology, molecular biology, developmental biology, functional genomics, endocrinology, pharmacology, high-throughput screening
Richard Chamberlin: Organic synthesis, chemical biology, medicinal chemistry
John Fruehauf: Mechanisms of drug action and resistance with the goal of improving therapeutic outcomes for cancer patients
Celia Goulding: Structural biology, biochemistry, proteomics, microbiology, X-ray crystallography
Stephen Hanessian: Organic, bioorganic and medicinal chemistry as research interests
Mahtab Jafari: Anti-aging effects of botanicals and pharmaceutical compounds; the impact of botanical extracts on mitochondrial bioenergetics, oxidative stress, and other pathways of aging using cell culture and *Drosophila*
Young Kwon: Gene therapy, drug delivery, cancer-targeted therapeutics, combined Molecular imaging and therapy, cancer vaccine
Andrej Luptak: RNA biology and chemistry
David Mobley: Computational techniques for drug discovery, free energy calculations, molecular simulations, solubility
Thomas Poulos: Protein crystallography, protein engineering, heme enzyme structure and function
Jennifer Prescher: Chemical biology, molecular imaging, organic chemistry, immunology, bioorthogonal chemistry, post-translational modifications

REVISED COPY (continued)

UCI General Catalogue Copy – Interdisciplinary Studies (to replace current information under heading 'Graduate Study', pages 381-382)

Rainer Reinscheid: Neuropharmacology of peptide transmitters involved in stress, sleep and memory using cellular and transgenic animal models
Paolo Sassone-Corsi: Signal transduction and gene expression; chromatin remodeling and epigenetics; germ cell differentiation; circadian clock and rhythms
Shiou-Chuan (Sheryl) Tsai: Biochemistry, chemical biology, structural biology, enzymology, microbiology
Weian Zhao: Stem cell therapy, diagnostics, biosensors, nano- and microtechnology, aptamers

The Department of Pharmacology in conjunction with the Department of Pharmaceutical Sciences offers an interdisciplinary Program leading to a Ph.D. degree in Pharmacological Sciences. The Ph.D. degree prepares students for careers in academic research institutions, in the biotechnology and pharmaceutical industry, in federal and state agencies and in private research institutions by providing a research-intensive approach to the study of pharmacological sciences.

Faculty research programs in the Pharmacology Department that are currently available through this program include molecular and cellular pharmacology, neurosciences, gene regulation, circadian rhythms, epigenetic modifications, neuropharmacology, psychopharmacology, cardiovascular pharmacology, structure-based drug design, and screening-based drug discovery. Emphasis is placed on providing an integrated understanding of drug receptors: their structure, location, and function; molecular aspects of drug action; receptor signaling mechanisms; structure-activity relationships and drug design; the influence of genetic variation on drug-receptor interactions; and the role of receptors and drugs in development and aging, plasticity, reinforcement and drug abuse, neural disorders, and cardiovascular physiology and disease. Information about the Department of Pharmacology faculty and their research programs is available at http://www.pharmacology.uci.edu/.
For course descriptions see the Department of Pharmacology in the School of Medicine section of the *Catalogue*, page 425.

Faculty research programs in Pharmaceutical Sciences that are available through this program currently include organic, medicinal, and bioorganic chemistry; structural biology; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery. Information about the Department of Pharmaceutical Sciences faculty and their research programs is available at http://www.pharmsci.uci.edu/.
For course descriptions see the Department of Pharmaceutical Sciences section of the *Catalogue,* page 434.

Prerequisites for admission include a bachelor's degree in one of the core disciplines of the pharmaceutical sciences, namely a physical science (including computer science), a biological science, biochemical or biomedical engineering, or allied field. Non-biological sciences majors must have passed a minimum of two quarters (or one semester) of introductory biology. In addition, courses in biochemistry, pharmacology, protein structure and function, biophysics or

related fields would be a plus regardless of major. The general Graduate Record Examination is required for admission; subject GRE exams are optional but can provide valuable additional information to the admissions committee in marginal applications.
The graduate program requires a diverse group of classroom courses selected by the student in consultation with the Graduate Advisor. The departmental requirements leave the student a great deal of latitude in choosing an area of emphasis. In keeping with this principle and the highly interdisciplinary nature of pharmacological sciences, and subject to the approval of the Graduate Advisor, students may take graduate courses in allied fields outside the department such as Biological Sciences, Physical Sciences, Engineering, or Computer Science. Similarly, up to eight units of graduate courses taken through UCI University Extension and/or UCI upper-division undergraduate classes can be counted toward the elective course requirements with prior written approval from the Graduate Director. In addition, two lab rotations of one quarter in length are required.

Advancement to candidacy for the Ph.D. normally takes place in the third year and is based on an oral and written exam assessing overall performance and progress in the program. Students may also receive the M.S. degree after completion of appropriate requirements. The main additional requirement for the Ph.D. is the satisfactory completion and oral defense of a written dissertation based on original research carried out under the guidance of a faculty member. All candidates for the Ph.D. degree are required to engage in research activities throughout the course of their academic programs. This requirement applies to all students whether or not they are compensated for such services. An appointment as a graduate student researcher is awarded on the basis of scholarship and not as compensation for services rendered.
The normative time for advancement to candidacy is three years, and all requirements for the Ph.D. degree should be completed within five years (the maximum time permitted is seven years). For more information, contact the Pharmacological Sciences Graduate Program Director/Advisor.

203A-B-C Advanced Studies in Experimental Pathology (1-1-1) F, W, S. A tutorial course for Ph.D. students in Experimental Pathology entailing attendance at Departmental seminars and critical reading of the scientific literature. Corequisite: Pathology 200A-B-C. May be repeated for credit.

204A, B, C Experimental Pathology Research Seminar (1, 1, 1) F, W, S. Seminar series for graduate students in Experimental Pathology. Students attend seminars and, beginning in their third year of graduate study, present one formal seminar on their graduate research. May be repeated for credit as topics vary.

212 Signal Transduction and Growth Control (4) S. Covers various eukaryotic signaling pathways (tyrosine kinase, ras-raf-MAPK, TGF-ß, wnt, JAK-STAT, and FAS) with an emphasis on the experimental underpinnings. The material is covered in lectures and discussions of pertinent papers. Prerequisite: consent of instructor. Same as Biological Chemistry 212. *Offered every other year.*

221 Immunopathogenic Mechanisms of Disease (3) S. Lecture, one and one-half hours; seminar, one and one-half hours. Examination of the mechanisms underlying disease states mediated by immune dysregulation. Topics include innate and adaptive immunity, autoimmunity, immunodeficiency, inflammatory disorders, and certain infectious diseases. Emphasis on biological basis of immunopathologies taught from reports in the original scientific literature. Prerequisite: Microbiology and Molecular Genetics 215. Same as Microbiology and Molecular Genetics 221.

225 Molecular Mechanisms of Human Disease (3) S. Provides an overview of the molecular mechanisms of human diseases, including neurologic, hematologic, neoplastic, and infectious diseases. Students gain an understanding of these mechanisms, as well as models of human diseases. Same as Microbiology and Molecular Genetics 225.

226 Topics in Experimental Pathology (4) W. Select topics related to principles of experimental pathology including normal host responses to disease are presented. Animal models of human disease are emphasized. Material includes both lectures and critical review of the primary literature.

230D Principles of Experimental Pathology (4) F. Introduces graduate students to the general pathologic processes that mediate disease. Topics include cell injury and repair, inflammation, immunopathology, neoplasia, and genetic diseases. Combines lecture, small group discussion, and oral presentations.

231A Pathology of Cardiovascular Diseases (2) F. For graduate students interested in human cardiovascular disease. Students receive training in physiology, anatomy, and pathologic processes of the heart and blood vessels. Experimental approaches to study such processes are emphasized.

232A Pathology of Pulmonary Diseases (1.5) F. For graduate students interested in pulmonary disease. Students receive training in physiology, anatomy, and pathologic processes of the lungs and airways. Experimental approaches to study such processes are emphasized.

233A Pathology of Renal Diseases (1) F. For graduate students interested in renal disease. Students receive training in physiology, anatomy, and pathologic processes of the kidneys. Experimental approaches to study such processes are emphasized.

234A-B Pathology of Gastrointestinal Diseases (0-2) F, W. For graduate students interested in gastrointestinal disease. Students receive training in physiology, anatomy, and pathologic processes of the gastrointestinal tract. Experimental approaches to study such processes are emphasized. In-progress grading.

235A-B Pathology of Genitourinary Tract Diseases (0-2) F, W. For graduate students interested in genitourinary tract or breast disease. Students receive training in physiology, anatomy, and pathologic processes of the breast and genitourinary tract. Experimental approaches to study such processes are emphasized. In-progress grading.

236B Graduate Neuropathology (1.5) W. For graduate students interested in diseases of the nervous system. Students receive training in physiology, anatomy, and pathologic processes of the central and peripheral nervous system. Experimental approaches to study such processes are emphasized.

292A-B-C Scientific Communication (2-2-2) F, W, S. Seminar, two hours. Small group meetings for graduate students to practice scientific writing, debate, and presentation skills. Satisfactory/Unsatisfactory only. May be repeated for credit.

299 Dissertation in Experimental Pathology (1 to 12). Provided for the preparation and completion of the dissertation required for the Ph.D. degree. Prerequisite: consent of instructor.

CURRENT COPY

Pharmacology and Toxicology

360 Medical Surge II; (949) 824-7651
http://www.pharmacology.uci.edu/
Olivier Civelli, **Department Chair**
Geoffrey W. Abbott, **Department Vice Chair and Departmental Graduate Advisor**

Graduate Program Faculty

Geoffrey W. Abbott: Biology and pharmacology of voltage-gated potassium channels, voltage-independent potassium channels, and ion transporters
James D. Belluzzi: Brain substrates and pharmacology of reward; characterization and development modulation of nicotine and cocaine reinforcement; abuse potential of tobacco smoke constituents
Emiliana Borrelli *(Joint)*: Dopamine signaling and drugs of addiction; mouse models of neurodegenerative diseases
Olivier Civelli: Molecular biology of G protein-coupled receptors; search for novel neurotransmitters and neuropeptides; pharmacological and behavioral characterizations of the novel neurotransmitters and neuropeptides
Sue Piper Duckles *(Emerita)*: Pharmacology and physiology of vascular smooth muscle; regulation of cerebral circulation, impact of gender and gonadal steroids on vascular function
Frederick J. Ehlert: Muscarinic receptor coupling mechanisms; functional role of muscarinic receptor subtypes; pharmacological methods of analysis; analysis of drug receptor interactions
Pietro R. Galassetti *(Joint)*: Physiological and altered adaptive responses to stress in healthy and dysmetabolic children and adults; non-invasive monitoring of metabolic variables through analysis of exhaled gases
Kelvin W. Gee: Pharmacology of allosteric modulators of the $GABA_A$ receptor, selective modulation of $GABA_A$ receptor subtypes; novel molecular targets for neuropharmacological agents and drug discovery
Naoto Hoshi: Physiological role and regulation of the M-channel, molecular biology, electrophysiology and live cell FRET imaging
Mahtab Jafari *(Joint)*: Anti-aging effects of botanicals and pharmaceutical compounds; the impact of botanical extracts on mitochondrial bioenergetics, oxidative stress, and other pathways of aging using cell culture and *Drosophila*
Diana N. Krause: Cerebrovascular regulation and pharmacology; vascular effects of gonadal hormones; melatonin receptors
Frances M. Leslie: Addiction, drugs of abuse and brain development
Z. David Luo *(Joint)*: Molecular mechanisms of pain and transduction; study gene regulation and signaling pathways in chronic pain processing using animal models, and molecular biology techniques
Daniele Piomelli: Biochemistry and pharmacology of the endogenous cannabinoid and other lipid derived messengers
Rainer K. Reinscheid *(Joint)*: Neuropharmacology of peptide transmitters involved in stress, sleep and memory using cellular and transgenic animal models
Paolo Sassone-Corsi: Signal transduction and gene expression; chromatin remodeling and epigenetics; germ cell differentiation; circadian clock and rhythms
Xiaolin Zi: *(Joint):* Cancer prevention and treatment using novel naturally occurring compounds and the study of their underlying molecular mechanisms; Secreted Wnt antagonists in cancer growth and metastasis

Graduate program joint faculty are from Pharmaceutical Sciences, Microbiology and Molecular Genetics, Chemistry, Pediatrics, Endocrinology, Developmental and Cell Biology, Anesthesiology, Emergency Medicine, Pathology, and Urology.

The Department of Pharmacology joins forces with the Department of Pharmaceutical Sciences to offer an interdisciplinary program leading to the Ph.D degree in Pharmacology and Toxicology. The

SCHOOL OF MEDICINE
PHARMACOLOGY + TOXICOLOGY
CURRENT COPY - CONTINUED

Department of Pharmacology is engaged in a broad scope of research activity. The Ph.D. program prepares students for careers in academia, research institutions, and the pharmaceutical industry by providing a foundation in all aspects of pharmacology, from molecular mechanisms through behavior. Faculty research interests include molecular and cellular pharmacology, neurosciences, gene regulation, circadian rhythms, epigenetic modifications, neuropharmacology, psychopharmacology, and cardiovascular pharmacology. Emphasis is placed on providing an integrated understanding of drug receptors: their structure, location, and function; molecular aspects of drug action; receptor signaling mechanisms; structure-activity relationships and drug design; and the role of receptors and drugs in development and aging, plasticity, reinforcement and drug abuse, neural disorders, and cardiovascular physiology and disease. For complete program information, see page 381.

Prerequisites for admission include a background in the physical and biological sciences which includes courses in mathematics, physics, chemistry, and biochemistry, including laboratory experience. The Graduate Record Examination (GRE) and Subject Test in Biology or Chemistry are highly recommended.

The graduate core program includes Pharmacology 241A-B, 252, 254, 255, 256, 257, Biochemistry 210A, and Physiology 206A-B, quarterly participation in Pharmacology 298-299, and any additional elective courses assigned by faculty advisors. (Ph.D. students may receive the M.S. degree after completion of appropriate requirements.) The major additional requirement for the Ph.D. is the satisfactory completion and oral defense of a dissertation based on original research carried out under the guidance of a faculty member. All candidates for the Ph.D. degree are required to engage in research activities throughout the course of their academic programs. This requirement applies to all students whether or not they are compensated for such services. An appointment as a graduate student researcher is awarded on the basis of scholarship and not as compensation for services rendered. Before advancing to candidacy each student must pass a written qualifying examination to determine the student's competence in pharmacology or pharmacology and toxicology. The full-time student is expected to pass the written qualifying examination by the eighth quarter and the oral qualifying examination for the Ph.D. by the eleventh quarter. The normative time for advancement to candidacy is three years. All requirements for the Ph.D. degree should be completed within five years, and the maximum time permitted is seven years. For more information, contact the Graduate Program Director/Advisor, Department of Pharmacology.

Graduate Gateway Program in Medicinal Chemistry and Pharmacology (MCP). The one-year graduate MCP Gateway Program is designed to function in concert with selected department programs, including the Ph.D. in Pharmacology and Toxicology. Upon successful completion of the MCP curriculum at the end of their first year, students choose a faculty advisor who is affiliated with one of the participating departments, and transition into their "home" department to complete the remaining degree requirements. They will receive their Ph.D. degree from the department of their chosen advisor. Detailed information is available at http://www.pharmacology.uci.edu.

The Department also participates in the **Interdepartmental Neuroscience Gateway Program,** described in the School of Biological Sciences section of the *Catalogue.* Students who select a focus in Neuroscience and a research advisor in the Department begin following the departmental requirements for the Ph.D. at the beginning of their second year and will receive their Ph.D. from the department of their chosen advisor. Detailed information is available at http://www.inp.uci.edu/research/facsort_dept_list.cfm?department=15.

COURSES IN PHARMACOLOGY AND TOXICOLOGY

***(Schedule of Classes* designation: Pharm)**

241A-B Medical Pharmacology and Therapeutics (6-6) F, W. Lecture and seminar, eight hours. Principles of pharmacology and in-depth study of drug action. Pharmacokinetics and pharmacodynamics: absorption, distribution and metabolism, general principles of action and receptor concepts. Discussion of major drug classes: molecular mechanism of action, physiological consequences of administration, and clinical use. Prerequisites: Physiology and Biophysics 206A-B and Molecular Biology and Biochemistry 210A.

252 Neurotransmitter and Drug Receptors (6) W. Lecture, three hours; seminar, three hours. Ligand gated ion channels, G protein linked receptors, receptor tyrosine kinases, ligand regulated transcription factors, their signaling mechanisms, trafficking and physiological responses. Analysis of receptor properties by pharmacological methods, radioligand binding, and molecular biology.

254 Methods in Pharmacology (4) F. Lecture, four hours; laboratory, eight hours. Receptor analysis: bioassay measuring contraction, calcium mobilization, second messenger responses; operant conditioning: whole animal, single neuron; radioligand binding; quantitative autoradiography; immunocytochemistry; in situ hybridization for analysis of mRNA; Western and Northern analysis; transgenic mouse knock in and knock out techniques. Prerequisite: consent of instructor.

255 Chemical Transmission (4) S. Lecture, two hours; seminar, two hours. Mechanisms underlying chemical signaling processes in the brain and periphery. Molecular biology, signal transduction, transmitter synthesis and inactivation, pharmacology of integrative function and behavior. Prerequisite: consent of instructor.

256 Experimental Design for Pharmacologists (1) F, W, S. Lecture, one hour; discussion, one hour; laboratory, one hour. Population and sample statistics, hypothesis testing, analysis of variance, nonparametric statistics, experimental design, power, and the use of statistical computer software. Prerequisite: Pharmacology 252 or consent of instructor.

257 Ethics in Research (1) F, W, S. Lecture, one hour; discussion, one hour. Ethical conduct in research including data handling, authorship, conflict of interest, animal rights, handling of misconduct. Prerequisite: Pharmacology 299 or consent of instructor. May be taken for credit two times.

298 Seminar (2) F, W, S. Presentation and discussion of current problems and methods in teaching and research in pharmacology, toxicology, and therapeutics.

299 Research (1 to 12) F, W, S

Physiology and Biophysics

Building D, Room D340, Medical Sciences I; (949) 824-5863
http://www.physiology.uci.edu/
Michael D. Cahalan, **Department Chair**
Todd C. Holmes, **Department Vice Chair and Departmental Graduate Advisor**

Faculty

Kenneth M. Baldwin: Developmental, hormonal, and exercise factors regulating striated muscle gene expression
Ralph A. Bradshaw *(Emeritus)*: Structure and function of polypeptide growth factors and their receptors; mechanisms of protein turnover
Michael D. Cahalan: Ion channels and Ca^{2+} signaling in the immune system
Vincent J. Caiozzo: Cellular and molecular mechanisms regulating the mechanical properties of skeletal muscle
K. George Chandy: Molecular biology of ion channels and their role in immune cells
John Jay Gargus: Molecular analysis of membrane signaling proteins
Alan L. Goldin: Molecular biology of neural channels and receptors
Harry T. Haigler: Structure, function, and topography of annexin calcium binding proteins on membranes
James E. Hall: Biophysics of membrane channels, gap junctions and water channels
Todd C. Holmes: Ion channels, cellular physiology, neural circuits and behavior; circadian and visual circuits
Lan Huang: Developing and employing mass spectrometry-based proteomic approaches for study of signal transduction networks, identification of protein complexes and characterization of their post-translational modifications

REVISED COPY

UCI General Catalogue Copy – to replace current information under School of Medicine, Pharmacology and Toxicology, pages424-425)

(Note: Course changes shown in red were already approved by Graduate Council in July 2010 and were subsequently submitted with other General Catalog revisions but were inadvertently left out). I have e-mail confirmation from Registrar's Office attached.

Pharmacological Sciences

360 Medical Surge II; (949) 824-7651
http://www.pharmacology.uci.edu/
Olivier Civelli, **Department Chair**
Geoffrey W. Abbott, **Department Vice Chair and Graduate Program Director/Advisor**

Graduate Program Faculty

Geoffrey W. Abbott: Biology and pharmacology of voltage-gated potassium channels, voltage-independent potassium channels, and ion transporters
Emiliana Borrelli *(Joint)*: Dopamine signaling and drugs of addiction; mouse models of neurological and neuropsychiatric disorders.
Olivier Civelli: Molecular biology of G protein-coupled receptors; discovery of novel neuropeptides; functional characterization of novel neuropeptides, discovery of active components of traditional Chinese medicines
Frederick J. Ehlert: Muscarinic receptor coupling mechanisms; functional role of muscarinic receptor subtypes; pharmacological methods of analysis; analysis of drug receptor interactions
Pietro R. Galassetti *(Joint)*: Physiological and altered adaptive responses to stress in healthy and dysmetabolic children and adults; non-invasive monitoring of metabolic variables through analysis of exhaled gases
Kelvin W. Gee: Pharmacology of allosteric modulators of the GABAA receptor, selective modulation of GABAA receptor subtypes; novel molecular targets for neuropharmacological agents and drug discovery
Naoto Hoshi: Physiological role and regulation of the M-channel, molecular biology, electrophysiology and live cell FRET imaging
Mahtab Jafari *(Joint)*: Anti-aging effects of botanicals and pharmaceutical compounds; the impact of botanical extracts on mitochondrial bioenergetics, oxidative stress, and other pathways of aging using cell culture and *Drosophila*
Frances M. Leslie: Addiction, drugs of abuse and brain development
Z. David Luo *(Joint)*: Molecular mechanisms of pain transduction; study gene regulation and signaling pathways in chronic pain processing using animal models, and molecular biology techniques
Daniele Piomelli *(Joint)*: Lipid-derived signaling, special emphasis on endogenous cannabinoids; role in pain, mental health and inflammation. Cellular and system pharmacology and medicinal chemistry are used to identify pharmacological agents that interfere with the functions exerted by endocannabinoids and other signaling lipids
Rainer K. Reinscheid *(Joint)*: Neuropharmacology of peptide transmitters involved in stress, sleep and memory using cellular and transgenic animal models
Zhou, Qun-Yong: Pharmacology and physiology of prokineticins and prokineticin receptors
(Note (not to be included in General Catalog; info only): Dr. Zhou was inadvertently deleted from the General Catalog from 2006/07 on; needs to be added back in).
Xiaolin Zi: *(Joint):* Cancer prevention and treatment using novel naturally occurring compounds and the study of their underlying molecular mechanisms; Secreted Wnt antagonists in cancer growth and metastasis

Graduate program joint faculty are from Anatomy and Neurobiology, Anesthesiology and Perioperative Care, Microbiology and Molecular Genetics, Pediatric, Pharmaceutical Sciences and Urology.

The primary graduate program for the Pharmacology Department direct admit students is the graduate program in Pharmacological Sciences. This is an interdisciplinary program. For complete program information, see Interdisciplinary Studies, pages 381-382.

REVISED COPY (Continued)

UCI General Catalogue Copy – to replace current information under School of Medicine, Pharmacology and Toxicology, pages424-425)

The Department of Pharmacology also admits students through the following two gateway programs:

Graduate Gateway Program in Medicinal Chemistry and Pharmacology (MCP). The one-year graduate MCP Gateway Program is designed to function in concert with selected department programs, including the Ph.D. in Pharmacological Sciences. Upon successful completion of the MCP curriculum at the end of their first year, students choose a faculty advisor who is affiliated with one of the participating departments, and transition into their "home" department to complete the remaining degree requirements. They will receive their Ph.D. degree from the department of their chosen advisor. Detailed information is available at http://www.pharmacology.uci.edu.

The Department also participates in the **Interdepartmental Neuroscience Gateway Program,** described in the School of Biological Sciences section of the *Catalogue.* Students who select a focus in Neuroscience and a research advisor in the Department begin following the departmental requirements for the Ph.D. at the beginning of their second year and will receive their Ph.D. from the department of their chosen advisor. Detailed information is available at http://www.inp.uci.edu/research/facsort_dept_list.cfm?department=15.

COURSES IN PHARMACOLOGICAL SCIENCES

***(Schedule of Classes* designation: Pharm)**

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252 Neurotransmitter and Drug Receptors (6) W. Lecture, three hours; seminar, three hours. Ligand gated ion channels, G protein linked receptors, receptor tyrosine kinases, ligand regulated transcription factors, their signaling mechanisms, trafficking and physiological responses. Analysis of receptor properties by pharmacological methods, radioligand binding, and molecular biology.

254 ~~Methods in~~ Introduction to Pharmacology (4) F. Lecture, four hours; laboratory, eight hours. Receptor analysis: bioassay measuring contraction, calcium mobilization, second messenger responses; operant conditioning: whole animal, single neuron; radioligand binding; quantitative autoradiography; immunocytochemistry; in situ hybridization for analysis of mRNA; Western and Northern analysis; transgenic mouse knock in and knock out techniques. Prerequisite: consent of instructor.

255 Chemical Transmission (4) S. Lecture, two hours; seminar, two hours. Mechanisms underlying chemical signaling processes in the brain and periphery. Molecular biology, signal transduction, transmitter synthesis and inactivation, pharmacology of integrative function and behavior. Prerequisite: consent of instructor.

256 Experimental Design for Pharmacologists (1) F, W, S. Lecture, one hour; discussion, one hour; laboratory, one hour. Population and sample statistics, hypothesis testing, analysis of variance, nonparametric statistics, experimental design, power, and the use of statistical computer software. Prerequisite: Pharmacology 252 or consent of instructor.

257 Ethics in Research (1) F, W, S. Lecture, one hour; discussion, one hour. Ethical conduct in research including data handling, authorship, conflict of interest, animal rights, handling of misconduct. Prerequisite: Pharmacology 299 or consent of instructor. May be taken for credit two times.

298 Seminar (2) F, W, S. Presentation and discussion of current problems and methods in teaching and research in pharmacology, toxicology, and therapeutics.

299 Research (1 to 12) F, W, S

Bhalla, Pamela

From: Leslie O'Neal [laoneal@uci.edu]
Sent: Monday, July 30, 2012 9:14 AM
To: Pamela J. BHALLA
Subject: Fwd: Pharm course title check

Hi Pam,

I apologize for not getting back to you sooner regarding the approved titles of Pharm 241A-B and 254. You are indeed correct that the change of titles to "Graduate Pharmacology" and "Introduction to Pharmacology" were approved, and that the course titles shown in the Catalogue are incorrect. I apologize for these errors and thank you for bringing them to my attention. Per Peggy in Registrar's, the approved course titles are correct in the Casper system, so no action in necessary on your part.

We will make the title corrections for the 2013-14 Catalogue.

With apologies,

Leslie

Leslie O'Neal
UC Irvine General Catalogue Editor
laoneal@uci.edu

-------- Original Message --------
Subject: Re: Please check for me
Date: Mon, 23 Jul 2012 13:58:23 -0700
From: Peggy Siebrandt <psiebran@uci.edu>
To: Leslie O'Neal <laoneal@uci.edu>
References:<50085526.1070607@uci.edu>

Hi Leslie,

I checked in Casper, and Pam does have the correct titles. Effective F10, Pharm 241A-B is titled "Graduate Pharmacology", and Pharm 254 is titled "Introduction to Pharmacology".

Thanks, Peggy

Leslie O'Neal wrote:
Hi Peggy,

When you have a chance, could you please look up the courses below in your system and let me know what the current approved titles are?

Thanks very much!

Leslie

CURRENT COPY

REQUIREMENTS FOR THE B.S. DEGREE IN PHARMACEUTICAL SCIENCES

University Requirements: See pages 54–61.

Major Requirements

A. *Lower-Division Requirements:*

1. Chemistry 1A-B-C or H2A-B-C, and 1LC-LD or H2LB-LC or M2LB-LC; Chemistry 51A-B-C, 51LA-LB or H52A-B-C, H52LA-LB.
2. Mathematics 2A-B and one course selected from Statistics 7, 8, Mathematics 2D, 3A, or 3D.
3. Physics 3A-B-C, 3LB-LC.
4. Biological Sciences 93, 94, 97, 98, 99.

B. *Upper-Division Requirements:* Biological Sciences 100, 194S, Pharmaceutical Sciences 120 and 120L, 170A, 170B, 171, 172, 173, 174, 174L, 176, 177, 177L.

C. *Upper-Division Electives (8 units):*

1. One course, for students who choose electives that have these courses as prerequisites, selected from Biological Sciences D103, D104, N110.
2. The upper-division elective units may be selected from the following courses: Biological Sciences D111L, D126, D129, D136, D137, D145, D148, D151, D153, E136, E137, E141, E142, E189, M114, M114L, M116L, M118L, M120, M121, M122, M122L, M123, M124A, M124B, M124L, M125, M128, M137, M143, M144, N113L, N153, N154, N171, Chemistry 107, 107L, 125, 128, 128L, 138, 151, 151L, 156, 160, 170, and Public Health 121. (Course may not be used to satisfy more than one requirement.)

Upper-Division Writing Requirement: Pharmaceutical Sciences majors satisfy the upper-division writing requirement by completing Biological Sciences 100 with a grade of C or better, followed by the completion of Pharmaceutical Sciences 174L and 177L. Students must earn a grade of C or better in each of these laboratory courses.

NOTE: Double majors with Pharmaceutical Sciences, Public Health Sciences, Nursing Science, Biomedical Engineering: Premedical, or with any of the School of Biological Sciences majors are not permitted.

Sample Program — Pharmaceutical Sciences

FALL	WINTER	SPRING
Freshman		
Bio. Sci. 93	Bio. Sci. 94	Chemistry 1C, 1LC
Chemistry 1A	Chemistry 1B	Math. 2A
WR 39B or Hum. 1A	WR 39C or Hum. 1B	Gen. Ed. or Hum. 1C
Gen. Ed.	Gen. Ed.	Pharm. Sci. 1
Sophomore		
Bio. Sci. 97	Bio. Sci. 98	Bio. Sci. 99
Chemistry 51A, 1LD	Chemistry 51B, 51LB	Chemistry 51C, 51LC
Math. 2B	Stats. 7 or 8 or	Pharm. Sci. 90
Bio. Sci. 194S	Math. 2D, 3A, or 3D	
	Gen. Ed.	
Junior		
Pharm. Sci. 120, 120L	Pharm. Sci. 170A	Pharm. Sci. 170B
Pharm. Sci. 172	Pharm. Sci. 177, 177L	Pharm. Sci. 173
Physics 3A	Physics 3B, 3LB	Physics 3C, 3LC
Bio. Sci. 100	Gen. Ed.	Elective
Senior		
Pharm. Sci. 171	Gen. Ed.	Pharm. Sci. 176
Pharm. Sci. 174, 174L	Elective	Gen. Ed.
Gen. Ed.	Elective	Elective

Graduate Program

Graduate students in the Department of Pharmaceutical Sciences are admitted through the Gateway Program in Medicinal Chemistry and Pharmacology (MCP). This interdepartmental program was established through the joint efforts of the Departments of Chemistry, Pharmacology, Molecular Biology and Biochemistry, and Pharmaceutical Sciences. The MCP program provides first-year students with state-of-the-art practical and theoretical training in their specific field of interest, while also providing a broader exposure to fundamentals of each of the other core disciplines. This dual goal is accomplished through a one-year initial interdisciplinary program of course work and lab rotations, followed by the transition into one of the participating department's Ph.D. programs for in-depth specialization and research work. The integrated curriculum offered in this program gives students a breadth of expertise that is not easily achievable in any single, individual department.

For the Ph.D. degree, the Department of Pharmaceutical Sciences joins forces with the Department of Pharmacology to offer an interdisciplinary program leading to a Ph.D. degree in Pharmacology and Toxicology. The Ph.D. degree prepares students for careers in academia, research institutions, and the pharmaceutical industry by providing a research-intensive approach to the study of pharmaceutical sciences. Faculty research programs in Pharmaceutical Sciences that are available through this program currently include organic, medicinal, and bioorganic chemistry; structural biology; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery. For complete program information, see page 381.

Courses in Pharmaceutical Sciences

(*Schedule of Classes* designation: PhrmSci)

LOWER-DIVISION

1 Introduction to Pharmaceutical Sciences (1) S. Lecture, one hour. Introduction to the scientific disciplines that comprise the multidisciplinary field of pharmaceutical sciences. Students gain an appreciation of basic concepts in the relevant physical, biological, and clinical sciences and how they fit together in the search for new medicines. Pass/Not Pass only.

90 Speaking About Science (4) S, Summer. Lecture, three hours; discussion, one hour. Introductory courses in research, composition, organization, and delivery of informative and persuasive speeches for various purposes, including scientific talks. Includes strategies for reducing speaker apprehension.

UPPER-DIVISION

120 Human Physiology (4) F. Lecture, three hours; discussion, one hour. Focuses on anatomy and physiology—organism structure and function, respectively—as they relate to human diseases and their treatment. Prepares students for more advanced studies in pharmacology, medicinal chemistry, biopharmaceutics, and other disciplines encompassing pharmaceutical sciences. Prerequisite: Biological Sciences 99. Pharmaceutical Sciences 120 and Biological Sciences E109 may not both be taken for credit.

120L Human Physiology Lab (3). Laboratory, four hours. Through an active learning environment, provides practical knowledge of topics covered in human physiology as they relate to health care professions. Participation in group projects that strengthen basic laboratory skills and teach students to work more efficiently in a team. Corequisite: Pharmaceutical Sciences 120. Prerequisite: Biological Sciences 194S or E109. Pharmaceutical Sciences 120L and Biological Sciences E112L may not both be taken for credit.

REVISED COPY

UCI General Catalogue Copy – Pharmaceutical Sciences (to replace current information under heading 'Graduate Program', page 433)

Graduate Program

The Pharmaceutical Sciences Department offers a program that provides a unique opportunity for students interested in any scientific discipline represented by our faculty to have a year of broad, interdisciplinary training followed by focused doctoral research in the Pharmaceutical Sciences research group of their choice. Students complete their first year of graduate study in the Medicinal Chemistry and Pharmacology (MCP) graduate gateway program where they complete coursework, lab rotations, and other activities intended to provide a broad foundation in the pharmaceutical sciences. At the end of this first year of interdisciplinary training, they transition from MCP into a research group to begin their more focused doctoral research under the guidance of a Pharmaceutical Sciences faculty member; current areas of study include structural biology; medicinal chemistry; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery, among others. The two-phase integrated curriculum offered in this program gives students a breadth of expertise that is not easily achievable in any single, individual department.

For the Ph.D. degree, the Department of Pharmaceutical Sciences joins forces with the Department of Pharmacology to offer an interdepartmental doctoral program leading to a Ph.D. degree in Pharmacological Sciences. The Ph.D. degree prepares students for careers in academia, research institutions, and the pharmaceutical industry by providing a research-intensive approach to the study of pharmaceutical sciences. Faculty research programs in Pharmaceutical Sciences that are available through this program currently include organic, medicinal, and bioorganic chemistry; structural biology; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery. For complete program information, see Interdisciplinary Studies, pages 381-382.

OVERVIEW: GRADUATE PROGRAM

- CURRENT COPY

The Department of Pharmacology offers a PhD in pharmacology and toxicology in the following areas of study:

- Molecular and cellular pharmacology
- Neurosciences
- Gene regulation
- Circadian rhythms
- Epigenetic modifications
- Neuropharmacology
- Psychopharmacology
- Cardiovascular pharmacology

Pharmacology also participates in two special interdisciplinary gateway programs:

- Interdepartmental Neuroscience Program (INP)
- Medicinal chemistry and pharmacology (MCP) graduate program.

Upon successful completion of the first-year curriculum in these programs, students choose a faculty adviser who is affiliated with one of the participating departments and transition into that department to complete the remaining degree requirements. Students will receive a PhD degree from the department of their chosen adviser.

Academic Program

- What does our program offer?
- Program of study
- Curriculum
  - Timetable for degree
  - Course curriculum
- Graduate program faculty
- Relationship with industry

Prospective Graduate Students

- Application requirements
- Admissions and application
- Financial support
- Housing
- Student life

Current Graduate Students

- Pharmacology graduate student profiles
- Graduate Student Handbook (PDF)
- Pharmacology graduate program brochure (PDF)

Alumni

- Pharmacology alumni/thesis projects
- Alumni positions

REVISED COPY - PHARMACOLOGY WEB SITE

OVERVIEW: GRADUATE PROGRAM

The Department of Pharmacology in conjunction with the Department of Pharmaceutical Sciences offers an interdisciplinary program leading to the PhD degree in Pharmacological Sciences encompassing the following areas of study:

- Molecular and cellular pharmacology
- Neurosciences
- Gene regulation
- Circadian rhythms
- Epigenetic modifications
- Neuropharmacology
- Psychopharmacology
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Department of Pharmacology
University of California, Irvine · School of Medicine

WHAT DO WE OFFER?

- CURRENT COPY

Our goal is to provide a cutting-edge program in pharmacology that leads to a wide range of employment opportunities upon graduation. Your education prepares you for a career as a pharmacologist in academic institutions, in biotechnology and pharmaceutical companies, in federal and state agencies and in private research institutions.

Our program offers:

- A broad-based, multidisciplinary education focused on neuroscience and cardiovascular pharmacology.
- Faculty expertise ranging from cellular and molecular biology to behavior.
- Research focused on:
  - receptors and their signaling mechanisms
  - novel endogenous and therapeutic ligands
  - neurochemical basis of behavior
- Individualized research training in well-equipped laboratories
- Excellent faculty-to-student ratio allows you to work closely with professors in a challenging and supportive environment

Explore Pharmacology

Please note that UC Irvine does not offer a program in pharmacy, but other schools world-wide do offer such programs.

REVISED COPY - PHARMACOLOGY WEB SITE

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Our goal is to provide a cutting-edge program in pharmacological sciences that leads to a wide range of employment opportunities upon graduation. Your education prepares you for a career as a pharmacologist in academic institutions, in biotechnology and pharmaceutical companies, in federal and state agencies and in private research institutions.

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    - novel endogenous and therapeutic ligands
    - neurochemical basis of behavior
- Individualized research training in well-equipped laboratories
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DEPARTMENT OF PHARMACOLOGY
UNIVERSITY of CALIFORNIA, IRVINE · SCHOOL OF MEDICINE

PROGRAM OF STUDY - CURRENT COPY

The Department of Pharmacology offers a program leading to a PhD in pharmacology and toxicology. A combined MD/PhD program is also available to students interested in pursuing medical careers that include basic research.

The PhD programs are flexible and tailored to the needs of individual students. Training consists of an initial sequence of courses and seminars that provide a strong basic foundation in pharmacology and related biomedical science. Students primarily select courses in:

- molecular biology
- neurobiology
- biochemistry
- physiology
- neuroanatomy
- behavioral science

Students are actively engaged in research throughout their training: In the first year, laboratory rotations ensure exposure to a variety of techniques and research problems. At the end of the second year, students are considered for advancement to PhD candidacy on the basis of academic standing, laboratory performance and a qualifying examination. After advancement to candidacy, students devote their time to completion of an original research thesis.

Students typically complete their graduate education in four to five years. Candidates for the MD/PhD degree normally begin by completing the first two years of the medical school curriculum. Advanced graduate training, dissertation research and clinical training occupy the next four to five years. Students are eligible for both the MD and PhD degrees at the end of seven years provided the degree requirements for both the School of Medicine and the graduate school have been fulfilled.

REVISED COPY - PHARMACOLOGY WEB SITE

PROGRAM OF STUDY

The Department of Pharmacology offers a program leading to a PhD in pharmacological sciences. A combined MD/PhD program is also available to students interested in pursuing medical careers that include basic research.

The PhD programs are flexible and tailored to the needs of individual students. Training consists of an initial sequence of courses and seminars that provide a strong basic foundation in pharmacology and related biomedical sciences. Students primarily select courses in:

- molecular biology
- neurobiology
- biochemistry
- physiology
- fundamental and applied pharmacology
- behavioral science

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DEPARTMENT OF PHARMACOLOGY
UNIVERSITY of CALIFORNIA, IRVINE - SCHOOL OF MEDICINE

ADMISSIONS AND APPLICATION – CURRENT COPY

Students are admitted to the UC Irvine Graduate Program in Pharmacology and Toxicology on an annual basis in the fall quarter. The Graduate Program Executive Committee and director act as the admissions committee.

Following an initial screening of applications, suitable applicants will be invited to visit the department in late January or early February at the department's expense. Admissions decisions will be made after that time. In order to preserve a high faculty/student ratio, the program only admits approximately four to six students per year. The chair makes final offers of admission to applicants, based on the recommendations of the interviewing faculty and the executive committee.

Application Deadline: Dec. 5
To be considered for entrance to the program in the fall quarter, students must submit applications no later than Dec. 5 of the preceding calendar year.

Applicants are required to:

- Submit an official online application including the application fee ($70 for domestic applicants, i.e. US citizens and permanent residents and $90 for foreign applicants
- One official original transcript
- Three letters of recommendation
- GRE general and subject test scores
- International students are also required to submit TOEFL scores

Recruitment period for Fall 2012: The recruitment weekend for invited applicants is Jan. 19-21. We look forward to meeting you.

Please apply to our graduate program online via Graduate Division/UC Irvine web page: online application for graduate admissions.

For further information, please contact:

Student Affairs Coordinator
Department of Pharmacology
School of Medicine
Room 360, Med Surge II
Irvine, CA 92697-4625
949.824.7651
pharm@uci.edu

REVISED COPY - PHARMACOLOGY WEB SITE

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New Copy to add to current site

PhD Program- Website Copy – Pharmaceutical Sciences

The Pharmaceutical Sciences Department offers a program that provides a unique opportunity for students interested in any scientific discipline represented by our faculty to have a year of broad, interdisciplinary training followed by focused doctoral research in the Pharmaceutical Sciences research group of their choice. Students complete their first year of graduate study in the Medicinal Chemistry and Pharmacology (MCP) graduate gateway program where they complete coursework, lab rotations, and other activities intended to provide a broad foundation in the pharmaceutical sciences. At the end of this first year of interdisciplinary training, they transition from MCP into a research group to begin their more focused doctoral research under the guidance of a Pharmaceutical Sciences faculty member; current areas of study include structural biology; medicinal chemistry; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery, among others. Students in the Department of Pharmaceutical Sciences go on to earn a PhD in Pharmacological Sciences, a new interdepartmental doctoral program with the Department of Pharmacology.

Students interested in earning a PhD in the Pharmaceutical Sciences department must apply through the MCP graduate gateway (not directly to the Pharmacological Sciences program). For details regarding the application process and requirements, please visit the Graduate Admissions webpage.

UNIVERSITY *of* CALIFORNIA • IRVINE

Geoffrey W. Abbott, M.Sc., Ph.D.
Professor and Vice Chair, Department of Pharmacology
Professor, Department of Physiology and Biophysics
Director, Pharmacology Graduate Program

School of Medicine
356A Med Surge II
Irvine, CA 92697-4625
Tel: 949-824-3269
Email: abbottg@uci.edu

September 28, 2012

Proposal to change the name of the Pharmacology and Toxicology Graduate Program to Pharmacological Sciences Graduate Program.

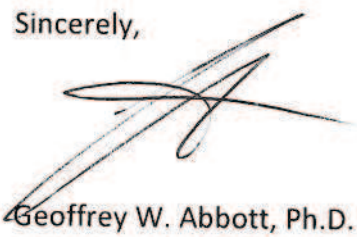
As of July 1, 2012 the participating departments of the Pharmacology and Toxicology Graduate Program are the Department of Pharmacology in the School of Medicine and the freestanding Department of Pharmaceutical Sciences on the main campus. This newly expanded PhD program was recently approved by the UCI Grad Council, and because it is interdepartmental and inter-school, campus policy is that the Dean of the Graduate Division has decanal responsibility.

The primary reason for this request to modify the name of the program is to better reflect the broader range of scientific disciplines represented among the newly expanded group of participating faculty members in both departments, i.e., "Pharmacology" is too specific to accurately represent the program. In addition, "Toxicology" is no longer suitable since no participating faculty member in the program does toxicology research per se, which was the case in the original program for years. We therefore propose a more informative and all-encompassing degree name, "Pharmacological Sciences Graduate Program," that will be far more appropriate for the foreseeable future.

Research and teaching in the Department of Pharmacology is centered on the interactions of drugs with their receptors in living organisms, but also encompasses chemical synthesis of novel compounds and screening for potential drug activity, and also more fundamental research aimed at identifying new drug targets and novel roles for proteins using technologies including mouse genetics. In the Pharmaceutical Sciences Department, research and teaching are focused on drug design and development, including structural biology, medicinal chemistry, drug delivery, and stem cell research. Crucially for the name change, neither department can claim to teach toxicology as a separate discipline; instead, this topic is widely considered to be an integral part of pharmacology and pharmaceutical sciences across the board and not a separate discipline. Thus, the degree title "Pharmacology and Toxicology" is not only redundant but does not reflect the newly broadened research interests of participating faculty members.

In order to reflect the new status of the graduate program as an interdepartmental program between the Departments of Pharmacology and Pharmaceutical Sciences, we propose to change the name of the PhD Program from "Pharmacology and Toxicology Graduate Program" to "Pharmacological Sciences Graduate Program." We believe that this name far better represents the recently expanded scope of research and teaching performed by the two participating departments.

Sincerely,



Geoffrey W. Abbott, Ph.D.

Academic Planning Council
Comments on Self-Supporting Policy
November 2012

POLICY ON SELF -SUPPORTING GRADUATE DEGREE PROGRAMS
September 13, 2011

Self-supporting programs allow the University to serve additional students above and beyond the resources provided by the state while fulfilling demonstrated higher education and workforce needs. Currently, there are populations of working adults not served by UC state-supported programs who would be willing to enroll in self-supporting graduate degree programs. This policy is designed to facilitate the establishment of self-supporting programs by the University and its campuses while ensuring that these programs do not use state resources. These programs will receive no state-support; however, they have the potential to generate resources that would enhance the quality, access, and affordability of core academic programs and departments. For example, they could provide additional support for graduate students and students in state-supported programs.

1. General

A. Self-supporting graduate degree programs must be financially independent and sustainable and not draw upon state resources or tution revenue generated by students enrolled in the University's state-supported degree programs. should meet one or more of the following criteria, although meeting a single criterion is not necessarily sufficient justification for self-supporting status:

1. primarily serve a non-traditional population, such as full-time employees, mid-career professionals, international students, and/or students supported by their employers;
2. be offered through an alternative mode of delivery, such as online instruction or a hybrid model;
3. be alternatively scheduled, such as during evenings, weekends, and summers; and/or

4.A. be offered in an alternative location (e.g., off-campus centers).

B. Such programs should not be undertaken if they strain the resources of the department that sponsors them or have an adverse effect on regular programs on campus. If the campus determines a graduate degree program should be offered on a self-supporting basis, such programs should be fully self-supporting upon inception or in no less than three years. Self supporting within a short phase-in period; "self-supporting" means that full program costs, including but not limited to faculty instructional costs, program support costs, student services costs, and overhead, should be covered by student tuition and fees or other non-state funds, including funds raised through private philanthropy. The sponsors of each proposed self-supporting program should submit a cost analysis and fiscal phase-in plan with their request for approval of proposed student tuition and fees as defined in the Implementation Guidelines.

C. By expanding self-supporting programming that serves practitioners, the respective department may have access to additional field-based resources (working students, their employers, and field-based lecturers) that it might not otherwise be able to afford. Therefore, where appropriate, partnerships with the profession served are encouraged.

D. Courses may be offered on-campus, at appropriate off-campus locations, or in a combination of on-campus and off-campus facilities, or on line, using . The programs may also use distance technologies (computer and video-based, e-mail, etc.) as appropriate. As provided by Academic Senate Regulation 694, courses to satisfy the requirements of such programs may be given, either in whole or in part, at off-campus sites.[1]

[1] SR 694: *A school, department, or group of departments which offers a program leading to a Master's degree under the jurisdiction of a Graduate Division, may, in cooperation with University Extension, provide at a center or centers other than a*

Comment [rl1]: The University Policy Office oversees policy making at OP, revisions or redrafting of the SSP policy should be coordinated with them http://www.ucop.edu/ethics-compliance-audit-services/policy/

Comment [rl2]: Suggest this sentence be deleted, it sounds like the University is trying to justify offering SSPs, no justification is needed.

Comment [rl3]: Suggest this sentence be deleted also, examples of usefulness of SSPs to other constituencies is not necessary.

Comment [cs4]: I disagree. It is important to explicitly state the justification for SSPs. It seems to have shifted from serving "non-traditional" populations to broadening UC's reach to serve non-state funded students with the aim of generating income to support core programs.

Comment [cs5]: Consensus was that most of these criteria no longer fit current circumstances and are too prescriptive. The first two sentences of the policy describe the population that SSPs now aim to serve. Make intro paragraph I.A.? Any more specific criteria should be in implementation guidelines.

Comment [cs6]: Is there consensus on retaining this criterion?

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Comment [rl7]: The criteria rely on concepts that are not defined, e.g., non-traditional, alternative. Consider offering definitions before listing criteria; include "adverse effect."

Comment [rl8]: As asked in the Nov 8 APC meeting, is a self-supporting program a financial model or a delivery model? The criteria are about delivery. May need to clarify this to improve the policy.

Comment [cs9]: Define. It's defined elsewhere as 3 years. CCGA advises 2 years. Is this realistic?

II. Programs Ineligible for Self-Supporting Status

Doctor of Philosophy (Ph.D.) programs are not eligible to become self-supporting programs. In addition, an academic Master's degree program solely or primarily leading to a Ph.D. degree is not eligible to be self-supporting.

Comment [cs10]: Question at Nov. 8 meeting: Should policy apply to combined undergraduate/graduate degree programs?

III. Relationship to State-Supported On-Campus Programs

A. Self-supporting graduate degree programs are should be held to the same standards of quality as regular programs, as determined by the appropriate Graduate Council. Standards of admission and performance for any student, regardless of whether the program is a self-supporting or state-supported graduate degree program are, should be demonstrably high, . Just as in the case of state supported graduate degree programs, the standards of admission and performance and are governed by the Academic Senate.

B. Any self-supporting programs should be established by academic departments or units and staffed with faculty on the same basis as state-supported programs. Teaching faculty should be appointed through regular campus processes irrespective of academic series. Certain practice oriented degree programs may warrant a higher proportion of non-regular faculty (e.g., clinical/adjunct faculty, lecturers, visitors), but that proportion must be in keeping with the standards of each campus' Graduate Council. Under no circumstances shall anyone teach in self-supporting programs whose appointment has not been subject to the appropriate academic review. Impact of the SSP on the existing graduate programs will be evaluated as a critical components of the review process.

C. The Dean of the school or college offering the self-supporting program is responsible for assuring that program publicity and marketing meet the highest standards of quality and accuracy, and the Dean is accountable to the Executive Academic Vice Chancellor or Provost for such representations.

D. Self-supporting graduate degree programs may be administered in cooperation with University Extension.[2] UC Extension's role is generally limited to assisting in activities that are part of the administration of the program (e.g., course enrollment, collecting tuition and fees, advertising, career services, and technical support) although UC Extension may provide more services when requested by the department. However, authority over courses, curriculum, and faculty appointment must be fully exercised by the academic unit responsible for the program.

Comment [cs11]: Move I.B. to this section. The impact of SSPs on existing programs is one of the Senate's main concerns and should be included here.

Comment [rl12]: Revise to read "are to be held", not "should be held". "Should" is guideline language, not policy language.

Comment [rl13]: See comment above.

Comment [r14]: I made these sentences black and white, as far as quality and senate oversight of this quality.

Comment [cs15]: Faculty workload issue must be addressed here and more explicitly in guidelines.

IV. Initiation, Approval, and Review Procedures for New Self-Supporting Programs

A. Departments, groups of departments, or schools offering graduate degree programs under the jurisdiction of a Graduate Division may propose self-supporting programs.

B. Self-supporting programs should originate with an academic unit that is already authorized to conduct graduate work on the campus at the level that is at least equal to the level of the proposed graduate program.

C. The establishment of any new self-supporting graduate program shall be approved by the campus Graduate Council, Divisional Senate, Systemwide Academic Senate, campus administrators, the Chancellor, and the UC President according to established procedures and requirements as specified in the Compendium of Universitywide Review Processes for Academic Programs, Academic Units, & Research Units.[3]

Comment [cs16]: Incorporate points in CCGA's March 2011 memo to Divisional Graduate Councils on the review of proposed new SSPs.

campus o/the University, a program of graduate instruction designed to satisfy, in full or in part, the requirements for that degree. See http://www.universityofcalifomia.edulsenate!manuallrpart3.html#r690

[2] SR 694. See footnote 1

[3] *The UC Office of the President (UCOP) and the CCGA review proposals for all new graduate degree programs, including self-supporting and professional degree programs. Self-supporting graduate degree programs must adhere to the same UC academic standards as do other graduate degree programs* (Compendium, January 2011).

E. Graduate Councils or other duly appointed campus review bodies appointed by the Academic Senate shall review such programs as part of regularly scheduled campus program reviews, on the same basis on which regular academic programs are reviewed. Once established, the self-supporting program will be under the purview of the divisional Graduate Division, if appropriate,[4] to ensure adequate progress of students according to campus criteria.

E. If approved, such programs shall be conducted in accordance with this Policy.

F. Courses for self-supporting programs are subject to normal campus procedures for approval (i.e., approval by Committee on Courses [see Implementation Guidelines]).

V. Admission and Enrollment

A. Admission standards for self-supporting programs should be comparable in effect to those in effect for the state-supported programs. In many cases, there will be no comparable state-supported programs.

B. Students must be admitted to a Graduate Division through the regular admissions process in order to enroll in any program established under this policy.

C. Access to courses offered as part of these programs must be equally available to all qualified students. No preference in enrollment may be given to members of any non-University organization.

D. Admissions criteria may specify some type or period of work experience in the field, as applicable to the specific graduate degree proposed.

VI. Program Funding and Student Tuition and Fees

A. Self-supporting programs will not be funded from State General Funds and reports of state funded enrollments will exclude students in self-supporting programs. However, these enrollments will be reported to the Office of the President as a separate category which is not counted against the campus budgeted (state-funded) enrollment target. During the approved phase-in period, distribution of enrollment between state and non-state targets will conform to specifications of the phase-in plan.

B. The President is responsible for reviewing and approving any proposed program tuition and fees for self-supporting graduate degree programs and subsequent increases or decreases. The President will report annually to Tthe Regents on self-supporting graduate programs and their tuition and fee levels.

C. Programs administered in cooperation with UC Extension shall follow all requirements of this policy, and tuition and fees must be set to cover all program costs as defined in LB, above.

Comment [r17]: what does LB refer to here and in the paragraph below?

D. Self-supporting program tuition and fees should be levied such that they will cover all program costs after a short phase-in period.

E. Self- supporting program tuition and fees should be based on a full and accurate assessment of all program costs as defined in LB. The proposed self-supporting program tuition and fees, its phase-in plan, and its justification shall be submitted with the proposal for the program to the President. When the self-supporting program tuition and fees have been fully implemented, no State General Funds (including student tuition and/or fee revenue from sources other than the program) will be provided to the program. Non-State funds can be used for a self-supporting program if a campus determines that it is necessary to meet a critical strategic need. If the program fails to reach self-support in line with its phase-in plan, state funds will be withdrawn from its support. Self-supporting programs will be periodically

Comment [r18]: clarification needed here - does this imply that partial state support can continue during the phase-in period?

[4] Some degrees in professional schools are under Graduate Council and CCGA jurisdiction.

reviewed by campus and/or systemwide audit to assure compliance to policy.

F. University employees enrolled in self-supporting degree programs are not eligible for reduced course tuition and fees. However, this provision does not preclude the option of the employee's department subsidizing a portion of the tuition and fees.

G. Program deficits including any deficits during the phase-in period, will be covered by the campuses; state funds cannot be used to cover any deficit. Campuses are encouraged to identify in advance one fund source to be used to cover deficits.

H. State-supported and self-supporting programs must separately account for their use of resources. Campuses shall not charge a "blended" tuition and fee level for any course or program (i.e., a program tuition and fee level that combines state-supported and self-supported students). However, self-supporting and state-supported students can be enrolled in the same courses so long as there is separate accounting for the self-supporting and state-supplied costs.

Comment [r19]: we need to consider adding more detail about this issue of combining state-supported and self-supported students in the same course, at least in the implementation guidelines - this is not well understood by program proposers and reviewers.

I. Self-supporting programs must have an articulated financial accessibility goal for their students and a student financial support plan for achieving their goal. Examples of possible student financial support plan components include providing scholarships or grants from the program's own resources (e.g., return-to-aid from program tuition and fees assessed but not from state funds or tuition and/or fees charged to students in state-supported programs, or funds raised through private philanthropy), providing tuition and fee waivers, participation in federal and/or private loan programs, and participation in other external support programs such as veterans benefits. Self-supporting programs are responsible for meeting the administrative requirements and costs of financial aid program participation.

VII. Conversions of State-Supported Programs to Self-Supporting Programs

Comment [cs20]: Consensus at the Nov. 8 meeting was that conversions should have different criteria and the policy should be distinct from the establishment of new SSPs.

Comment [r21]: I would like to suggest that this is a component of the policy that requires the most work, and that CCGA should be very involved in recommending language for this component. If we want to avoid difficulties with future programs that propose conversion, it is best to work with CCGA so that the committee "owns" the language that becomes policy.

REVISION HISTORY

This policy supersedes the Presidential policy of the same name dated June 24, 1996 and any guidance issued by the Budget Office prior to the issuance date of this revision.

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Comment [cs22]: Implementation guidelines should provide a clear set of steps to be followed and perhaps an Appendix with budget templates.

Comment [cs23]: See Feb. 11, 2011 Dan Simmons letter to Provost Pitts. Although it is a response to an earlier draft of the SSP policy, it details the Senate's main concerns and makes specific implementation suggestions for alleviating those concerns.

Implementation Guidelines for the Policy on Self-Supporting Graduate Degree Programs

Program Approval

For new self-supporting graduate degree programs, campuses should obtain required program approvals. The establishment of any new self-supporting graduate program shall be approved by the campus Graduate Council, Divisional Senate, Systemwide Academic Senate, campus administrators, the Chancellor, and the UC President according to established procedures and requirements as specified in the *Compendium of Universitywide Review Processes for Academic Programs, Academic Units, & Research Units.*

Cost Analysis and Tuition & Fee Approval Request

All programs must submit an annual cost analysis to Budget and Capital Resources. This analysis includes an estimate of average costs for the campus and school in addition to direct program costs. Program costs include the direct costs of staff and faculty salaries and benefits, supplies and equipment, and financial aid. Campus and school costs are the indirect costs for items such as instruction, research, public services, academic and administrative support, and operation and maintenance of the plant.

Programs are expected to demonstrate that student tuition and fees cover full direct and indirect costs, and, to the extent that program tuition and fee revenue is insufficient to cover these costs, that only non-State fund sources (excluding student tuition and/or fee revenue from sources other than the program) are used to subsidize the program.

In addition to the cost analysis, campuses must submit a program tuition and fees approval request letter to the

Vice President – Budget and Capital Resources for all of their proposed self-supporting programs. Campuses must provide requested program tuition and fee levels and the percentage tuition and fee increases for each program, as well as provide information about upcoming new programs and programs operated by University Extension.

Newly proposed self-supporting programs submit the same cost analysis to Budget and Capital Resources.
Programs are expected to become fully self-supporting within three years, though campuses may continue to subsidize programs with non-State funds (excluding student tuition and/or fee revenue from sources other than the program) at their discretion. Program deficits including any deficits during the phase-in period, will be covered by the campuses; state funds cannot be used to cover any deficit. Campuses are encouraged to identify in advance one fund source to be used to cover deficits.

Faculty FTE

All faculty must be funded directly from the revenue of self-supporting programs in proportion to the faculty member's workload commitment to the program, or the program must reimburse an amount equivalent to the cost of faculty time. This includes the involvement of faculty from other departments. Alternatively, faculty can be paid for overload teaching within the 120% salary limitation that governs teaching in University Extension. Appropriate campus review committees should be vigilant to ensure that the overload option and 120% salary limitation are used appropriately. CAN WE ADD IN HERE THAT FACULTY CAN ALSO BE COMPENSATED BY DIRECTING THE FUNDS TO THEIR RESEARCH ACCOUNT?

Enrollments

Because enrollments in these programs are self-supported, they should not be included in counts of state-supported enrollment. Programs should be identified in the Corporate Student System by a separate major code and attribute flagging the enrollment as self-supporting.

Timeline

Campuses receive cost analysis templates for the next academic year in December, as well as the previous year's actual self-supporting enrollment numbers from the Corporate Student System. Campus financial statements, used in the preparation of the cost analysis, are posted online late in the month. Detailed instructions for the program tuition and fees approval request letter are also given at this time.

Templates and letters are due back to Budget and Capital Resources (BCR) by March 1. After review by BCR, templates and a summary of program tuition and fee requests are given to the President for approval, which usually happens by April. Campuses are then notified of approved program tuition and fee levels for the upcoming academic year. This information is also reported to The Regents annually.