A New Instructional Program
for a Graduate Certificate in Management for Science Professionals

June 2007

Oregon State University
College of Science

1. Certificate Program Overview

a. Proposed CIP number: 301801

b. Brief overview including description and rationale:

People working in science or science-related fields typically receive no formal training in management, communications, ethics or professional technical skills. However, a variety of individuals employed as researchers in managerial positions, small business owners, veterinarians, pharmacologists, private consultants, or government employees often need such skills to perform their everyday work. This 19-credit Graduate Certificate is designed specifically for science majors and mid-career professionals. Recipients of the Certificate will successfully develop and manage private science-based practices in medicine and biology, effectively run research laboratories, broadly communicate with diverse groups of people, and think critically about the work in which they are engaged.

These courses are also required for Professional Science Master’s (PSM) students at Oregon State University (OSU). The PSM is a unique science graduate degree because students are required to complete an internship in lieu of research and take additional courses in communications, business management, and ethics. At OSU, PSM options are currently offered in Applied Biotechnology, Applied Physics, Environmental Sciences, and Applied Systematics in Botany. Graduates can serve as effective liaisons between the marketing and research development arms of industry.

The Graduate Certificate in Management for Science Professionals consists of eight courses emphasizing four key topic areas:
- management, finance and organizational principles (9 units in which courses are taught sequentially),
- communications (3 units),
- ethics (3 units), and
- professional skills (4 units taught over 3 terms).

An online version of this Certificate Program is planned, which will:
- enable entire PSM programs at OSU to be offered via distance education,
- increase student recruitment, including non-PSM degree seeking students,
- create opportunities for curriculum sharing with other PSM programs in the U.S., and
- improve capacity to develop additional PSM degree programs at OSU.

Graduates of this Certificate Program will receive recognition for completing the professional training, which currently can only be achieved through an assemblage of disjointed courses or a two-year intensive MBA Program designed more for business majors.

c. When will the program be operational, if approved?
2. Course of Study

a. Briefly describe proposed curriculum.

Course topics were developed based on feedback received from industry representatives during PSM program development workshops held at OSU in June 2001 and December 2003. Additional information from other universities, OSU students, non-governmental organizations, and government agencies obtained during annual workshops for the last several years has continued to upgrade and augment the curriculum.

We are requesting a new course designator (PSM). The Graduate Certificate consists of 19 units:

- PSM 565 Accounting and Finance for Decision-Making (3 units)
- PSM 566 Marketing and Management (3 units)
- PSM 567 Innovation Management (3 units)
- COMM 512 Communication and the Practice of Science (3 units)
- PHL 547 Research Ethics (3 units)
- PSM 511 Professional Science (1 unit)
- PSM 512 Professional Science (1 unit)
- PSM 513 Professional Science (2 units)

b. Describe new courses; include proposed course numbers, titles, credit hours, and course descriptions.

Existing courses include Communication and the Practice of Science (COMM 512), which is currently offered under Topics in Speech Communication through the Department of Speech Communication. Research Ethics (PHL 547) is currently offered through the Department of Philosophy.

The Professional Science series (PSM 511, 512, 513) evolved to address specific professional training needs in public speaking, website design, conducting and giving interviews, professional etiquette, leadership, teamwork, and development of multi-media portfolios. Management classes (PSM 565, 566, 567) are specially designed for science majors to provide a practical understanding of business skills in finance, marketing and entrepreneurship that will be useful in the workplace.

Complete descriptions of all courses for the PSM certificate are attached as Appendix A.

c. Provide a discussion of any non-traditional learning modes to be utilized in the new courses, including, but not limited to: 1) the role of technology, 2) the use of career development activities such as internships.

An online version of this Graduate Certificate will be offered, and a development grant from e-campus has already been awarded pending approval of this Category I proposal. The ability to offer the Certificate on-line will significantly increase student access beyond the OSU campus and create opportunities for curriculum-sharing with other universities interested in developing complementary professional programs of study.
The Graduate Certificate in Management for Science Professionals fosters career development and expansion of scientific skills to produce graduates capable of effectively and productively interacting with co-workers in business and scientific fields. The management courses were designed after careful consideration regarding content, learning sequence, and presentation style. Professors and students at five universities that also offer PSM programs with professional training components were visited in 2004, and they were queried about teaching style and learning effectiveness. Integration, synthesis, and application characterize successful teaching methods, particularly when educating science-based students in business concepts. Integrative learning occurs when students are asked questions like, “Which company would you buy stock in?” Answering such questions requires them to understand financial statements, market trends, leveraging, and other business concepts, not typically taught to science-based students. There is a steep learning gradient that exists as students progress from didactic lectures to demonstrations and finally hands-on learning opportunities. When students work in teams on various projects, they must synthesize their communication, business, and scientific skills.

The PSM 511 class requires students to complete service learning projects (examples in Appendix B), which engages them in their community and creates opportunities to apply their skills and interests in meaningful ways. Students determine the duration, breadth and depth of their individual projects. Students design their own websites in PSM 512, which becomes part of their multi-media portfolio. They also learn to conduct and give effective interviews, utilizing video resources at the OSU Career Services Center. The PSM 513 spring-term course is designed around case study projects, which serve as integrative experiences where students apply their collective business, communication, and scientific skills. These projects are developed and mentored by working professionals from various organizations and disciplines (examples in Appendix B). Student teams develop project management plans, work together to solve real-time problems, and then share results through final reports and on-site presentations.

Unlike most graduate-level courses, comprised of similar discipline-cohorts, this certificate includes students representing a wide range of science-based careers. It sets the stage for interdisciplinary communication and broad-based learning opportunities.

d. What specific learning outcomes will be achieved by students who complete this course of study?

Certificate graduates with this will have an understanding of:
- Basic concepts in accounting and finance, marketing, project management, and entrepreneurship
- Interpersonal and organizational communication styles
- Ethical issues in scientific and social settings
- How to integrate scientific information with business, management, and communication skills to problem solve and work effectively as part of a multi-disciplinary team.

Specific course learning outcomes include:

**PSM 565: Accounting and Finance for Scientists**
- Apply fundamental accounting principles for different types of organizations and interpreting financial statements of these organizations
- Understand how to use activity-based cost analysis and performance measurement analytics
- Follow business cycle fluctuations, free market dynamics, and inflation trends

**PSM 566: Management and Marketing Scientific Technologies**
- Draft a project management plan that includes work breakdown structures, time and cost components, project control and quality parameters
- Adapt marketing concepts (research, target positioning, pricing, and methods of promotion) to develop new products or services

**PSM 567: Innovation Management**
- Develop a business plan to commercialize a new technology, product or service
- Understand how to structure small business enterprises and non-profit organizations
- Explore sustainable business practices

**COMM 512: Communication in Science and Industry**
- Write and give presentations on various topics to diverse audiences
- Learn how to work effectively in teams, engage in collaborative decision-making, and negotiate
- Engage in different styles of interpersonal communication and understand organizational communication strategies

**PHL 547: Research Ethics**
- Learn problem-solving methodologies that can be used to deal with ethical issues in scientific, business, and social settings
- Explore organizational business and cultural values and how they affect the practice of science and conservation
- Understand guidelines relating to patent, trademark, copyright, and authorship issues

**PSM 511: Professional Skills**
- Draft effective cover letters and resumes, organize a multi-media portfolio
- Create PowerPoint presentations and become an effective, adaptable speaker
- Initiate a service-learning project to connect with the community and integrate professional and scientific skills

**PSM 512: Professional Skills**
- Develop leadership and teamwork skills
- Learn how to write effective job descriptions as well as conduct and participate in job interviews
- Create a personal website

**PSM 513: Professional Skills**
- Integrate science, business management, and ethics principles
- Apply interdisciplinary communication and teamwork skills
- Enhance creative thinking, writing, presentation, and public speaking skills

**e. Is there a maximum time allowed for a student to complete this program? If so, please explain.**
Students can work through the program in a timeframe that fits their own schedule, although ideally they will complete the Certificate in one academic year, working with the same cohort of students. Individuals will be bound by normal Graduate School guidelines and timelines (e.g., completing a Master’s degree within a 7-year time period).

3. Accreditation of the Program

a. If applicable, identify any accrediting body or professional society that has established standards in the area in which the proposed program lies.

There is currently no organization that accredits this type of Graduate Certificate.

b. If applicable, does the proposed program meet professional accreditation standards?

N/A

4. Evidence of Need

a. What evidence does the institution have of need for the program? Please be explicit.

The PSM degrees at OSU (http://professionalmasters.science.orst.edu) require courses currently offered through the proposed Graduate Certificate, and clearly address the needs recognized and articulated by key organizations like the Sloan Foundation and CGS (http://sciencemasters.com/)—see below.

The Graduate Certificate in Management for Science Professionals packages the additional training (also known as “plus” courses) provided in the PSM degree. Students majoring in scientific disciplines are drawn to these types of courses because they recognize how the training enhances their career options by adding value and versatility to their skills-base. We receive at least 10 to 12 inquiries per year from students interested in taking the “plus” PSM courses. Letters of support for this Graduate Certificate from the Dean of the College of Forestry and Associate Dean of the College of Agricultural Sciences (Appendix C) indicate interest from these scientific disciplines. Veterinary and pharmacy students also benefit from this training; however, their heavy course loads preclude their participation until graduation.

As an online option, this Graduate Certificate represents another step towards making entire PSM degree programs available via distance education.

b. Identify statewide and institutional service-area employment needs the proposed program would assist in filling. Is there evidence of regional or national need for additional qualified individuals such as the proposed program would produce? If yes, please specify.

Over 6 years ago, the Alfred P. Sloan Foundation provided seed money for development of PSM degrees at major universities. OSU was one of the grant recipients. These non-thesis Master of Science degrees emphasize interdisciplinary studies that integrate natural sciences and mathematics with training in management, communication, and professionalism. Students acquire skills in analytical thinking, problem solving, and gain
real-world experience through internships. A quote from USA Today summarizes the PSM degree in this way:

“The PSM is being called the MBA for scientists and mathematicians. It's an education aimed at future managers who will be able to move comfortably in the business of science.”

The Council of Graduate Schools (CGS) recent report “Graduate Education: The Backbone of American Competitiveness and Innovation” recommends:

“...support for innovative graduate education programs, such as professional master's degrees, which respond to workforce needs…”

There is a regional and national need to provide this type of training to people with careers in science and mathematics. Organizations need people who are comfortable in the worlds of both science and business. Letters of support for this Graduate Certificate come from a variety of government agencies, industries, and small businesses interested in hiring these graduates and attest to this need (Appendix C). Graduates with the Certificate can serve as effective liaisons between the scientific and business arms of different organizations and agencies. Graduates will also be capable of running private practices, managing small business enterprises, or serving in managerial research positions for larger companies or agencies.

c. **What are the numbers and characteristics of students to be served? What is the estimated number of graduates of the proposed program over the next five years? On what information are these projections based?**

Each year, OSU accepts between 10-15 new PSM students into its Applied Systematics in Botany, Applied Physics, Environmental Sciences, and Applied Biotechnology tracks. More PSM tracks are envisioned and each program has capacity for approximately 10 students per year. Conservatively, we estimate that another 50 to 60 non-PSM students will register for the Certificate each year (on campus and via distance education) in about 3 years.

As an online option, PSM students from other universities gain access to OSU’s “plus” curriculum required for their degree programs. The National PSM Association (NPSMA) recently conducted a survey of its members. These members indicated a strong interest in curriculum sharing among institutions offering PSM degrees. Development of the “plus” training required has been a challenge for many institutions, which our Certificate could easily overcome by sharing relevant courses via distance education. There are currently over 100 PSM programs offered at 50 universities across the U.S. (map next page), and these programs potentially represent significant numbers of students interested in OSU’s Certificate in Management for Science Professionals.
However, the Graduate Certificate in Management for Science Professionals would also be available to non-PSM students. Individuals who recently completed their undergraduate training often seek graduate degrees to learn additional skills. Others want to re-tool in their existing fields or advance in their current positions of employment. These students would all be able to register for this Graduate Certificate.

Traditional courses offered on campus have a capacity of approximately 20 students. Additional students can only be accepted if more sections are added. However, significantly greater numbers of students could be accommodated through an online offering of the Graduate Certificate in Management for Science Professionals, as currently envisioned.

d. Are there any other compelling reasons for offering the program?

The Graduate Certificate in Management for Science Professionals is unique and addresses a compelling need in the field of science and mathematics.

e. Identify any special interest in the program on the part of local or state groups (e.g., business, industry, agriculture, professional groups).

Special interest in the type of training offered through this Graduate Certificate has been expressed by numerous individuals, agencies, and organizations. A letter of support from Senator Ron Wyden (Appendix C) acknowledges that “the Graduate Certificate in Management for Science Professionals will enable individuals to bridge the gap between business and science in a variety of workforce sectors…” Congresswoman Darlene Hooley shares that opinion and offers that “expanding the PSM programs to include a Graduate Certificate will provide a wonderful opportunity for students outside the PSM program area who are interested in gaining critical professional skills.”

Professional associations such as Associated Oregon Industries (AOI), which represents more than 20,000 businesses in the state, and the Oregon Bioscience Association (OBA) are both strong proponents of OSU’s PSM program and the proposed Graduate
Certificate. John Ledger, Vice President for External Affairs of AOI, and Bob Lanier, Executive Director of OBA, both serve on the OSU PSM Advisory Board.

Large and small businesses (e.g., Hewlett Packard, Chemica Technologies, Inc. and ViewPlus Technologies) are interested in the proposed Graduate Certificate in Management for Science Professionals, as are state government agencies (Oregon Department of Fish & Wildlife), and those affiliated with agriculture and forest industry sectors (see letters of support in Appendix C).

f. Discuss considerations given to making the complete program available for part-time, evening, weekend, and/or place bound students.

The $75,000 grant from e-campus will help create an online version of the Graduate Certificate in Management for Science Professionals, thereby allowing access for individuals who would simply like to work on the certificate part-time (5-7 units/term to finish in one academic year) or full-time (in conjunction with another graduate program). Students would then be able to complete the Certificate by working online whenever and wherever they currently live.

While exploring what types of teaching styles worked best for this type of curriculum and audience, we came across an excellent example of an online master’s degree program at Michigan State University. That program requires students (from all over the world) to gather on campus for 5-6 weeks at the beginning of their degree program to learn about challenging topics in person and meet and connect with one another. We hope to develop our online Graduate Certificate curriculum using a similar format.

5. Similar Programs in the State

a. List all other closely related OUS programs.

Various MBA programs incorporate elements of what will be taught through the Graduate Certificate in Management for Science Professionals, but such programs are not designed for science majors. Single course offerings sometimes attempt to address the recognized need within an MBA degree, but currently no program exists for science majors like the one being proposed. Letters from Oregon state legislators, previously referenced, underscore the value of the Graduate Certificate in Management for Science Professionals.

In the Pacific Northwest, OSU is currently the only university offering PSM programs and this Certificate is similarly unique.

b. In what way, if any, will resources of other institutions (another OUS institution or institutions, community college, and/or private college/university) be shared in the proposed program?

All resources necessary for the Graduate Certificate in Management for Science Professionals are located at OSU.

c. Is there any projected impact on other institutions in terms of student enrollment and/or faculty workload?
There are no projected impacts on other institutions in terms of student enrollment and/or faculty workload; however, as an online option, PSM students from other universities gain access to OSU’s “plus” curriculum, required for their degree programs. The courses in the Certificate Program are transferable to other graduate programs depending on the requirements of the Department, College, and University administering the degree.

6. Resources

a. Identify program faculty, briefly describing each faculty member's expertise/specialization. Separate regular core faculty from faculty from other departments and adjuncts. Collect current vitae for all faculty, to be made available to reviewers upon request.

Core Faculty:

To be identified; College of Science, OSU (PSM 565, 566, and 567)

   Instructor: Will have training and experience in both business management and science; teaches courses in accounting, management, marketing and entrepreneurship with applications in science-related fields; also assists with outreach and development of internship opportunities for OSU’s PSM Program.

   Gregg Walker; Speech Communications, OSU (COMM 512)

   Professor: Previous chair of the Department of Speech Communication, adjunct professor of Forest Resources, and Director of the Peace Studies program; teaches courses in conflict management, bargaining and negotiation, mediation, international negotiation, natural resources decision making, and peace studies; conducts training programs on collaborative decision making, designs collaborative public participation processes, facilitates collaborative learning community workshops about natural resource and environmental policy issues, and researches community-level collaboration efforts.

   Jonathan Kaplan; Philosophy, OSU (PHL 547)

   Associate Professor: Explores the relationship between developmental and evolutionary biology, especially the importance of non-genetic heritable variations in developmental resources for evolutionary innovations; teaches biomedical ethics, scientific reasoning, philosophy of biology, and reasoning and writing.

   Ursula Bechert; College of Science, OSU (PSM 511, 512, and 513)

   Director of Off-Campus Programs: Teaches professional development courses for graduate science majors; directs development of PSM programs as well as international programs; research in reproductive biology of wildlife species, development of novel diagnostic and population management tools, nutritional and pharmacological studies; international collaborative research in southern Africa, primarily Botswana.

b. Estimate the number, rank, and background of new faculty members who would need to be added to initiate the proposed program in each of the first four years of the proposed program's operation (assuming the program develops as anticipated). What commitment does the institution make to meet these needs?
One new faculty member will be required to deliver this Certificate Program. This person will be hired as an instructor during the first year of the Certificate. He/she should have a graduate degree (MS or PhD) in science and an MBA or formal training in business management. Work experience in industry, research and/or academia is desirable. In addition to teaching accounting, management, marketing and entrepreneurship with applications in science-related fields (PSM 565, 566, and 567), this individual will assist with outreach and development of internship opportunities for PSM students at OSU.

A letter from the Dean of the College of Science (Appendix C) confirms the institution’s commitment to meet this need. No other additional hires are needed for this Certificate Program.

c. **Estimate the number and type of support staff needed, if any in each of the first four years of the program.**

No additional support staff will be needed to develop and deliver this Certificate. A grant from e-campus ($75,000) will facilitate conversion of traditional courses to online options. Recruitment efforts will be folded into current PSM student recruitment activities. An existing 0.2 FTE PSM Coordinator position will assist with the student application process, and a review committee, composed of core Program faculty, will review applicant materials for admission.

d. **Describe the adequacy of student and faculty access to library and department resources that are relevant to the proposed program.**

Information can be readily accessed by students enrolled in the Certificate Management for Science Professionals Program on the OSU campus.

e. **How much, if any, additional financial support will be required to bring access to such reference materials to an appropriate level? How does the institution plan to acquire these needed resources?**

No further acquisitions are required. Reference material currently available is adequate.

f. **Identify any unique resources, beyond those on hand, necessary to offer this program. How does the institution propose that these additional resources will be provided?**

No unique resources are required.
APPENDICES

Appendix A: Course Descriptions

List of Proposed Courses

PSM 511: Professional skills (1 unit)
PSM 512: Professional skills (1 unit)
PSM 513: Professional skills (2 units)
COMM 512: Communication in science and industry (3 units)
PHL 547: Research ethics (3 units)
PSM 565: Accounting and finance for scientists (3 units)
PSM 566: Management and marketing scientific technologies (3 units)
PSM 567: Innovation Management (3 units)

Appendix B: Service-Learning and Case Study Project Examples

Appendix C: Letters of Support

Oregon State University
Sherman Bloomer, Dean, College of Science
Ilene Kleinsorge, Dean, College of Business and Sherman Bloomer, Dean, College of Science
Stella Coakley, Associate Dean, College of Agricultural Sciences
Hal Salwasser, Dean, College of Forestry
Mark Merickel, Associate Dean, Extended Campus
Courtney Campbell, Chair, and Jonathan Kaplan, Associate Professor, Dept. of Philosophy
Charlotte Headrick, Acting Chair, Department of Speech Communication

Government Representatives
Ron Wyden, U.S. Senator, Oregon
Darlene Hooley, State Representative, Oregon
Doris Matsui, State Representative, California
Jennifer Bond, Senior Advisor, Council on Competitiveness

Industry and Government Agency Advisors
John Ledger, Vice President of External Affairs, Associated Oregon Industries
Takuji Tsukamoto, President and CSO, Chemica Technologies, Inc.
Linda Amedo, Business Systems Manager, Hewlett-Packard Company
John Gardner, President, ViewPlus Technologies
Charlie Corrarino, Conservation and Recovery Program Manager, Oregon Department of Fish and Wildlife

Appendix D: Budget
Appendix A: Course Descriptions

PSM 511: Professional skills (1 unit)

Instructor: Ursula Bechert

Offered: Fall term

Course description: Students create their own multi-media portfolios, initially refocusing career goals and learning to draft effective cover letters and resumes. They organize PowerPoint presentations, practice public speaking, attend a professional networking and dining etiquette workshop, and initiate a service-learning project that engages them in the community and complements their scientific discipline.

Approach: The class meets weekly for one hour and provides students a chance to further focus their career goals through group discussions, networking, exploring potential employment opportunities, and completing a service-learning project. Students also learn through the process of evaluating each others' work, engaging in reviews of cover letters and resumes, and providing objective feedback on presentations. Hands-on learning is emphasized by involving students in activities throughout the term.

Timeline:
Week 1 define career goals; overview of multi-media portfolios; update resume and draft cover letter for prospective employer; evaluate classmates' cover letters and resumes
Week 2 discuss evaluations of cover letters and resumes; begin defining service-learning project opportunities
Week 3 networking styles; dining etiquette (workshop)
Week 4 define elements of a good talk and create an effective PowerPoint presentation
Week 5 conduct job and internship searches; explore available resources
Week 6 service-learning project; PowerPoint presentations
Week 7 service-learning project PowerPoint presentations
Week 8 service-learning project PowerPoint presentations
Week 9 service-learning project PowerPoint presentations
Week 10 service-learning project PowerPoint presentations
Week 11 finals week; class evaluations

Grading: The class is graded A/F based on completion of assignments and initiation, but not necessarily completion, of the service-learning project, which will have a variable timeline dependent on the nature of the project.
PSM 512: Professional skills (1 unit)

Instructor: Ursula Bechert

Offered: Winter term

Course description: The course includes workshops on leadership, making working groups effective, and conducting and giving interviews. Students also develop their own websites to incorporate into their multi-media portfolios and continue working on their service-learning projects, if they did not complete them fall term.

Approach:
This class meets weekly for one hour and, through group discussions and individual tests, allows each student to explore the qualities that define their own style of leadership. Students learn team building techniques through experiential group activities that complement lectures. They also develop interview skills through opportunities to serve as both the interviewer and as the person being interviewed. Students use job descriptions they drafted based on personal career interests. Facilities at Career Services on the OSU campus are used to videotape interviews, giving each student unique insight into how they present themselves. Each student also learns the basics of web design and creates his/her own website to add to their multi-media portfolio.

Timeline:
Week 1 leadership skills
Week 2 web design: survey of tools and methods Part I
Week 3 web design: survey of tools and methods Part II
Week 4 web design: writing for the web
Week 5 writing a job description; skills for interviewing and being interviewed
Week 6 interview sessions
Week 7 web design: online media
Week 8 web design: how to promote your online presence
Week 9 making working groups effective Part I
Week 10 making working groups effective Part II
Week 11 finals week; class evaluations due

Grading:
The class is graded A/F based on completion of assignments.
Course description: The class provides an integrative learning experience by giving students opportunities to apply their collective management, communication, and scientific skills to real-time case study projects. These projects are developed and mentored by working professionals from various disciplines. Student teams work together to solve problems and share results through final reports and on-site presentations. One or two projects are completed per term, based on the amount of work involved per project.

Approach:
The class meets weekly for two hours, and students are expected to work together outside class time based on project needs. Off-campus mentors initially make presentations and share background information about particular projects. Specific objectives are then addressed by the class working together. A project management plan, drafted by the students, further details individual responsibilities and guides team efforts. Project outputs include a final report and PowerPoint presentation. Thus, students develop interdisciplinary communication and teamwork skills; enhance their creative thinking, writing, presentation, and public speaking skills; build self-confidence by applying concepts previously learned in separate classes; and further expand and integrate knowledge particularly with respect to management and science. Guided team and self evaluations provide insightful feedback for each student about his/her performance as a team member at the conclusion of the project.

Timeline:
Week 1  “crossing the chasm” – bringing new technologies/services to market
Week 2  introduction to case study
Week 3  mentoring (working professionals answer questions and provide general project guidance; the team typically works on the project outside class time)
Week 4  mentoring; project management plan due
Week 5  mentoring
Week 6  mentoring
Week 7  mentoring
Week 8  mentoring
Week 9  turn in drafts of final report and PowerPoint presentation for feedback from working professionals and instructor
Week 10  PowerPoint presentation; final report due
Week 11  finals week; class and team evaluations due

Grading:
The class is graded A/F based on completion of assignments, specifically the project management plan, final report, and PowerPoint presentation.
COMM 512: Communication in Science and Industry (3 units)

Instructor: Gregg Walker

Offered: Fall term

Course description: Topics in this class include teamwork and collaborative decision-making; interpersonal and organizational communication; writing for and making presentations to diverse audiences; negotiation and consensus building; as well as persuasion and influence.

Approach:
The class meets twice weekly for 1½ hours to encourage discussions. Gregg Walker serves as the lead instructor and four other faculty members contribute to the course based on their areas of expertise (outlined below). Students explore different communication styles and give a formal presentation at the end of the term.

Timeline:

Week 1 communication theory; conflict resolution; negotiation; environmental policy and decision-making; mediation (Gregg Walker)
Week 2 interpersonal communication; gender and communication – Part I (Judy Bowker)
Week 3 interpersonal communication; gender and communication – Part II (Judy Bowker)
Week 4 communication in organizations; team management; team building; decision-making – Part I (Celeste Walls)
Week 5 communication in organizations; team management; team building; decision-making – Part II (Celeste Walls)
Week 6 intercultural communication; international and health communication – Part I (Lily Arasaratnam)
Week 7 intercultural communication; international and health communication – Part I (Lily Arasaratnam)
Week 8 persuasion and influence in communication; mediated communication; video production and effects; media aesthetics; media law – Part I (Laura Wackwitz)
Week 9 persuasion and influence in communication; mediated communication; video production and effects; media aesthetics; media law – Part II (Laura Wackwitz)
Week 10 student presentations
Week 11 student presentations

Grading:
The class is graded A/F based on completion of assignments and the final presentation.
Instructor: Jonathan Kaplan

Offered: Winter term

Course description: The course provides a basic understanding of: 1) responsible conduct in scientific research (e.g., guidelines relating to patent, trademark, copyright, and authorship issues), 2) scientific ethics and corporate culture, and 3) cultural impacts on decision-making processes, science, and societal values. In addition, the course covers recent trends such as the increased politicalization of science and the difficulties engendered by particularly strong economic incentives (e.g., start-up pharmaceutical and biotechnology companies).

Approach:
The class meets twice weekly for 1½ hours to encourage discussions. Various case studies, both historical and recent, are used to introduce and illustrate particular kinds of ethical problems that arise in scientific research and in the commercialization of particular kinds of results. Students become familiar with ethical problems they might face in their professions, identify ethically problematic situations, explain what aspects of those situations are ethically problematic, and then explain why those situations are ethically problematic.

Timeline:
Week 1 introduction to ethical theory and reasoning
Week 2 social nature of scientific research and discovery
Week 3 fraud, fabrications and wishful thinking
Week 4 use of human and non-human animals in research; contemporary guidelines and IRB systems
Week 5 authorship, credit, and peer review issues
Week 6 conflicts of interest: money, politics, policy and power – Part I
Week 7 conflicts of interest: money, politics, policy and power – Part II
Week 8 risks, benefits, and the “public good”; researchers allegiance – Part I
Week 9 risks, benefits, and the “public good”; researchers allegiance – Part II
Week 10 student presentations
Week 11 student presentations

Grading:
The class is graded A/F based on completion of assignments and the final presentation.
PSM 565: Accounting and Finance for Scientists (3 units)

Instructor: To be identified

Offered: Fall term

Course description: The course frames accounting and financial issues, including the broader environment in which a variety of enterprises operate (e.g., corporations to non-profit organizations). Fundamental principles of accounting and financial analysis for different types of organizations are covered. Lectures on micro- and macro-economics include inflation, business cycle fluctuations, and free market dynamics.

Approach: The class meets twice weekly for 1½ hours. Students are assigned to 3-4 person teams, based on their different disciplinary backgrounds, to encourage communication skill-building opportunities. At the beginning of the term, each team chooses a company that serves as a model to illustrate key concepts (e.g., human resource management) that students explore through specific projects.

Timeline:

Week 1 Accounting I: fundamentals; assets; liabilities and equities; operating and maintenance expenses
Week 2 Accounting II: financial plans and budgets, reports for equity, common stock, loan or bond sales; sales on account and cash sales; effects of depreciation; balance sheets
Week 3 Accounting III: income and cash flow statements; operating and capital plans and budgets
Week 4 Accounting IV: alignment of company plans and goals with departmental budgets; how to prepare/use management reports, sales reports, and financial ratios
Week 5 Accounting V: regulatory, industry and income tax reporting; internal controls, fraud and embezzlement; internal and external audits
Week 6 Finance I: financial statements; cash flow, working capital, leverage, cost allocation systems, and tools that can be used to judge financial performance
Week 7 Finance II: use of present value as a decision making tool; analyzing capital budgeting problems using present value principles; leverage and impacts on financial results
Week 8 Finance III: basics regarding weighted average cost of capital; basics of fixed income, equities; how indexes work and strategies for investing long term
Week 9 Micro and Macro Economics I: determinants and influences of the national income, employment, inflation, and business cycle fluctuations; fiscal and monetary policy; free market dynamics, supply and demand
Week 10 Micro and Macro Economics II: use economics analysis to understand the market environment and influence business decisions; competitive forces in domestic and international markets; international trade; foreign trade financing instruments

Grading: The class is graded A/F based on participation, discussion responses, case studies, assignments and projects, papers, and examinations. Pre-assigned readings and on-line examinations optimize use of class time.
PSM 566: Management and Marketing Scientific Technologies (3 units)

Instructor: To be identified

Offered: Winter term

Course description: Project management emphasizes work breakdown structures, time and cost management, project control and quality, and human resources. Frameworks for management within a variety of entities (from non-profit organizations to large corporations) involved in science or science technologies are explored. Methods of market research, segmentation, target marketing and positioning, new product development, product life cycles, pricing, and promotion and distribution are addressed. The importance of the global market and cultural factors that affect marketing strategies are included.

Approach:
The class meets twice weekly for 1½ hours. Students are assigned to 3-4 person teams based on their different disciplinary backgrounds to encourage communication skill-building opportunities. At the beginning of the term, each team chooses a company that serves as a model to illustrate key concepts (e.g., human resource management) that students explore through specific projects.

Timeline:

Week 1 Project Management I: concepts; defining and aligning project objectives and business strategies; human resources; defining requirements and managing scope

Week 2 Project Management II: creating a work breakdown structure; project management plans; risk management

Week 3 Project Management III: time and cost management; documentation and communication; scheduling

Week 4 Project Management IV: resource consideration; cost planning and performance; project control and quality

Week 5 Operations Management I: strategic framework for operations in an organization; process design, analysis tools, and service operations issues

Week 6 Operations Management II: basic inventory management models; supply chain management concepts; use of information technologies

Week 7 Marketing I: systematic approach to structure, implementation, and analysis of marketing research for decision-making; models of consumer demand

Week 8 Marketing II: Market segmentation and positioning; pricing, new product development, packaging and design

Week 9 Marketing III: distribution and supply chain; consumer behavior; advertising; marketing communications; resources on marketing in a variety of economic sectors

Week 10 Planning Process and International Business: global market and adaptation; cultural factors that affect business transactions

Grading:
The class is graded A/F based on participation, discussion responses, case studies, assignments and projects, papers, and examinations. Pre-assigned readings and on-line examinations optimize use of class time.
PSM 567: Innovation Management (3 units)

Instructor: To be identified

Offered: Spring term

Course description: Commercialization of new scientific technologies, products and processes, technology transfer mechanisms, entrepreneurship, and development of a business plan are key topics. Legal topics include intellectual property; structuring small business enterprises, partnerships and corporations; regulatory issues; and sustainable business practices. Other topics include intellectual property management, management of scientists and engineers, business assessment based on the triple-bottom-line, and actual commercialization of products and services.

Approach:
The class meets twice weekly for 1½ hours. Students are assigned to 3-4 person teams based on their different disciplinary backgrounds to encourage communication skill-building opportunities. At the beginning of the term, each team chooses a company that serves as a model to illustrate key concepts (e.g., human resource management) that students explore through specific projects.

Timeline:
Week 1 Legal Topics I: structuring small private enterprises, non-profits, partnerships and corporations
Week 2 Legal Topics II: regulatory issues; liability issues and insurance; employment laws
Week 3 Entrepreneurship: concepts and roles; processes involved in identifying and defining opportunities in emerging industries; developing and refining business concepts
Week 4 Technology Evaluation and Commercialization Concepts I: commercialization of new technologies, products and services; technology transfer mechanisms including spin-offs, licensing, and high technology start-ups
Week 5 Technology Evaluation and Commercialization Concepts II: corporate processes for technology and product development, product market, and ownership strategies; development of a business plan
Week 6 Technology, Competition, and the Law I: intellectual property laws (e.g., patent, copyright, trademark) and their impact on management decision-making
Week 7 Technology, Competition, and the Law II: International differences in intellectual property law; relationship to torts, contracts and antitrust
Week 8 Quality Management: quality design and conformance; problems as opportunities to improve; decision-making and problem-solving based on data and facts
Week 9 Free Enterprise and Nature: end-of-life product design; environment protection legislation and the corporation; green production; development versus the wilderness
Week 10 Student Presentations: entrepreneurial ventures - business plans

Grading:
The class is graded A/F based on participation, discussion responses, case studies, assignments and projects, papers, and examinations. Pre-assigned readings and on-line examinations optimize use of class time.
Appendix B: Service-Learning and Case Study Project Examples

Previous examples of service-learning projects completed by PSM students include:

- **Organization and promotion of the biofuels learning center:** A team of PSM Applied Physics students collaborated with the OSU campus Biodiesel Initiative to develop a Biofuels Learning Center. The students defined the goals and organization of the Center, produced an informational brochure, and created a website for the Center.
- **Education garden for Waldorf Elementary School:** An Environmental Sciences PSM student wrote a proposal to make an education garden at a local K-8 school. The school accepted the proposal and granted space for the garden. A local nursery helped design and develop the garden, and future plans included securing outside funding for an onsite greenhouse.
- **High school biotechnology curriculum:** A team of Applied Biotechnology PSM students designed curriculum for high school students to help them learn more about biotechnology and genetic engineering, which they planned to offer though the OSU Saturday Academy.
- **Conservation of the Fender’s Blue Butterfly:** In cooperation with the Institute for Applied Ecology, a student in the Applied Systematics – Botany PSM program mentored four Philomath high school students throughout the year on habitat restoration projects to conserve the endangered Fender’s Blue Butterfly.

Some previous examples of case study projects are listed below:

- **Black & Veatch,** an environmental consulting firm, asked PSM students to create a business development plan to attract two new potential clients in the Portland OR and Vancouver WA region. Their final report and presentation were delivered at the Black & Veatch office in Lake Oswego.
- **Anderson Risk Analysis, Inc.** mentored students on a project conducted for the Salem Water/Wastewater Management Taskforce. The Taskforce and Mayor of Salem listened to the PSM students’ presentation on how Salem could reduce its mercury discharges into the Willamette River by 27 percent.
- **Willamette National Forest** challenged PSM students with two ethical case studies focused on the conservation of spotted frogs and spotted owls. Panel discussions were set-up by the students to share viewpoints and conservation plans of different stakeholders including the USGS, USFWS, ODFW, as well as members of the general public.
Appendix C: Letters of Support
Hi Gina:

Here's the exchange Ilene and I had about these courses at the end of April. I've copied her on this as well so she's aware we are going forward with implementation of the courses and the associated certificate.

Let me know if we need more documentation.

Thanks,
Sherm

Begin forwarded message:

From: "Kleinsorge, Ilene - COB" <Ilene.Kleinsorge@bus.oregonstate.edu>
Date: April 29, 2007 6:40:14 PM PDT
To: "Bloomer Sherman" <bloomers@science.oregonstate.edu>
Subject: RE: Professional Science Masters Curriculum

Ilene,

As long as this does not end up being a major but is a certificate, we have no problems with the proposed curriculum or offerings. I checked with AACSB last week and was encouraged to find that your plan would not cause problems for the COB. Of course they didn't understand why the resources were not available to the COB to deliver for you, but that is not in my control and I will not be held accountable for making it so.

Ilene

From: Bloomer Sherman [mailto:bloomers@science.oregonstate.edu]
To: Kleinsorge, Ilene - COB
Subject: Professional Science Masters Curriculum

Ilene:

Thanks for the conversation a couple weeks ago about the Professional Science Masters curriculum. I really do appreciate the efforts COB went to in exploring these courses and I also understand the difficulties they present.
My understanding is that COS will go ahead and work with Ecampus to develop and staff a three course series intended to familiarize STEM students with the key concepts they will encounter in the private or public sector workplace. I've attached a working outline of what those three courses might look like and how we would talk about the, so as to make it clear these are not business courses and not intended for anyone thinking about business as the focus of their professional career. I want to be very clear about who these are for and how we'll use them.

Let me know if this seems OK to work from. If so I'll get the next steps going for Fall and will keep you posted on where we are and how the courses are shaping up.

Many thanks,
Sherm
April 25, 2007

Dr. Ursula Bechert
Director of Off-Campus Programs
College of Science
Oregon State University
CAMPUS

Dear Dr. Bechert,

This letter is written in strong support of the Category I proposal for the development of a “Graduate Certificate in Management for Science Professionals.” As you know, I was the P.I. on the Alfred P. Sloan Foundation grant to Oregon State University (OSU) that resulted in the development of the Professional Science Masters Program at OSU. From my experience with the program, I have seen the value of offering the management opportunities to science students and believe that many more of our students could benefit from this aspect of the Professional Science Masters (PSM) Program. I am also aware of how other institutions have struggled (as we have) with establishing and sustaining the management aspect of this unique program.

I believe that developing a Graduate Certificate Program would allow non-PSM degree seeking students in other science-related disciplines to also benefit (e.g., veterinary students and veterinarians). By opening enrollment of this program to a broader audience, it should be possible to help recover costs of development and delivery of the management aspect. We know that other PSM programs are interested in curriculum sharing and that several will benefit from the certificate program once it is offered online. I understand that the online version will be developed as soon as the Category I proposal is approved and I believe that aspect will be of great value to our campus overall.

As you know, the College of Agricultural Sciences has been a partner in the development of the PSM programs and we see opportunities for additional units to be involved in these programs in the future. There is additional value in making the management related courses available online and in encouraging traditional thesis seeking Masters and Ph.D. students to obtain additional expertise in this area of professional development. We know from the experiences to date with developing the PSM program that just offering business courses developed for other purposes does not work well for the students.

In summary, I support the direction that you are taking with the Category I proposal to develop this new program. Please let me know if there are questions that arise about this proposal that I am able to answer.

Sincerely,

Stella Melugin Coakley
Associate Dean
23 April 2007

Dr. Ursula Bechert
College of Science
Oregon State University
2082 Cordley Hall
Corvallis OR 97331

Dear Dr. Bechert:

I support your proposal to create a Graduate Certificate Program in Management for Science Professionals, which springs from the Professional Science Master’s (PSM) degree programs that you’ve been developing.

The College of Forestry sees real value in providing additional training opportunities in business management, communications, and ethics to students enrolled in our graduate programs. In fact, our on-line Sustainable Natural Resources curriculum is an elective option within the PSM degree in Environmental Sciences.

Graduates from the College of Forestry find employment with a variety of organizations, including federal and state natural resource agencies as well as private companies. The development of the additional skills that you describe in your proposal will make our students more competitive and versatile employees and natural resource managers. As we have begun looking into this type of opportunity ourselves, we encounter great interest throughout the region, nation, and world in the business and science courses that would be available in your program. Natural resource management is in the process of substantial change and a Graduate Certificate such as you propose would be extremely beneficial to forest and other natural resource managers.

You have our support in developing a Graduate Certificate Program in Management for Science Professionals at OSU.

Best wishes,

Hal Salwasser, Dean
College of Forestry
DATE: May 21, 2007

TO:

**Ursula Bechter, DVM, PhD**
Director of Off-Campus Programs  
College of Science  
Oregon State University  
DBPP- 2082 Cordley Hall  
Corvallis, OR 97331  
Tel: 541 737 5259  
Fax: 541 737 3573  
ursula.bechter@oregonstate.edu

**Sherman H. Bloomer, PhD**
Dean, College of Science  
128 Kidder Hall  
Oregon State University  
Corvallis, OR 97331-4608  
Ph: 541-737-3877  
FAX: 541-737-1009  
Sherman. Bloomer @oregonstate.edu

FROM: Mark Merickel, PhD  
Associate Dean, OSU Extended Campus

SUBJECT: Letter of Support for Category 1 proposal, Graduate Certificate in Management for Science Professionals

OSU Extended Campus fully supports the establishment of an OSU Graduate Certificate in Management for Science Professionals. We have other highly successful programs for professionals in various fields of science, know how to market to this audience, and have established a reputation nationally for high quality, accessible courses and programs. Bringing this program to an extended audience nationally and internationally reinforces our goal of improving access to OSU programs.

The online version of this graduate certificate would be marketed nationally and would be of interest to students in other Professional Science Masters programs across the country. (Nationwide program information—http://www.scinemasters.com/). In addition, we anticipate enrollment in the individual courses by working professionals who are managing science programs and wish to upgrade their skills in core areas essential to their management success.

Upon curricular approval Ecampus will provide assistance with program planning, marketing, course design and development, Blackboard training, and supporting services
to students at no cost to the college or department and will return tuition revenue to the program according to the established Ecampus revenue-share model. We will support development of the online courses within this program by providing funding for the content provider for each course. With careful planning and with anticipated enrollment, this program will be self-sustaining under this model.
April 20, 2007

To whom it may concern:

We are writing in support of the Category I proposal to create a Graduate Certificate Program (19-credits), “Graduate Certificate in Management for Science Professionals,” based on the Professional Science Masters (PSM) degree cohort curriculum.

As part of the PSM cohort curriculum, students are required to take Philosophy 547, "Research Ethics," which one of us (Jonathan Kaplan) has taught for the past two years. The response from the PSM students has been quite positive – the comments on the qualitative student evaluations this year included such remarks as “a great, thought-provoking class” “I really enjoyed this class even though I was a bit apprehensive about taking a philosophy course” and “very stimulating, relevant, and interesting.” It is clear from these experiences in 547 that students from technical backgrounds have not been exposed to rigorous, sustained thinking about the ethical issues engendered by scientific research, and that, while initially skeptical of the value of such work, come to appreciate the importance of taking these kinds of issues seriously.

Creating a Graduate Certificate Program that, as part of preparing students in the sciences to work effectively in the private sector, includes a required ethics component, would benefit the OSU community in a number of ways. First, of course, those students taking advantage of the Certificate Program would benefit by gaining the expertise necessary to work effectively as both research scientists and business people, while maintaining a focus on the ethical issues inherent in their careers. Second, the businesses in which these students end up working will no doubt benefit by having hired people who, at the very least, been asked to think seriously about what ethical conduct in research settings involves. And finally, such a program would send a strong message that ethical training, and ethical behavior, is a critical part of good management practice in the sciences, something that, unfortunately, has not always been seen as obvious, nor always practiced.

In short, the proposal to create a “Graduate Certificate in Management for Science Professionals” Graduate Certificate Program, based on the Professional Science Masters (PSM) degree cohort curriculum, is well worth supporting.

Sincerely,

[Signatures]

Dr. Courtney Campbell, Department Chair, Philosophy Department
campbell@oregonstate.edu

Dr. Jonathan Kaplan, Associate Professor of Philosophy
Jonathan.Kaplan@oregonstate.edu
2 May 2007

Ursula Bechert, DVM, PhD  
Director of Off-Campus Programs  
College of Science  
Oregon State University  
DBPP- 2082 Cordley Hall  
Corvallis, OR 97331

Dear Prof. Bechert:

The Department of Speech Communication supports the Category I proposal from the College of Science to create a Graduate Certificate Program in Management for Science Professionals which includes COMM 512-036, Communication and Practice of Science. We believe the inclusion of COMM 512-036 strengthens an already strong proposal. We will continue to teach this class as long as we continue to receive funding from the College of Science.

Sincerely,

Charlotte J. Headrick, Ph.D.  
Prof., Theatre Arts  
Acting Chair, Department of Speech Communication
Dr. Ursula Bechert  
College of Science  
Oregon State University  
2082 Cordley Hall  
Corvallis OR 97331

Dear Dr. Bechert:

It is a critical time for the United States. Everywhere we look, we see evidence of the global competition that American companies are facing. Unfortunately, we also see evidence that American companies are struggling because their employees lack the training necessary to compete in this global marketplace.

I am proud to say that the State of Oregon and the Oregon University system have been on the forefront in fighting to improve this situation. In particular, a tremendous amount of effort has been focused on ensuring Oregon’s students get the math and science education, skills and knowledge that they will need to succeed. Oregon State University’s Graduate Certificate Program in Management for Science Professionals is an important part of this effort.

This Graduate Certificate Program will help us become more competitive in science and math by providing individuals interested in working in science-related fields with training in business management, communications, ethics and professional technical skills. People working in research facilities, private practices or consulting firms, government agencies, and other industries often need such skills in their everyday work, but they have no way to acquire this training within their current professions. The Management for Science Professionals Graduate Certificate Program will enable individuals to bridge the gap between business and science in a variety of workforce sectors, and will arm their employers with the able workers needed to succeed in the 21st Century marketplace.

Oregon State University’s Graduate Certificate Program in Management for Science Professionals should be applauded and emulated.

Sincerely,

Ron Wyden
United State Senator
April 25, 2007

Ursula Bechert D.V.M., Ph.D.
College of Science
Oregon State University
DBPP-2082 Cordley Hall
Corvallis, OR 97331

Dear Dr. Bechert:

I am excited to learn about Oregon State University’s success with the Professional Science Master’s (PSM) programs. I first learned of this program in 2005, when it was being developed. I have been a long time supporter of science based education and am encouraged to see this program growing.

Expanding the PSM programs to include a Graduate Certificate Program will provide a wonderful opportunity for students outside the PSM program area who are interested in gaining critical professional skills.

In this global economy, we should take every opportunity to arm our graduates with the tools they need to thrive and compete. We also compete at the university level for the best and brightest students and this program is one more way we can continue to recruit students to Oregon State University.

Thank you for keeping me informed about the growth of this exciting program. Please let me and my staff know how we can continue to support the important work you are doing.

Sincerely,

DARLENE HOOLEY
Member of Congress
May 8, 2007

Ms. Ursula Bechert  
Oregon State University  
2082 Cordley Hall  
Corvallis, Oregon 97331

Dear Ursula:

As a supporter of scientific research and increasing science, technology, engineering and math education in our nation's schools, I wanted to update you on important developments in Washington.

Science and technology issues, such as global warming and alternative energy, are crucial to our nation's competitiveness and security. As research into such pressing issues continues I believe our nation's researchers should be encouraged to effectively communicate new discoveries to the public. That is why I am proud to report that the House of Representatives incorporated a program I introduced—the Scientific Communications Act of 2007 (H.R. 1453)—into the National Science Foundation reauthorization bill (H.R. 1867). This bill will create a NSF grant program to train science graduate students to communicate more effectively with policymakers, business leaders, and other non-scientists in order to capitalize on the federal government's enormous annual investment in scientific research. I look forward to working with my colleagues in the Senate to ensure this legislation becomes law.

Late last month, the House also passed two bills that will advance STEM education and research in our country and ensure that the U.S. workforce remains competitive in the global economy. One of those bills, H.R. 362, will expand programs that help put qualified STEM teachers in our classrooms, improve teaching methods, and will create a panel of experts to identify and develop a new set of K-12 STEM curriculum for use in our public schools. Following the recommendations made in the National Academy of Sciences landmark report, Rising Above the Gathering Storm, H.R. 363 will strengthen the federal government's long-term basic research programs. The bill supports outstanding young researchers through grants at the NSF and the Department of Energy, while also establishing a national coordination office to identify, prioritize and fund research infrastructure at universities and national laboratories.

If you have any questions about these or any other issue, please do not hesitate to contact my office at (916) 498-5600.

Sincerely,

DORIS O. MATSUI  
Member of Congress
April 24, 2007

Ursula Bechert, DVM, PhD
Director of Off-Campus Programs
College of Science
Oregon State University
DBFP - 2062 Cordley Hall
Corvallis, OR 97331

Dear Dr. Bechert:

I am writing in support of the development of a Graduate Certificate in Management for Science Professionals at OSU. I understand that this certificate program would be designed for science majors and emphasize organizational finance, marketing and entrepreneurship, communications, ethics and professional skills. My work with the Council on Competitiveness has made me keenly aware of the need for this type of training. The Council on Competitiveness is a private nonprofit organization comprised of CEOs, university presidents and labor leaders focused on fostering innovation-based growth and global competitiveness. As part of our National Innovation Initiative, the Council recommended the development and support of these types of PSM programs. We believe PSM programs and this type of training are essential for national competitiveness and regional economic growth as well. In my collaboration with the Council on Graduate Schools in support of PSM programs throughout the nation, I have seen a large demand for graduate certificate programs in communication, ethics and business skills, not only within the PSM programs, but by students in many different fields of science who are preparing for a research career and pursuing a Ph.D.

During my many years working at the National Science Foundation as the Director of Science and Engineering Indicators, I became convinced that providing business and communication skills for scientists and engineers is an important way of capturing and transmitting innovative ideas and products. Additionally, my colleagues at the National Science Foundation and other federal and state technical agencies needed and used such skills in their work responsibilities as science administrators on a daily basis. These skill sets are very important not only for entrepreneurs and business professionals, but also for scientists and engineers in all occupations, because they need to be prepared to enter the workforce in many different sectors.
I was very impressed with the OSU PSM programs and students when I recently participated in the two-day OSU industry advisory meeting for your PSM programs. I believe that instituting a “Graduate Certificate in Management for Science Professionals” would strengthen the PSM programs and also meet a broader need at OSU and the Corvallis community. Indeed, I believe that the curriculum would be of broader interest throughout Oregon and the nation.

Good luck in your efforts to formalize such a graduate certificate program. I believe that it will be a big success.

Sincerely,

Jennifer Sue Bond
Senior Advisor
Council on Competitiveness
April 24, 2007

Ms. Ursula Bechert, DVM, PhD
Director of Off-Campus Programs
College of Science
Oregon State University
DBPP-2082 Cordley Hall
Corvallis, OR 97331

Dear Dr. Bechert:

I was very pleased to see the proposal for Graduate Certificate program for Science Professionals in Management.

As you know, AOI is Oregon’s largest and oldest comprehensive business association, with members ranging from Intel to single-person small businesses. Many of our members are research and consulting companies, especially high-tech and environmental.

Our members often seek managers, or those with management potential, with master’s degrees in science, engineering and mathematics. Unfortunately, most employees with scientific background have little or no managerial training, a very real deficit. So the proposed curriculum looks very germane to today’s business needs.

I believe graduates from such a program, who must now compete with applicants throughout the nation or worldwide, would be very attractive to Oregon employers.

Please feel free to cite AOI as a strong endorser of your proposal.

Sincerely,

[Signature]

John Ledger
Vice President, External Affairs

JL:kah
April 20th, 2007

Dr. Ursula Bechert
College of Science
Oregon State University
2082 Cordley Hall
Corvallis OR 97331

Dear Dr. Bechert:

I have been a long-time, enthusiastic supporter of the Professional Science Master’s (PSM) Program at Oregon State University (OSU), because I understand the value of merging training in business management, communications, ethics and professional technical skills with a science-based graduate degree. At Chemica Technologies, Inc., we value scientists who understand how their work fits within the broader context of the world of business. These individuals are more effective contributors to team projects and are versatile employees.

Oregon State University’s Graduate Certificate Program in Management for Science Professionals will broaden access to this type of training to non-PSM degree-seeking individuals, which is excellent. Additionally, I understand that other universities offering PSM degrees are interested in curriculum sharing opportunities, and OSU’s Graduate Certificate Program in Management for Science Professionals would certainly be of interest as an online option.

The Graduate Certificate Program will enable individuals to bridge the gap between business and science in a variety of workplaces, and I really appreciate your devoted effort to further develop and promote this substantial program to fill a long time need in many industries.

I strongly support the PSM program at OSU.

Sincerely,

[Signature]

Dr. Takuji Tsukamoto
President/CSO
Chemica Technologies, Inc.
325 SW Cyber Dr.
Bend, OR 97702-1076
To: Ursula Bechert, DVM, PhD

Dr. Bechert,

I was excited to learn of your proposal to create a Graduate Certificate Program from the PSM cohort curriculum that is designed specifically for science majors not included in the PSM program. I am also very supportive of your proposal to develop an online version of this certificate program as I believe this would be an attractive learning option for many students, especially adult learners who are returning for higher level academic degrees.

As you are aware, I am a big proponent of students in science or science-related fields receiving some type of formal training in management, communications, ethics and professional technical skills.

Employers, such as Hewlett Packard, appreciate technical candidates who have a basic understanding of finance and marketing principles, have been exposed to the potential business practices companies might use when managing in an innovative environment, have a grounding in business ethics and know multiple methods for communication. Applicants with this type of background are typically more successful in the interviewing process than those who do not.

I would like to provide my support for your proposal as I believe programs such as this are in the best interest for companies such as ours – now and into the future. Please let me know if there is anything more I can do to help in gaining the approval you need to move forward on this.

Regards,

Linda Amedo

Linda Amedo
Business Systems Manager
Graphics and Imaging Business
Hewlett-Packard Company

541-715-3552 Phone
541-715-9929 Fax
linda.amedo@hp.com
April 23, 2007

Dr. Ursula Bechert
Director of Off-Campus Programs, College of Science
Oregon State University
Corvallis, OR 97331

Dear Ursula:

I am happy to hear about the new proposal for a Graduate Certificate in Management for Science Professionals. Since it will require courses that are already in place for the Professional Science Master degree program, it should require minimal extra effort for a possibly significant reward to OSU.

The courses required to earn the certificate would be very valuable for a scientist in virtually any business situation. Even scientists intending to pursue academic careers could profit considerably if ever they should become involved with a spin-off or other cooperative venture with a small company.

I approve this initiative wholeheartedly.

John Gardner
President, ViewPlus Technologies and
Professor Emeritus, Physics, Oregon State University
April 24, 2007

Ursula Bechert, DVM, PhD
Director of Off-Campus Programs
College of Science
Oregon State University
DBPP- 2082 Cordley Hall
Corvallis, OR 97331

Re: Letter of support for Graduate Certificate Program

Dear Dr. Bechert,

Per your request I would like to express support from the Oregon Department of Fish and Wildlife (ODFW) for your proposal to create a Graduate Certificate in Management for Science Professionals.

ODFW employs over 1,000 managers, biologists and administrative support staff. Most of our biologists receive their formal education in one of the life sciences such as fishery or wildlife biology. On the job training for ODFW biologists focuses on collecting and interpreting data from a suite of fish or wildlife species. Most ODFW managers are recruited from within the rank of our biological staff and have little formal training to manage human and financial resources. There are several reasons why the Graduate Certificate in Management for Science Professionals is appealing. First, the list of courses you provided is consistent with management skills necessary to become an effective manager. Second, the courses are offered throughout the year and the program can be completed in eight months. Finally, since many ODFW employees live in remote portions of the state, an on line, distance learning option is highly desirable.

Good luck developing the program and feel free to contact me should you have any questions.

Sincerely,

Charlie Corrarino
Conservation and Recovery Program Manager
Cc:
Virgil Moore, ODFW Director
Dr. Dan Edge, Head, OSU Department Fisheries and Wildlife
Laurie Byerly, ODFW Deputy Director
Roxie Burns, ODFW HR Administrator
Ed Bowles, ODFW Fish Division Administrator
Ron Anglin, ODFW Wildlife Division Administrator
Additional instructors were hired or recruited to teach the specialized management, communication, ethics, and professional skills-based courses. It is envisioned that by expanding access to a greater population of students, these acquisition costs for new faculty can be largely recovered by increased tuition revenue.
September 23, 2008

To: Ursula Susan Bechert
    College of Science
    2082 Cordley Hall

From: Robert Frost, Co-Chair
    Budgets and Fiscal Planning Committee

The Budgets and Fiscal Planning Committee of the Faculty Senate met in the spring and reviewed the CAT 1 proposal for the Graduate Certificate in Management for Science Professionals.

Prior to forwarding the proposal to the Curriculum Council, the committee had only a few specific requests. Please send a revised proposal to address the following:

1. Please provide a detailed budget that shows how funding would be utilized overall developmental phase and actual program operation. Specific attention should be given to:
   (a) identify the actual cost of instruction and administration for this certificate program;
   (b) make explicit where the sources for these costs would be coming from or subsidized from; and
   (c) include an e-campus aspect of this budget that shows development grant revenue, tuition revenue based on enrollment projections, expenditures, and how the e-campus budget relates to, or subsidizes, the on-campus version of this certificate program.

2. An indication of budget review/approval by COS Dean or appropriate staff would be helpful as well.

Once we've received the revised proposal, we will review it quickly.
If you have any questions, feel free to contact me.

Cc: Becky Warner, Co-Chair, BFP
    Dan Dowhower, Academic Programs
    Vickie Nunnemaker, Faculty Senate
Becky, Robert:

I apologize for the delay in getting some answers to you about the CAT 1 proposal for the Graduate Certificate in Management for Science Professionals. The budget questions got passed to me, as the College has been the principal sponsor of the program since the end of the Sloan grant. I have tried to address the committee’s specific questions below. I hope this will serve as an appropriate addendum to the proposal to address your questions.

Please provide a detailed budget that shows how funding would be utilized overall developmental phase and actual program operation. Specific attention should be given to:

- identify the actual cost of instruction and administration for this certificate program;

The Professional Science Masters program currently exists and is being delivered in conjunction with degrees in environmental science, applied physics, systematics, and biotechnology. The program costs currently committed include:

Program director, coordinator (0.5 FTE)
internship oversight, professional
development course $32,000 (+OPE)
Communication course: $5,000
Ethics/philosophy courses: $15,000
Management courses (3 x 2) and $30,000 (+OPE)
management course development $
Biotech internship coordination (0.2 FTE) $17,000
Advertising, media, fundraising materials $7,500

The management courses already include delivery in Ecampsus format, with one CRN number for on-campus students (i.e. through normal enrollment) and one CRN number for true distance students. The funds provided to Philosophy include support this year for delivery of the on-campus and an ecampus version of the course.

Addition of the fully online version will require addition of an additional section for the communications course ($5000-7000 depending on enrollment). As the program grows, the coordinator position will likely require an additional 0.5 FTE, either to one full-time position or two half-time positions to manage the internship coordination and oversight.

- make explicit where the sources for these costs would be coming from or subsidized from; and

The College of Science is supporting all of these costs excepting the costs for the biotech internship coordinator, which are provided by the College of Agricultural Sciences. The College sees the development of PSM as an important strategic step in developing the science and technology workforce the nation needs. We have been, and remain, committed to the costs of making the program go.
The support for the on-campus program will be ongoing, and provides a base that makes the implementation of a distance version much less costly. The reason to pursue a distance version is the emerging national interest in PSM. The development and delivery of the cohort curriculum, particularly the management component, is challenging. We have been a leader here and have an opportunity to provide a curricular program to other institutions that are trying to develop a PSM.

- include an e-campus aspect of this budget that shows development grant revenue, tuition revenue based on enrollment projections, expenditures, and how the e-campus budget relates to, or subsidizes, the on-campus version of this certificate program.

We are pursuing the Ecampus version of the program to:
- 1) increase opportunities for Oregonians to pursue the degree as many of our students are in companies now; an online component would facilitate their pursuit of the program, but would still require an on-campus stay, given the degrees we have
- 2) Provide a stand alone component that scientists and engineers currently employed could use to augment their skills in management and team projects
- 3) Provide a curricular component that other institutions (including those in Oregon) could use as building blocks for a PSM program

The additional costs for starting that online version are largely course development (these are included in the pending grant from Ecampus), delivery of an online section of the communications course ($7000) and an online version of the professional skills/case study course ($7000). In addition, the goal is to eventually recoup the costs of the online courses in ethics and management, and an appropriate portion of the internship coordinator position.

A pretty conservative budget projection for the program is:

Initial projections for PSM Online Certificate
This considers only students registered through Ecampus

<table>
<thead>
<tr>
<th>Ecampus program costs:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25 coordinator:</td>
<td>22,880</td>
</tr>
<tr>
<td>Management courses:</td>
<td>21,450</td>
</tr>
<tr>
<td>Communication course:</td>
<td>7,000</td>
</tr>
<tr>
<td>Ethics Course:</td>
<td>7,000</td>
</tr>
<tr>
<td>Advertising/media:</td>
<td>5,000</td>
</tr>
<tr>
<td>Professional Skills Course:</td>
<td>7,000</td>
</tr>
<tr>
<td>0.1 Internship coordinator:</td>
<td>8,500</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>78,830</td>
</tr>
</tbody>
</table>

(The coordinator and management course positions incur OPE)
<table>
<thead>
<tr>
<th>Student Cohort</th>
<th>Annual Credits</th>
<th>80% Ecampus Tuition</th>
<th>(Subsidy)/Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY09</td>
<td>5</td>
<td>30</td>
<td>8,352</td>
</tr>
<tr>
<td>FY10</td>
<td>20</td>
<td>120</td>
<td>33,408</td>
</tr>
<tr>
<td>FY11</td>
<td>35</td>
<td>210</td>
<td>58,464</td>
</tr>
<tr>
<td>FY12</td>
<td>60</td>
<td>360</td>
<td>100,224</td>
</tr>
</tbody>
</table>

The student cohort is the number of students enrolled in the program. We have assumed those students will take only 2 of the 6 program courses in a given year. This would be characteristic of students working while pursuing the certificate. Students pursuing this as part of a PSM degree at another institution will likely take the full six courses in a year, but we’re being conservative. Once student numbers reach this level, the coordinator position for this part will likely need to increase another 0.25 FTE for a total of 0.5 FTE.

We have been quite conservative here, assuming that most students will pursue this part-time. This is consistent with what we see in current Ecampus use and is the most likely current audience. As the visibility of PSM programs increases, we expect to see significantly more growth in students pursuing the program full time in conjunction with other university PSM programs.

The immediate fiscal goal is to cover costs related to this part of the program. When fully successful, the program will also create net revenues that will be used to expand the curriculum to be more closely tailored to specific audiences (we already have requests for one of the management courses to focus on regulatory requirements and processes for example; we just don’t have the student base yet to create such course diversity).

- An indication of budget review/approval by COS Dean or appropriate staff would be helpful as well.

This program has the full support of the Dean and the College. We are committed to underwriting the costs of this program until the student numbers are such that it is self-sufficient. We remain committed to the on campus version of the PSM as well and are actively working to expand the number of degree options available to students.

Please let me know if you have other questions.

Best regards,
Sherm