Florida Board of Governors

Request to Offer a New Degree Program

Florida Atlantic University	Fall 2010
University Submitting Proposal	Proposed Implementation Date
Charles E. Schmidt College of Science	Biological Sciences
Name of College or School	Name of Department(s)
Business and Biotechnology	PSM in Business Biotechnology
Academic Specialty or Field	Complete Name of Degree (CIP -261201.)

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees		President	Date
Signature of Chair, Board of Trustees	Date	Vice President for Academic Affairs	Date

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Student Enrollment (From Table 1)		Projected Program Costs (From Table 2)		
	HC	FTE (0.53125)	Total E&G Funding	Contract & Grants Funding	E&G Cost per FTE
Year 1	10	5.3125			
Year 2	14	7.4375			
Year 3	22	9.5625			
Year 4	24	11.6875			
Year 5	28	12.75			

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed.

INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

(a) The proposed program is a Professional Science Masters (PSM) program that is considered a terminal degree in that graduates would transition to the work force rather than continuing their graduate training. The program will be housed in the Charles E. Schmidt College of Science with support from the Barry Kaye College of Business in the form of courses that are offered as part of existing programs.

(b) The proposed program requires students to complete the core curriculum that consists of a bridging course between science and business entitled *Biotechnology Business Development* (3-credits), a course in entrepreneurship (3-credits) and two internships (4-credits total). These internships are a lynchpin for this program with one business-oriented and one science-based. Students must also complete 15-credits of science courses and 9 credits of business courses.

(c) The proposed program would be a total of 34 credits.

(d) Professional Science Masters (PSM) are intended to provide the requisite skill sets for a graduate to move directly into the workforce. The internship component of this program will place students in organizations where there is an opportunity for an employment offer. A study by the Council of Graduate Schools (CGS) found that 70% of graduates with the PSM degree in 2006 had found employment in non-academic sectors at salaries significantly higher than those of individuals with either a baccalaureate degree or traditional Masters in science.

B. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which goals the program will directly support and which goals the program will indirectly support. (See the SUS Strategic Plan at http://www.flbog.org/StrategicResources/)

The proposed program fits within Goal 2 of FAU's Strategic Plan – to meet the statewide professional and workforce needs. Scripps Florida and the Max Plank Institute, both located on the FAU-Jupiter campus are serving as a recruitment magnet for start-up and established biotechnology-oriented institutions. The majority of these companies are for-profit. There will be a clear need for individuals with both a strong science background and a knowledge of business and management.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

Management, scientific and technical consulting services are projected to be one of the fastest growing industries in the country in the period of 2006-2016. The estimated growth is nearly 6% per year nationally (The Bureau of Labor Statistics on the U.S. Department of Labor (www.bls.gov)).

The Florida Agency for Workforce Innovation and Bureau of Labor Statistics predicts about 13,000 job openings in Florida between 2008-16 in the areas of operations and marketing managers as well as sales for individuals with a science background. That rate will likely be higher in the southeast Florida area since the growing cluster of biotechnology-based companies and institutions anchored by Scripps Florida and the Max Plank Institute that are both housed on the FAU campus in Jupiter was not factored into the above projections. For graduates willing to relocate out-of-state, the projected job openings in these areas for the 2008-16 time period approaches 500,000. Business-savvy students with a strong background in science should have a competitive advantage for these workforce positions. The interdisciplinary nature of this program and the rapid changes occurring nationally in the biotechnology-oriented businesses suggest that actual employment opportunities may be greater than the projections discussed above.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

Estimates of projected enrollments are speculative because of the rapid changes in the biotechnology "landscape" of south Florida. The initial pool will be mainly the currently enrolled biology undergraduate majors at FAU. The biology undergraduate program is one of the largest at FAU, with nearly 1,900 majors (including the pre-medical majors). More than 60% of these students identify with a career path in medicine when surveyed informally. However, only a small fraction of that group will ultimately be admitted to a professional medical program. Informal surveys and numerous discussions with students has revealed that many students retain a strong interest in science, but are not attracted to working as bench-scientists. This program will provide training for a career option that keeps the student in the science area, but working on the business side of the biotechnology industry.

C. If similar programs (either private or public) exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of any communication with such programs with regard to the potential impact on their enrollment and opportunities for

possible collaboration (instruction and research). Provide data that support the need for an additional program.

The University of South Florida (USF) has a PSM program in biotechnology with cross-training in other areas including business. This is the most similar program and is located in Tampa, which is on the Gulf Coast of Florida. The projected growth of biotechnology-oriented businesses in the Treasure Coast to Miami area of south Florida (see attachment of about 50 life science oriented companies currently in these areas) suggests that employment opportunities will emerge for our graduates. This is only for graduates who want to stay in the local area. Biotechnology is a growing industry across the country, providing even more opportunities for graduates.

D. Use Table 1 (A for undergraduate and B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 40 credit hours per year and graduate FTE will be calculated as 32 credit hours per year. Describe the rationale underlying enrollment projections. If, initially, students within the institution are expected to change majors to enroll in the proposed program, describe the shifts from disciplines that will likely occur.

The students targeted for this program will likely be undergraduates who are already declared biology majors. Students admitted to the PSM program will require an undergraduate degree in science (biology or chemistry). Therefore, implementation of this program will have negligible effect on numbers of majors in biology and chemistry.

Full-time Masters graduate students are typically enrolled in 9 credits per term. While some students may be able to successfully take more credits per term, our experience has been that 9 credits is a manageable courseload for full-time Masters students. This PSM program is designed to be completed in two academic years (fall-spring) and one summer term between the two academic years. Therefore, the average annual credits will be 17 and the FTE factor would be 0.53125%. There will likely be students wanting to pursue the program on a part-time basis. Prior to the two internships, the program is based solely on academic courses. Therefore, this program could also be successfully completed by part-time students.

E. Indicate what steps will be taken to achieve a diverse student body in this program, and identify any minority groups that will be favorably or unfavorably impacted. <u>The university's Equal Opportunity Officer should read this section and then sign and date in the area below.</u>

We anticipate that the existing undergraduate biology students will be the major pool of applicants for this program. Given the size of the potential pool (nearly 1,900 including pre-medical students at the time of this writing), the diversity of the applicant pool should closely mirror that of the existing undergraduate biology program. There is no evidence to suggest that any specific minority group will be adversely impacted either positively or negatively.

We will also market the program more broadly and anticipate the diversity of the applicants will reflect the diversity of the population of south Florida.

_____ _____

Equal Opportunity Officer Date

III. Budget

A. Use Table 2 to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

All but one of the required courses is offered regularly in either the science or business college. The one new course entitled *Business Biotechnology Development* is in the process of being approved as a new course. This course will be taught by an adjunct faculty (Dr. Tod Fairbanks) and it can also serve as an elective course for students in existing Masters and PhD programs. No new sections of any of the required courses will be required. There will be no impact on faculty teaching assignments.

B. If other programs will be impacted by a reallocation of resources for the proposed program, identify the program and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

Reallocation of resources is not applicable.

C. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

None.

D. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

Key external support for this program will involve the internship requirements. Informal discussions with investigators at Scripps Florida, the Max Plank Institute and Torrey Pines Institute for Molecular Studies have shown a keen interest in offering internship positions to students in this program. Torrey Pines Institute for Molecular Studies has also indicated possibilities for paid internships at the time of this writing. We will make efforts to see if

additional financial support for the internships can be obtained. Several members of the advisory board for this program are directly affiliated with biotechnology businesses. One advisory board member is from the Workforce Alliance of Palm Beach and specializes in placing individuals in life science based positions.

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Table 1, Table 2, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

The State of Florida and Palm Beach County made a substantial financial commitment to bring institutes such as Scripps Florida and the Max Plank Institute to this area. These internationally known research institutes were expected to serve as magnets to draw smaller biotechnology based businesses to southeast Florida. That anticipated outcome is beginning to emerge with more than 50 life-science based companies already in the area served by FAU (see attached list). These companies will need a pool of trained individuals in the role of research assistants. The Center for Molecular Biology and Biotechnology (CMBB) has been training students to fill these positions for more than a decade. However, the majority of these new companies are for-profit institutions. There will be a growing need for individuals with a strong scientific background who are also business-savvy. One of the first questions a prospective company will ask when considering whether to move to this area is: "What are the training opportunities in the area and is there a pool of trained applicants living in the area?". ***This program will help fill this new employment niche.*** To our knowledge, there is no equivalent program on the east coast of Florida.

V. Access and Articulation – Bachelor's Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a request to the BOG for an exception along with notification of the program's approval. (See criteria in BOG Regulation 6C-8.014)

Not applicable

B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see Common Prerequisite Manual http://www.facts.org). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."

If the proposed prerequisites ~~they~~ are not listed in the Manual, provide a rationale for a

request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

Not Applicable

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that community college transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in BOG Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

Not Applicable

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see Statewide Articulation Manual http://www.facts.org). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not Applicable

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan.

Goal 2 of the seven goals in the Strategic Plan for FAU is to meet statewide professional and workforce needs. FAU has a specific commitment to train professionals in "nursing, teaching and advanced technology". The proposed Professional Science Masters in Business Biotechnology directly addresses this goal, especially for training in advanced technology.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The proposed program will draw from existing resources and expertise in the Barry Kaye College of Business, Charles E. Schmidt College of Science, Charles E. Schmidt College of Biomedical Sciences and the Center for Molecular Biology and Biotechnology. It is clear that today's students will need more interdisciplinary training for the jobs of the future. The proposed program begins to fill this need by providing cross-discipline training in science and business. The Center for Molecular Biology and Biotechnology (CMBB) has a presence on both the Boca Raton campus and the Jupiter campus in close proximity to the Max Plank Institute and Scripps Florida. The director of CMBB, Dr. Herbert Weissbach has well-established relationships with scientists at Scripps Florida. The Max Plank Institute in still in the very early stages. Undoubtedly, links to this institute will be forged as more scientists begin working at the Jupiter campus. This will facilitate the development of a conduit for students in this program to move into internships with companies and institute that are in a position to provide long-term employment.

C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology (table) of activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

Dr. Herbert Weissbach came to FAU over a decade ago after serving as Director of the Roche Institute of Molecular Biology, which was supported by the pharmaceutical company Hoffmann-La Roche. Shortly after he arrived at FAU, we started talking about what would be needed to bring biotechnology businesses to this area. The first requirement would be individuals trained as entry-level lab bench scientists. Toward that goal, we established the Certificate in Biotechnology over 10 years ago. That program has been very successful.

Last year, a request was made by the Dean of the Graduate School for proposals for a fairly new class of graduate degree – the Professional Science Masters (PSM). The proposal for a program focused on the business-side of the biotechnology industry was selected as one of three proposals from the Charles E. Schmidt College of Science.

Regular meetings have been held with the Dean of the Graduate College, Dr. Barry Rosson, the Associate Dean Larry Liebovitch of the Charles E. Schmidt College of Science and all the PSM Professors/Directors.

An advisory board with members directly involved in a biotechnology business, the development of these businesses or placement of individuals in these businesses was established.

Meetings and e-mail exchanges with Dr. Peggy Golden, Chair Management Programs and Dr. Paul Hart, Associate Dean and Chair of the Department of Information Technology and Operations Management, from the business college were used to develop the business portion of the curriculum.

The proposed PSM program was presented and discussed with the members of the Graduate Curriculum Committee for the biological sciences department. At a subsequent faculty meeting, the program was unanimously supported.

The proposed program was discussed and unanimously approved by the Graduate Program Committee for the science college at a meeting in January 2010.

Planning Process

Date	Participants	Planning Activity
May 2009	D. Binninger, L. Liebovitch, H. Weissbach	Preliminary contact with Dean Rosson about interest in developing PMS program
June 2009	B. Rosson	Informed PSM applicants that funds to support program development had been awarded by Sloan Foundation
July 2009	P. Golden, K. Grimm, P. Hart, D. Binninger	Meet with representatives of the business college to discuss appropriate business courses for PSM proposal
August 2009 to present	D. Binninger, L. Liebovitch, H. Weissbach, P. Hart, B. Rosson	Monthly meetings to discuss progress on the PSM proposals

Events Leading to Implementation

Date	Implementation Activity

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

The following comments were taken from a self-study review of the biological sciences department in 2009 that was submitted to the Dean:

- The Biological Sciences department offers the most popular major within the university and gains evaluations (SPOT scores) superior to most other departments and colleges within the university.
- The department began a new doctoral program in 2003 and graduated eleven students in 2008.
- Four key faculty and instructors attended the Summer Institute for Undergraduate Education sponsored by the National Academies of Science and Howard Hughes Medical Institute and have returned to apply their skills in classrooms and laboratory.
- National Science Foundation (NSF) has funded a program ($700,000) for undergraduate research and mentoring.
- The Department has spent more than $100,000 on undergraduate laboratory technology enabling updated labs in every area of life sciences at FAU

- The Certificate in Biotechnology program for undergraduates continues to be successful with increased enrollment in laboratories that teach the technology
- New faculty have brought national recognition and research funding to FAU. These new faculty have added strength to the research and teaching capacity in biological imaging, statistical analysis, quantitative modeling and neuroscience.
- The department increased its extramural funding by 100% since 2001 and initiated significant partnerships with both the private and public institutions.
- A new Director of Environmental Sciences has developed a new curriculum and new research initiatives with South Florida Water Management District (SFWMD) and National Parks services internships ($500,000)
- The faculty have established a research group in oxidative stress and aging with a National Academy member and Director of CMBB at its center. The group presently consists of six faculty with four National Institutes of Health (NIH) grants and two National Science Foundation (NSF) grants.
- The establishment of Scripps Florida and the Max Plank Institute on our Jupiter campus will dramatically enhance the research culture at FAU as well as visibility of our research efforts nationally.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

The Professional Science Masters (PSM) is intended as a terminal degree for students interested in entering the workforce following completion of the degree. The program is tailored for the student with undergraduate training in biology or chemistry who is primarily interested in working in the business-side of the emerging biotechnology industry. Graduates will have a strong background in the scientific basis of the biotechnology and fundamental business practices. Graduates will also have at least one year of industry experience through two internships. One internship will provide experience working side-by-side with a research scientist. The second internship will expose the student to the business-side of the biotechnology industry. Graduates of the program are expected to move directly into the workforce, where employment opportunities are very encouraging. For PSM graduates in 2006, 70% found employment at highly competitive salaries in business, government or not-for-profit companies before or shortly after graduation (*Nature* 2008 455:704).

B. Describe the admission standards and graduation requirements for the program.

Admission requirements

1. Baccalaureate degree in biology or chemistry. Degrees in other scientific areas can be considered on an individual basis.
2. Graduating undergraduate science GPA of 3.2 or higher
3. Minimum of 1,000 on GRE

4. Personal statement of career goals and how the applicant feels this training will help achieve those goals.
5. Three letters of recommendation with at least one from a former professor

Degree Requirements

The program requires a total of 34 credits.

Core curriculum (10 credits)

Biotechnology Business Development (ENT 6188) course
Venture Creation (ENT 6016)
Two 2-credit internships (see below for more details)

Science Courses (15 credits)

The science courses are electives and their selection will vary depending on student demand, resources, faculty and new courses being developed. The following is a list of courses that would be appropriate for a student in this program. Other courses can be substituted with the approval of the faculty advisor.

Advanced Biochemistry (BCH 6740)
Advanced Cell Physiology (PCB 6207)
Advanced Immunology (PCB 6236)
Biochemistry of the Gene (BCH 5415)
Bioinformatics (BSC 6458C)
Cellular Neuroscience and Disease (PCB 6849)
Developmental Neurobiology (PSB 5515)
Macromolecular Structure and Function (PCB 6933)
Principles of Neuroscience (PSB 6037)
Protein Misfolding and Disease (PCB 6933)
Reproductive Endocrinology (PCB 6804)
RNA Biology and Disease (PCB 6525)

Business Courses (9 credits)

Select three of the following four courses

Seminar in Entrepreneurship/Venture Management (MAN 6875)
Technology Commercialization Strategies (ENT 6186)
Developing and Marketing Innovation (MAR 6837)
Financial Accounting Concepts (ACG 6027)

Two Internships (4 credits)

Each of the two 2-credit internships will last one semester. One internship will be science oriented with the student working directly with research scientists. The second will involve working on the business and administrative side of the company or institute including technology transfer and business development offices. The goal is to place students in one of the biomedical institutes (e.g. Scripps Florida and the Max Plank Institute) or an emerging biotechnology business.

C. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

The sequence of the elective courses will be determined by the student, in consultation with an advisor in the program.
The following table lists a proposed schedule of courses.

Spring year 1	c	Fall year 1	c	Summer C	c	Spring year 2	c	Fall year 2	c
MAN 6875	3	ACG 6027	3	Science Electives (2 courses)	6	BSC 6845	3	MAR 6837	3
MAN 6876	3	ENT 6186	3			Internship 1	2	Internship 2	2
Science Elective	3	Science Elective	3						
	9		**9**		**6**		**5**		**5**

Total of 34 credit hours including the two internships

D. Provide a one- or two-sentence description of each required or elective course.

Course #	Course Name	R/E	Course Description
ACG 6027	*Financial Accounting Concepts*	R	Principles applicable to the accounting cycle, asset valuation, income determination, financial reporting, basic business taxes, and owner's equity.
BCH 5415	*Biochemistry of the Gene*	E	A detailed study of selected topics in molecular biology, including DNA replication, gene regulation, transcription and RNA processing, and techniques of genetic engineering.
BCH 6740	*Advanced Biochemistry*	E	Principles of biomolecular structure determination by spectroscopic methods. Enzyme kinetics. Transport mechanisms across membranes.
BSC 6458C	*Bioinformatics*	E	A practical approach to accessing nucleic/protein databases, management of databases, identification of genes, and electronic expression profiling.
BSC 6845	*Biotechnology Business Development*	R	This course discusses the intellectual property, patent and drug development aspects of bringing a biotechnology-derived product to market.
ENT 6186	*Technology Commercialization Strategies*	R	Commercialization of science and technology including commercialization opportunities, intellectual property and market for ideas
MAN 6875	*Seminar in Entrepreneurship/Venture Management*	R	Comprehensive study of the elements of entrepreneurship, focusing on critical factors involved in the initiation of a successful venture.
ENT 6016	*Venture Creation*	R	Course provides an understanding of new venture finance and related issues including due diligence, valuation, financing, deal structuring deal sourcing all within an overall framework of strategic decision making for value creation.
MAR 6837	*Developing and Marketing Innovation*	R	This course revolves around the key challenges encountered in developing an innovation and creating

			its marketing plan.
PCB 6207	*Advanced Cell Physiology*		Course describes in-depth membrane physiology, intracellular signaling pathways, and cellular function, with an emphasis on neurons and human muscle cells
PCB 6236	*Advanced Immunology*	E	A study of the chemical and biological natures of antigens and antibodies: their preparation and reactions in vivo and in vitro, their applications in basic science and therapy, and the immunochemical and experimental methods involved with tagged or free immunologic products.
PCB 6525	*RNA Biology and Disease*	E	Course provides advanced-level training in molecular biology of RNA including principles of RNA structure, function, and metabolism; methodologies for studying RNA; diseases related to RNA deficiencies; and applications of RNA technologies in research and clinical development.
PCB 6804	*Reproductive Endocrinology*	E	Study the anatomy, histology, biochemistry and physiology of the human reproductive system, with an emphasis in reproductive endocrinology.
PCB 6849	*Cellular Neuroscience & Disease*	E	Cellular neuroscience from the point of view of human neurological diseases. This will connect various defects in development to neurological disorders such as Alzheimer's, Parkinson's, and Lou Gehrig's disease.
PCB 6933	*Protein Misfolding and Disease*	E	This course discusses a range of diseases that result from misfolding in relation to their structural bases, molecular pathology, implications for normal folding, possible treatments and roles in non-Mendelian inheritance.
PSB 6037	*Principles of Neuroscience*	E	A survey of principles of neuroscience as they relate to behavior. Topics include morphology and connectivity of neural cells, biological potentials, gross structure of the central and peripheral nervous system, and sensory, motor, and higher-order integrative functions.
PSB 6515	*Developmental Neurobiology*	E	In-depth coverage of the principles and recent advances in the development of the brain and nervous system, including nerve cell migration, axon outgrowth, specificity, plasticity, neurotrophism, nerve cell death, and the influence of experience on the nervous system.

.

E. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and identify if any industry advisory council exists to provide input for curriculum development and student assessment.

None

F. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

Not applicable

G. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

Not applicable

H. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

All courses in the proposed program are offered on the main campus in Boca Raton. All of the required business and science courses are taught regularly as part of the graduate training program in the respective department/college. Students admitted to this PSM program will be allowed to take the business courses without any prerequisite requirements. The internships will be arranged with biotechnology based institutes (especially Max Plank Institute, Scripps Florida and Torrey Pines Institute for Molecular Studies) and start-up companies that are coming to the southeastern Florida area.

IX. Faculty Participation

A. Use Table 4 to identify existing and anticipated ranked (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

The entire curriculum other than the two internships are regularly scheduled courses on the Boca Raton campus. The required business courses and science electives are taught by tenure-earning or tenured faculty in their respective departments/college. The annual teaching assignment of these faculty will ***not*** be affected by this program since they are teaching courses that are part of their assignment irrespective of this program.

B. Use Table 2 to display the costs and associated funding resources for existing and anticipated ranked faculty (as identified in Table 2). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

The projected additional cost for this program is salary to support the teaching of one course (*Biotechnology Business Development*) by an adjunct instructor (Tod Fairbanks, PhD). This course has been taught as a special topics course in the Department of Biological Sciences and enrollment was robust. Therefore, support to offer this course as an elective for graduate students in the Masters program in biological sciences and the Integrative Biology PhD students would be requested irrespective of this program.

C. Provide the number of master's theses and/or doctoral dissertations directed, and the number and type of professional publications for each existing faculty member (do not include information for visiting or adjunct faculty).

Faculty Name	Theses	Dissertations	Professional Publications

Not applicable since this program does not involve original research in the form of a thesis or publication.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

The Charles E. Schmidt College of Science and the Barry Kaye College of Business are among the largest and most productive colleges at FAU. Both colleges have well established undergraduate and graduate training programs as well as research supported by extramural funding. For example, the Department of Biological Sciences has nearly 100 Masters students and about 50 PhD students. The 22 tenure-earning/tenured faculty and 2 instructors all hold the PhD and collectively generate about $2 million in extramural funding including grants from the National Science Foundation and National Institutes of Health. The Barry Kaye College of Business also has established graduate training programs including an executive MBA program. Overall, the faculty of these two colleges are highly qualified and have the experience to teach the courses required for this program.

X. Non-Faculty Resources

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved for all doctoral level proposals.

FAU is designated a research-intensive university. The access to major research publications in the library is sufficient to support training PhD students and support extramurally funded research. A comprehensive list of the scientific research journals would number in the hundreds. Similarly, the business collage also trains graduate students at all levels including a well-established executive MBA program. Library resources are also substantial for supporting this level of training, research and investigation. In summary, the current library resources are more

than adequate for students in the proposed PSM program.

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 3.

No additional resources are needed.

_____ _____

Library Director Date

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

All of the coursework required for this program are regularly scheduled courses. Therefore, the existing facilities on the Boca Raton campus are sufficient.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2. Do not include costs for new construction because that information should be provided in response to X (J) below.

No additional classroom, research or office space will be needed.

E. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

No specialized equipment or research facilities are needed for implementation of the proposed program.

F. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2.

No additional equipment will be needed to implement the proposed program.

G. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2.

No specialized resources will be needed to implement the proposed program.

H. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2.

No existing fellowships, scholarships or graduate assistantships are being allocated to the

proposed program. As noted above, any stipends provided to students during the internships will come from the supporting institutes and businesses or other external source.

I. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Major institutes that are potential sites for internships are the Max Plank Institute, Scripps Florida and Torrey Pines Institute for Molecular Studies. In addition, there are more than 50 life-science based companies already operating in the southeast Florida (see attachment at the end of the document) that also offer internships and employment opportunities.

J. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

No new capital expenditures are required.

.

TABLE 1-B
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Graduate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Individuals drawn from agencies/industries in your service area (e.g., older returning students)	2	1.5	2	1.5	3	2.25	4	3	4	3
Students who transfer from other graduate programs within the university**	2	1.5	2	1.5	3	2.25	4	3	4	3
Individuals who have recently graduated from preceding degree programs at this university	4	3	6	4.5	8	6	10	7.5	12	9
Individuals who graduated from preceding degree programs at other Florida public universities	1	0.75	2	1.5	2	1.5	2	1.5	3	2.25
Individuals who graduated from preceding degree programs at non-public Florida institutions	1	0.75	2	1.5	2	1.5	2	1.5	1	0.75
Additional in-state residents***	0	0	0	0	0	0	0	0	0	0
Additional out-of-state residents***	0	0	0	0	0	0	0	0	0	0
Additional foreign residents***	0	0	0	0	0	0	0	0	0	0
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	**10**	**7.5**	**14**	**10.5**	**18**	**13.5**	**22**	**16.5**	**24**	**18**

* List projected yearly cumulative ENROLLMENTS instead of admissions

** If numbers appear in this category, they should go DOWN in later years.

TABLE 2
PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	**Year 1**						**Year 5**				
	Funding Source					**Subtotal E&G and C&G**	Funding Source				**Subtotal E&G and C&G**
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	Other New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)		Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	
Faculty Salaries and Benefits	91,705	0	0	0	0	**$91,705**	136,871	0	0	0	**$136,871**
A & P Salaries and Benefits	0	0	0	0	0	**$0**	0	0	0	0	**$0**
USPS Salaries and Benefits	1,043	0	0	0	0	**$1,043**	1,043	0	0	0	**$1,043**
Other Personnel Services	4,565	0	0	0	0	**$4,565**	4,565	0	0	0	**$4,565**
Assistantships & Fellowships	0	0	0	0	0	**$0**	0	0	0	0	**$0**
Library	0	0	0	0	0	**$0**	0	0	0	0	**$0**
Expenses	0	0	0	0	0	**$0**	0	0	0	0	**$0**
Operating Capital Outlay	0	0	0	0	0	**$0**	0	0	0	0	**$0**
Special Categories	0	0	0	0	0	**$0**	0	0	0	0	**$0**
Total Costs	**$97,313**	**$0**	**$0**	**$0**	**$0**	**$97,313**	**$142,479**	**$0**	**$0**	**$0**	**$142,479**

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "other new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions (person-years)	Year 1	Year 5
Faculty	0.63	0.85
A & P	0	0
USPS	0.02	0.02

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	$97,313	$142,479
Annual Student FTE	5.3125	12.75
E&G Cost per FTE	$18,318	$11,175

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
B43000 Management Programs	2,477,381	24,909	**$2,452,472**
B41000 Accounting	2,382,388	14,440	**$2,367,948**
B46000 Marketing	910,016	7,036	**$902,980**
B18000 BioMedical Science	2,195,428	17,338	**$2,178,090**
B11000 Chemistry	2,314,621	5,810	**$2,308,811**
B14000 Biological Sciences	2,437,736	26,737	**$2,410,999**
B14300 Biotechnology	138,874	1,043	$137,831
Totals	$12,856,444	$97,313	**$12,759,131**

TABLE 4
ANTICIPATED FACULTY PARTICIPATION

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	David Binninger, Ph.D. Biology	Associate	Tenure	2010	12	1.00	0.05	0.05	12	1.00	0.05	0.05
A	Tanje Godenschwege, Ph.D. Biology	Assistant	Tenure	2010	9	0.75	0.05	0.04	9	0.75	0.05	0.04
A	Kenneth Dawson-Scully, Ph.D. Biology	Assistant	Tenure	2010	9	0.75	0.05	0.04	9	0.75	0.05	0.04
A	James Hartmann, Ph.D. Biology	Professor	Tenure	2010	9	0.75	0.05	0.04	9	0.75	0.05	0.04
A	Sarah Milton, Ph.D. Biology	Assistant	Tenure	2010	9	0.75	0.05	0.04	9	0.75	0.05	0.04
A	Kailiang Jia, Ph.D. Biology	Assistant	Tenure	2010	9	0.75	0.05	0.04	9	0.75	0.05	0.04
A	Christopher Burns, PhD. Biomed	Associate	Tenure	2010	12	1.00	0.05	0.05	12	1.00	0.05	0.05
A	Howard Prentice, Ph.D. Biomed	Associate	Tenure	2010	12	1.00	0.05	0.05	12	1.00	0.05	0.05
A	Deborah Louda, Ph.D. Bio-Med	Associate	Tenure	2010	12	1.00	0.05	0.05	12	1.00	0.05	0.05
A	Frank Mari, Ph.D. Chemistry	Professor	Tenure	2010	9	0.75	0.05	0.04	9	0.75	0.05	0.04
A	Gary Castrogiovanni, Ph.D. Management	Professor	Tenure	2010	9	0.75	0.06	0.05	9	0.75	0.13	0.10
A	Chandra Mishra Management	Professor	Tenure	2010	9	0.75	0.06	0.05	9	0.75	0.13	0.10
A	Som Bhattacharya, Ph.D. Accounting	Professor	Tenure	2010	12	1.00	0.06	0.06	12	1.00	0.13	0.13

A	Allen Smith, Ph.D. Marketing	Associate	Tenure	2010	9	0.75	0.06	0.05	9	0.75	0.13	0.10
	Total Person-Years (PY)							**0.63**				**0.85**

Faculty Code		**Source of Funding**	**PY Workload by Budget Classsification**			
			Year 1			**Year 5**
A	Exisitng faculty on a regular line	Current Education & General Revenue	0.63			0.85
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.00			0.00
C	New faculty to be hired on a new line	New Education & General Revenue	0.00			0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00			0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00			0.00
		Overall Totals for	**Year 1**	**0.63**	**Year 5**	**0.85**

List of Life Sciences Companies in Southeast Florida[1]

Source: Workforce Alliance and University of Florida

NAME	SECTOR
Abrika Pharmaceuticals	Therapeutics, Delivery
Accu-Break Pharmaceuticals	Therapeutics, Delivery
Altor BioScience Corporation	Therapeutics
Anspach Effort	Med Device
Applichem	Contract Manufacturing, Therapeutics, Diagnostics
AssureImmune	Therapeutics
Atlas Spine	Med Device
Awareness Technology	Lab Instrumentation
Aveva Drug Delivery Systems	Therapeutics, Delivery
Beckman Coulter	Large Lab, Diagnostics
Bio-Nucleonics	Therapeutics
Bio-TechUSA	Diagnostics
Bio-Tissue	Biological Devices
Bioheart	Therapeutics
Biomet 3i	Med Device, Biological Devices
Biotest Biopharmaceuticals	Therapeutics
BioTools	Lab Services, Diagnostics
Boston Scientific	Med Device, Biological Devices, Delivery
Catalyst Pharmaceutical Partners	Therapeutics
PDR Chiral Corp	Lab Services, Diagnostics
Concordia Pharmaceuticals	Therapeutics
Cordis	Med Device, Biological Devices, Delivery
Custom Biologicals	Environmental, Diagnostics
Cygene Labs	Diagnostics, Lab Services, Therapeutics
Cytonics	Therapeutics, Diagnostics

[1] This is not a comprehensive list. Workforce Alliance has made a reasonable effort to ensure that the data herein is up-to-date and accurate at the time of disclosure. Authenticated information is only accurate as of the point in time of validation and verification. Workforce Alliance is not responsible for data that is misinterpreted or altered in any way. Southeast Florida is defined as Indian River County south through Monroe County

Cytorex Biosciences	Therapeutics
Dharma Biomedical	Therapeutics
DNA Labs International	Lab Services, Diagnostics
Dyadic	Genomic/Proteomics, Therapeutics, Industrial
GeneEx	Diagnostics
Goodwin Biotechnology	Contract Manufacturing, Diagnostics, Therapeutics
Heat Biologics	Therapeutics
Hema Diagnostic Systems	Diagnostics
Innovia	Med Device, Therapeutics, Biomaterials
iTherapeutics	Therapeutics
IVAX	Large Pharma, Therapeutics
Ivax Diagnostics	Diagnostics
Miami Cardiovascular Innovations	Med Device, Biological Devices, Delivery
MolecularMD	Diagnostics
National Healing Corporation	Large Health Care Services, Biological Devices
Natural Resource Protection	Environmental
Noven Pharmaceuticals	Therapeutics
Nutra Pharma	Therapeutics
Ocean Ridge Biosciences	Diagnostics, Genomics/Proteomics
Opko	Therapeutics, Diagnostics
OrbusNeich	Med Device, Biological Devices
Pique Therapeutics	Therapeutics
ReceptoPharm	Therapeutics
Schering Plough	Large Pharma, Therapeutics
Source Molecular	Environmental
Stiefel Laboratories	Large Pharma, Therapeutics, Delivery
TransDermal Technologies	Therapeutics, Delivery
US Spine	Med Device, Biological Devices
Vicor Technologies	Therapeutics
Watson Pharmaceuticals	Large Pharma, Therapeutics

SIGNATURES

Approved by:	***Date:***
Department Chair:	
_____	_____
College Curriculum Chair:	
_____	_____
College Dean:	
_____	_____
UGPC Chair:	
_____	_____
Dean of the Graduate College:	
_____	_____