

MBt Student Handbook

Program for Applied Biotechnology Studies (PABS) Master of Biotechnology

Cal State Fullerton
Cal State Los Angeles
Cal Poly Pomona



I. PROGRAM BACKGROUND

The PABS Master of Biotechnology Program

Introduction to the PABS MBt: A leader in Professional Science Masters Training

Southern California's biotechnology and biomedical device industries are key drivers of the nation's high-tech economy, and a well-trained, innovative workforce is essential to their continued growth and success. In response to this need, the California State University's Program for Applied Biotechnology Studies offers a Master of Biotechnology through the consortium of three CSU campuses: Cal State Fullerton, Cal Poly Pomona, and Cal State Los Angeles - the first consortium-based Professional Science Masters (PSM) program in the nation. The program draws on the strengths, resources and faculty expertise at each of the three member campuses in the areas of science, mathematics, engineering, computer science and business. Each campus offers at least one required course as well as advanced elective courses. PABS has served as a model for other such programs and is part of a growing number of Professional Science Masters programs in the US.

The PSM is an innovative, new graduate degree designed to allow students to pursue advanced training in science or mathematics, while simultaneously developing workplace skills highly valued by employers. PSM programs consist of two years of academic training in an emerging or interdisciplinary area, along with a professional component that may include internships and "cross-training" in workplace skills, such as business, communications, and regulatory affairs. All PSM Programs have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities.

The California State University (CSU) is recognized as a national leader in the PSM initiative, and has made the degree available through 24 programs in 16 discipline areas at 12 campuses. The PABS Program's focus on applied learning and active collaboration with industrial supporters provides one strong method to address the national concern with economic competitiveness and with the nation's ability to remain at the leading edge in high technology. For more information on PSM programs in the CSU, please visit: www.calstate.edu/psm/; and in the United States: www.sciencemasters.com.

In the PABS program, each student will be matriculated to a single "home-campus" at one of the PABS MBt consortium schools (Fullerton, LA, or Pomona). This campus will be the degree-granting institution and will house the courses for the student's concentration studies. Factors to consider in choosing a particular home campus include, but are not limited to, convenience of access to the campus and whether the campus offers strong courses in the concentration area of interest to the student.

The PABS Master of Biotechnology Curriculum: A focus on excellence

The Master of Biotechnology offers in-depth training in one of six technical disciplines (*see Concentration Areas below*) and "science-plus" training in business ethics, effective communication, project management and team leadership.

First Year

The first semester begins with a *Survey of Biotechnology*, a series of four courses that provide students with the competency to function effectively as contributing members of multidisciplinary teams. The Survey Series courses, taught at CSU Fullerton, include Technology Entrepreneurship and Commercialization, Molecular Biology and Pharmacology/Toxicology, Mathematical Modeling and Bioinformatics, Pharmaceuticals and Biomedical Device Technology.

During the second semester, students take Biotechnology Skills I (Drug Discovery Lab) and Project Management which are offered at CSU Los Angeles in the Winter Quarter. Students then take Regulatory Affairs, and Biotechnology Skills II (Microdevices Lab) and Biotechnology Skills III

(Stem Cell Lab) at Cal Poly Pomona in the Spring Quarter.

Summer Industry-Based Internship

After completing the foundational education provided in the first year of study, PABS students gain valuable practical by participating in an on-site internship with leading biotechnology and biomedical device companies in the Southern California region. Internships generally are 8-12 weeks long, and can serve as a bridge to the Applied Masters Project, the capstone experience of the program. Internships can also provide a valuable first step in establishing and/or broadening the student's professional network, a key element of success in the modern business world.

Second Year

During the third and fourth semesters of the PABS program, students complete the final Biotechnology Skills III at Cal Poly Pomona and complete course work in one of six concentration areas in their primary area of expertise at their home campuses. They also complete an Applied Master's Project, which includes individually-written project reports by team members and a presentation of the project findings.

More detail on the PABS curriculum in the ***Curriculum*** section of this handbook.

Concentration Areas

Medical Devices

Biomedical engineering for medical devices utilizes traditional engineering expertise to analyze and solve problems in biology and medicine. From nano-devices to artificial organs, biomedical device engineering encompasses a wide variety of applications and holds a tremendous potential for therapeutics development in the future. Students enrolled in the Concentration in Medical Devices will receive training in the technical areas related to bioinstrumentation and biomaterials. They also receive training in technical aspects of the regulatory and business environments associated with the clinical development and approval of medical devices. This concentration is well suited for students that have an engineering background.

Regulatory Affairs/Quality Assurance / Clinical Trials

The pharmaceutical industry is the most regulated of all industries, and regulatory affairs, quality assurance and clinical trials personnel are critical in managing these requirements. In this science-based concentration, students receive training in the fundamentals of FDA regulations surrounding the new drug development process. Students enrolled in the Concentration in Regulatory Affairs/Quality Assurance/Clinical Trials also receive training in statistics, preclinical and clinical trial design, data management and current Good Clinical Practice (cGCP). Concepts and practices in quality assurance and quality control also will be discussed. This concentration is suited for students from a wide variety of educational backgrounds.

Molecular Biology/Biochemistry

Innovation and development in the fields of industrial biochemistry and molecular biology have yielded many important applications to benefit mankind. For example, industrial biochemists and molecular biologists are involved with many critical aspects of the drug discovery and development process, including the identification of therapeutic targets, isolation and screening of novel therapeutic agents, and assessing the molecular interactions of these *in vitro* and *in vivo*. They are key players in solving medical problems at the molecular level. Students enrolled in the Concentration in Molecular Biology/ Biochemistry will receive training in the fundamental principles and techniques associated with drug discovery and development in the pharmaceutical and biotechnology industries. This concentration area is suited for students that have a Biology, Biochemistry, Physics or Engineering educational background.

Informatics/Biomathematics

Bioinformatics utilizes pattern recognition algorithms to identify biological or clinical patterns in

large amounts of data. Professional work is generally grouped into algorithm development, software engineering and systems biology. Since data mining continues to produce vast amounts of data and many new opportunities for therapeutics development, professionals in the area of bioinformatics are in high demand. Students enrolled in the Concentration in Informatics/Biomathematics will receive training in the theory and methods associated with their choice of one of the above three areas, with a focus on industrial applications. This concentration area is best suited to students that have an educational background in mathematics or computer science.

Biotechnology Business

The businesses of biotechnology, medical devices and molecular diagnostics are varied and complex. The bright promises of advances in micro- and nano-devices and discoveries from genomics and proteomics are balanced by a dwindling drug development pipeline and increased competition from generics. Individuals who have a solid foundation in both management and in technology are needed to address the business and management requirements of life science industries. Students enrolled in the Concentration in Biotechnology Business and Law receive training in analysis of biotechnology market trends, identification of strategic development opportunities, and business risk management. The PABS Professional Science Master's Program provides excellent preparation for the future managers of the biotechnology sector. This concentration area is best suited for students that have an educational or practical background in business.

Analytical Chemistry

Analytical chemists are employed in all aspects of chemical research in the biotechnology sector, and their work comprises the foundation of the basic operations of the biotechnology industry, including drug discovery, manufacturing, and quality assurance and control practices. The analytical chemist is involved in basic laboratory research, process and product development, and analytic instrument design, and provides support in marketing and intellectual property evaluation. Students enrolled in the Concentration in Analytical Chemistry have an option to receive training in the fundamental principles and techniques employed by pharmaceutical, biotechnology and medical device industries, including drug discovery and development, process development and validation, or in total quality management in manufacturing. This concentration area is best suited for students that have a strong background in chemistry and analytical chemistry.

Corporate Partners

The Program for Applied Biotechnology Studies has been developed in collaboration with many of the leading biotechnology and medical device companies and life science industry trade organizations in Los Angeles and Orange County. PABS Corporate partners include: Allergan, Ambry Genetics, Amgen, Applied Nanovolumes, Bausch and Lomb, Beckman-Coulter, BIOCUM, Carolina Liquid Chemistries, GenChem, Edwards LifeSciences, Eyeonics, Gilead Sciences, Grifols Biologicals, Irvine Scientific, Mannkind Corporation, Kite Pharma, Medtronic, Molecular Express, Ophidion, SoCalBio, TECO Diagnostics, Valeant Pharmaceuticals, Watson Pharmaceuticals, and WSP Environmental Strategies.

Corporate partners contribute to the program's success and insure its relevance to industry needs in a number of ways, including:

- Program Advisement and Curriculum Development
- Case Studies
- Industrial-Based Fellowships
- Continuing Education for Professionals
- Expert Participation in Instruction
- Master's Projects
- Material Support

- Scholarships

The PABS program spans a large geographic territory that mirrors the distribution of biomedical businesses in the Los Angeles and Northern Orange County regions (PABS Campuses are the vertices on the triangle). This map provides general picture of the relationship of PABS and the 500+ biomedical businesses in the area. The physical proximity of PABS and these businesses is very important in maintaining a dynamic program that meets the educational needs of students and the expertise needs of industry.



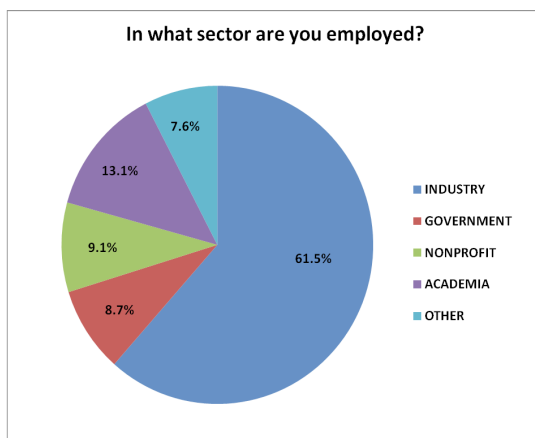
PABS Geography

Careers

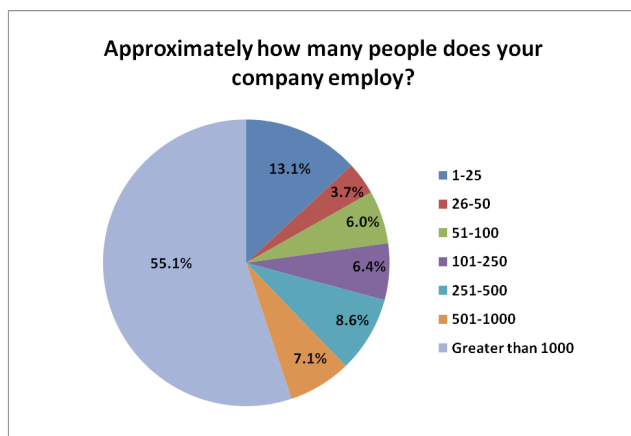
What are PSM alumni doing now?

The National Professional Science Masters Association (NPSMA) recently conducted a survey of the PSM-alumni employment. The results of the survey are summarized in Figures 1 and 2 below. The most frequently reported job titles were variations of “Senior/Research”, “Assistant/Associate” and “Project/Product/Program Manager”. Fifty-five percent of PSM alumni surveyed are working for large companies (those with 100 of more employees). There is near equal distribution of the remaining 45%, with 22% at mid-sized companies, and 23% at small companies. This distribution is shown in Figure 2.

Fifty-one percent of respondents reported that they were in the same job that they had upon completion of their PSM degree. Forty-three percent had earned a promotion since receiving their PSM degree and, of those, 44% indicated that their eligibility for the promotion was a result of having received the PSM degree.



PSM Alumni employment



Distribution of PSM Industrial Employment

Where can I get more information?

For more information about the PABS MBt Program in Biotechnology, contact the PABS Program Director, Dr. David Dyer, by e-mail at ddyer@fullerton.edu or by phone at (657) 278-7260. You also are welcome to visit the main office of the program located in 236B McCarthy Hall, or to write to the PABS Program Director, Department of Biological Science, California State University, Fullerton, 800 North State College Blvd., Fullerton, CA 92834-6850. For more information, visit our website at <http://pabs.fullerton.edu>

II. PABS PROGRAM MECHANICS

Admission to the PABS Program

Students seeking admission to the PABS MBt program must have: a B.S. degree in biology or related area from an accredited college or university; a GPA of 3.0 in all biology or biology-related courses (e.g. Biochemistry) and a GPA of 2.5 in all supporting course work in chemistry, physics, and mathematics. Students must submit their scores from one of the following: Graduate Record Examination (GRE) General test, Medical College Admission Test (MCAT), or Dental Admission Test (DAT). No absolute score on the entrance exams is required for admission, but the scores are used in the evaluation procedure, with special attention given to quantitative and writing/reading comprehension areas. To be admitted to the program, an applicant must be accepted by the PABS Program and the home campus. Further details on the application process can be obtained at <http://pabs.fullerton.edu>.

Policy of Good Standing

1. University Regulations

Grade-Point Average Requirements A grade point average (grade points divided by units attempted) of at least 3.0 is required for graduation with a master's degree. This grade point average applies to (1) the student's graduate grade point average (all 400- and 500-level units attempted subsequent to admission to a degree program, including all transfer work and previous coursework approved for use in the graduate career) and (2) the student's Study Plan grade point average (all units required on the graduate Study Plan including transfer courses). Each course on the Study Plan must be completed with a grade of "C" (2.0) or better.

A degree student may request a change in the Study Plan in order to raise the Study Plan grade point average by:

1. Adding no more than six units of approved coursework, or
2. Repeating no more than six units of coursework in which a "C" (2.0) or lower was earned, or
3. A combination of 1. and 2. not to exceed six units.

Requests to add courses to the Study Plan, repeat courses, or add courses to raise the overall grade point average, must be approved by the graduate program adviser and the associate vice president, Graduate Programs and Research (or designee) prior to registration. When a course is added or repeated, the original course remains on the Study Plan and on the student's transcript and both grades are used in calculating the student's grade point average.

A grade point average of at least 2.5 is required for continuing status as a credential, certificate or undeclared postbaccalaureate student.

Repeated Courses If a grade less than "C" (2.0) is received in a Study Plan course, the course must be repeated and passed with a grade of "C" (2.0) or better. A course may be repeated only once. ***If a course is repeated, both grades are included when computing the student's Study Plan and cumulative Cal State Fullerton grade point average.*** Repetition of a course carries no additional unit credit toward the degree; however, the additional units are included in the cumulative units shown on the Cal State Fullerton transcript. In extenuating circumstances, the student may petition the associate vice president, Graduate Programs and Research (or designee) to add another course to the approved program with the unit value equivalent to that of the course in which the unsatisfactory grade was received. Successful repetition of a course originally passed carries no additional unit credit toward a degree.

Probation A graduate student enrolled in a graduate degree program will be placed on academic probation if either the graduate or the Study Plan grade-point average falls below 3.0. A graduate student may also be placed on probation for reasons other than graduate and/or Study Plan grade-point average. This is known as administrative-academic probation. The reasons for this may include repeated withdrawal, failure to progress toward an educational objective, non-compliance with an academic requirement, failure to demonstrate a level of professional competence or fitness commensurate with the standards of the student's discipline, or inappropriate behavior as defined in the Student Bill of Rights and Responsibilities, and in the Academic Dishonesty sections of the University catalog (see "University Regulations"). Graduate degree students will be allowed two semesters on academic probation, following the semester in which the grade point average fell below the minimum 3.0 standard, before being subject to disqualification. Students will remain on administrative-academic probation contingent upon conditions required for their continuing in the program. The Graduate Studies Office maintains a list of students on probation and subject to disqualification.

Disqualification The associate vice president, Graduate Programs and Research (or designee), in consultation with the student's graduate program adviser, will disqualify a graduate student who is on probation if the student does not, or cannot, raise the Study Plan and graduate grade point average to 3.0 by the completion of the second regular semester following the semester in which the grade point average fell below the minimum 3.0 standard.

If a student's grade point average becomes so low that it cannot be raised to 3.0 within the prescribed limits of coursework, the student will be disqualified from the master's degree program. Students placed on probation for reasons other than grade point average will be disqualified if:

1. The conditions for removal of administrative-academic probation are not met within the period specified.
2. The student becomes subject to academic probation while on administrative-academic probation.
3. The student is removed from administrative-academic probation and subsequently becomes subject to administrative-academic probation for the same or similar reasons as originally placed on probation.

Disqualification removes a student from graduate standing and prevents further enrollment in university courses (except through University Extended Education). A student who has been disqualified from a master's degree program may not apply for readmission to that program. However, a student who has been disqualified from one degree program may apply for readmission to a different degree program. A readmitted student must file a new Study Plan that meets current requirements and policies. Any disqualified student who wishes to use previous coursework must have it approved by the associate vice president, Graduate Programs and Research (or designee).

Appeals related to graduate degree probation or disqualification should first be directed to the departmental graduate program adviser. Please contact the Graduate Studies Office for further information and procedures.

2. PABS MBt Program Regulations

1. PABS students must make adequate progress through the two-year curriculum, and maintain a full-time course load.
2. PABS students must have a cumulative GPA on their Graduate Study Plan courses at the end of the first academic year of no less than 3.0 in order to participate in an industrial internship.
3. If a student does not earn at least a grade of “B” in the internship, then he or she will be placed on academic/administrative probation, and must repeat the internship within two semesters.
 - a. A student in this situation can continue to take other courses listed on the Graduate Study Plan.
 - b. If the student does not successfully complete the repeat internship with a letter grade of “B” or better, he or she will be placed on academic/administrative probation, and be required to repeat an internship.
4. PABS students must obtain a grade of “B” or better in the internship in order to qualify for placement into an Applied Masters Project (AMP). A student that is unable to participate in an AMP can continue to take other courses listed on the Graduate Study Plan.

Advising and Graduate Study Plan

The PABS Program Director serves as the Graduate Advisor for students in the program. All PABS students must meet with the PABS Program Director at least twice monthly either by phone or in person to review program progress. A Graduate Study Plan (GSP) must be filed with the Graduate Studies Office before nine units have been completed toward the MBt. The GSP is the educational plan and contract that you must follow to complete the degree program. You should at all times be aware of the status of your progress related to the GSP. The PABS Program Director will work with PABS Students to set up the GSP in Fall of the first semester of coursework at CSU Fullerton. The requirements for the PABS MBt degree Study Plan include the following:

- 40 /60 total approved semester/quarter units
- 9/12 approved semester/quarter units in concentration courses
- University policy does not allow 300-level courses on graduate Study Plans.
- No more than six semester units shall be allowed for a thesis or project.
- No courses taken to satisfy prerequisite requirements.
- No correspondence courses and/or credit by examination.
- No courses with nontraditional grades (e.g., CR, S, P).
- Each course on the Study Plan must be completed with a grade of “C” (2.0) or better.
- A minimum grade-point average of 3.0 (“B”) in all courses attempted to satisfy requirements for the degree.
- Completion of all Study Plan courses within ten consecutive semesters (5 years) or fourteen consecutive semesters (7 years) with approved extension. The time limit starts with the earliest course on the Study Plan.
- All courses must be taken after completion of the baccalaureate (or postgraduate credit granted).
- No courses credited toward another degree.
- A final evaluation, which the Applied Masters Project project, comprising a written report and presentation.

The approved Study Plan is valid as long as the student maintains continuous enrollment in regular semesters at the university; otherwise it is necessary to reapply and meet any changed or additional requirements approved in the interim. Changes to the GSP must be authorized by the PABS Program Director and the Biology Chair of your home campus. Students wishing to make such changes should fill out the appropriate study plan change form from their home campus biology department.

Curriculum

PABS is considered a “lock-step cohort” program, which means that the program curriculum is for the most part predetermined. PABS Core Courses are offered only once per year, so a course repeat is not possible until the course is offered in the following year. The curriculum involves taking courses at the three PABS campuses in the following sequence:

Semester 1 (Courses are taught at Cal State Fullerton)

- Management 573 (Commercialization of Technology)
- Biology 570 (Survey of Biotechnology: Pharm/Tox)
- Biology 571 (Survey of Biotechnology: Informatics)
- Biology 572 (Survey of Biotechnology: Pharm Processes/Med Devices)

Semester 2a/Winter Quarter* (Courses are taught at Cal State Los Angeles)

- Biology 518 (Skills Laboratory; Drug Discovery)
- Management 554 (Project Management)

Semester 2b/Spring Quarter* (Courses are taught at Cal Poly Pomona)

- Biology 576 (Regulatory Affairs)
- Biology 456 (Skills Laboratory; Stem Cells)
- Engineering 520L (Skills Laboratory; Microdevices)

Summer 1

- Biology 580 (Internship)

Semester 3

- Applied Masters Project (Course numbers vary with home campus)
- Concentration Course 1 (Course numbers vary)

Semester 4

- Applied Masters Project (Course numbers vary with home campus)
- Concentration Courses 2 and 3 (Course numbers vary)

- *Cal Poly Pomona and Cal State Los Angeles are on a quarter system, and Fullerton is on a semester system.*

MBt Registration and Fee Payment Process

A. **Registration:** MBt students apply to, are accepted at, and enroll and pay fees at their home campus.

B. **Visitor and Concurrent Enrollment Forms:** MBt students will use the Intercampus Visitor Enrollment (IVE) and Intercampus Concurrent Enrollment (ICE) Forms (see Appendices 1a and 1b for the forms) for registration for courses taught at *non-home* campuses. For example, in the first semester of the program, courses are taught at Cal State Fullerton. Therefore, Cal Poly Pomona and Cal State Los Angeles students would use the IVE form for registration, and Fullerton students would enroll normally. In the Winter Quarter (Semester 2a) PABS courses are taught at Cal State Los Angeles. Therefore, Fullerton and Pomona students would use the IVE form for registration, while Los Angeles students would enroll by the normal mechanism.

The IVE form must be used when the student is taking ALL courses at a non-home PABS campus. The ICE form must be used when the student is taking SOME courses on the home campus, and SOME courses at a non-home campus. These forms will be identified with “MBt PROGRAM” at the top left corner.

Once forms have been approved by the PABS Program Director and Department Chairs, they will be delivered by the PABS Program Director to the registrar at the appropriate campus. Students must complete this process so that late class adds are not required. The PABS Intercampus Roadmap (see Appendix 2 and below) indicates the registration mode for students at each campus during each semester with either “IVE” or “ICE” “N” for normal. Certain courses for the Regulatory Affairs concentration are offered only online. Students wishing to enroll in these courses would pay fees for the course directly to the online registrar for the course.

C. **Intercampus Roadmap and Equivalent Courses:** To simplify the transfer and transcribing of grades earned by students across the three PABS campuses, a system of equivalent course numbers has been developed. This information is summarized in the “PABS Intercampus Course Roadmap” (see Appendix 2). This document shows the courses being taught in gray boxes, and the equivalent course numbers in the white boxes adjacent to these. For example, for the Fullerton course BIOL 570, the equivalent course number at Pomona would be BIO573, and at Los Angeles, BIOL570. As an additional example, the course MGMT554 taught at Cal State Los Angeles has the equivalent course number GBA554 at Cal Poly Pomona and MGMT554 at Cal State Fullerton. You will be asked to provide equivalent course numbers for the PABS first year core courses referenced at this table whenever you are enrolling in non-home campus courses.

D. **Fee Payment Process:** MBt Students will pay fees at the *Home Campus* except for the two summer session courses offered via University Extended Education (UEE) at CSUF: MGMT 573, which is the first required course, and BIOL 580. These classes are paid for on a per unit basis (designated as UEE special session courses). Currently, a parallel course for the Summer Internship (CSUF) BIOL 580 has been established at CSULA (BIOL 598). CSULA students will enroll in BIOL 598 at CSULA in Summer 2011. Cal Poly Pomona has not yet established a parallel for this course (BIOL 580) and these students will enroll in (and pay for) BIOL 580 at CSUF in Summer 2011. For MBt students only, NO Visitor or Concurrent status applies for fee payment purposes. Instead, a Study Agreement will be coded for fee payment purposes. MBt students will follow the fee payment deadlines set by their home campus.

Concentration Courses

In addition to the PABS Core courses, PABS students must also complete 3 courses (9 semester units/12 quarter units) in their concentration area. PABS currently offers six concentration areas:

1. Molecular Biology/Biochemistry
2. Analytical Chemistry
3. Engineering
4. Business
5. Informatics/Biomathematics
6. Regulatory Affairs

Further detail about the nature of career paths associated with each of these study areas is provided on pages 4-5 of this handbook. While the PABS core courses require no prerequisite coursework, the concentration courses, offered often by departments outside of the biology departments that house PABS, often do have prerequisites. In the majority of cases, these prerequisites may be met by coursework taken by students in their undergraduate major. Therefore, a student wishing to pursue a concentration in engineering, for example, would need the background provided by an undergraduate degree in engineering. This is likewise the case for concentrations 1, 2, 4 and 5. The concentration area of Regulatory Affairs does not require an undergraduate major in that area (there are no undergraduate majors at this time in Regulatory Affairs in the United States).

There are a wide variety of concentration courses from which to choose, and the PABS Program Director will assist students in choosing those courses. These concentration courses will be entered in the Graduate Study Plan, which is filed with the Graduate Studies Offices at the student's home campus. If a student wishes to change a concentration course after the GSP has been filed, he or she will have to file an official GSP change form, which must be signed by the Program Director, and turned in for approval by the Biology Chair.

PABS Internship

The PABS MBt internship is a key element of the MBt degree program. The internship should enable the student to:

- Experience first hand the nature of the business workplace in his or her area of expertise
- Apply knowledge acquired from previous training and academic experience to practical problems at the workplace
- Acquire additional skills and knowledge related to the business environment
- Carry out work that is useful to the internship site and to the student
- Produce a written analytical evaluation of the experience
- Interact regularly with industrial professionals and become knowledgeable about their skills work responsibilities and requirements.

Policies

A. Professional Behavior and Confidentiality

Internship Placement: PABS students will be placed for the most part in internships that are prearranged with industrial partners. A few of our partners will recruit interns on a competitive basis. All PABS MBt students are required to dress and act professionally, be on time and be fully engaged at all times on the worksite. Further, they are to conduct themselves according to the highest ethical standards, and to positively represent the PABS MBt program.

B. Internships at Employment Sites

- Students can receive internship credit at their sites of employment under the following circumstances:
- The place of internship is approved by the ICCT and the Internship Sponsor
- The student is assigned to a new area of responsibility (e.g. different department) for the duration of the internship. Students cannot receive credit for their regular jobs and must be allowed to have the opportunity to learn new skills and obtain new knowledge

C. Site Supervision

The internship site mentor will work in conjunction with the PABS Internship coordinator (e.g. PABS Program Director) to monitor the intern. The site mentor and the Intern Coordinator will communicate on a weekly basis to review the performance and progress of the intern. The comments and contents of these updates will be logged by the Intern Coordinator, and made available to the student and Intercampus Coordination Team members upon request. A fellow MBt student may not mentor the intern.

D. Compensation

Compensation for internships is allowed, but not the responsibility of the California State University, or the PABS MBt program.

E. Liability

Neither the California State University System, nor the PABS MBt program can assume worker's comp liability the intern for off-campus activities. This must be covered by the internship-sponsoring business. If the internship-sponsor will not cover the intern, there is a low-cost liability coverage plan available to students through the student health centers at the home campus. It is the student's responsibility in this case to purchase such insurance.

Coursework

A. Hours and Credits

Interns must complete 320 work hours *minimum* at an approved internship site. The student should sign up for the appropriate course at his or her campus in the fall semester/quarter following the internship to obtain the 1 unit course credit for the internship.

B. Internship Requirements

1. Identification of an appropriate MBt internship site and mentor.
2. Development of Learning Objectives prior to the start of the internship. These objectives must be pre-approved by the internship coordinator. After approval, the form must be signed by the student, mentor, and internship coordinator.
3. Completion of the Internship Memorandum of Understanding with signatures documenting approval by the student, mentor, and internship coordinator (see attached form).
4. Completion of the Student Consent Form with signature by the student.
5. Completion of on-site internship.
6. Completion of Student Evaluation of Internship and Mentor Evaluation of Student. These will also be emailed to the mentor and student prior to the end of the internship.
7. Submission of the Internship Portfolio that includes the Internship Memorandum of Understanding with the final signatures from the site mentor, student and Internship Coordinator documenting completion.

C. PABS Internship Learning Objectives

The PABS internship program learning objectives are aimed at optimizing the internship experience. PABS has established that the Student Learning Objectives (SLO's) given in Appendix 1 should be met in the process of the internship. The activities carried out by the interns will vary with the needs and activities of the internship sponsors, however, PABS requests that internship activities be directed at achieving as many of these objectives as possible.

In order to accomplish this, several weeks prior to the start of the internship, the student and the site mentor should meet to plan out the internship activities. Activities must be achievable and measurable, and their descriptions should be as specific as possible. Use words such as "describe", "recognize", "identify", "employ", "interpret", "apply", "analyze", "compare", "design", "create", "evaluate", or "manage". The PABS Internship Coordinator will assist the site, if necessary, in writing up these activities.

Responsibilities

A. Student Time Line of Responsibilities

1. Apply and interview to internship opportunities as prompted by the Internship Coordinator.
2. When site selection is confirmed, work with the site mentor to develop and finalize the Learning Objectives and specific activities to accomplish these objectives (student, site mentor and internship coordinator should review and sign this document).
3. Complete all necessary forms:
 - i. Internship Memorandum of Understanding
 - ii. Learning Objectives Activities
 - iii. Student Consent Form
4. Make final work schedule arrangements and expected start date; inform internship coordinator of your schedule and start date.

Documents and forms associated with the PABS Internship are available from the Program Director, and will be distributed prior to the start of internships in the Spring of the first year of instruction.

Applied Masters Project

Program for Applied Biotechnology

Student Applied Masters Project Manual

Introduction

This manual is intended to assist students, site supervisors in planning for and carrying out Applied Masters Projects that fulfill the degree requirements of the PABS Master of Biotechnology program. All MBt students must have at least an aggregate of 12 weeks of full time (480 hours) experience working on an assigned project on-site in a pharmaceuticals, biotechnology or medical device engineering business.

PURPOSE

The PABS MBt Applied Masters Project is a capstone element of the MBt degree program. The project should build on the industrial experience gained by the student in the course of the PABS curriculum and internship, and further enable the student to:

- Experience first hand the nature of the business workplace in his or her area of expertise
- Apply knowledge acquired from previous training and academic experience to a practical problem at the workplace
- Acquire additional skills and knowledge related to the business environment
- Plan and carry out work that is useful to the sponsor site and to the student
- Produce a written analytical report of the work completed
- Be able to clearly and succinctly explain the outcome and results of the assigned project to industry professionals.
- Interact regularly with industrial professionals and become knowledgeable about their skills work responsibilities and requirements.

POLICIES

A. Professional Behavior

Project Placement: PABS students will be placed for the most part in projects that are prearranged with industrial partners. A few of the PABS industrial partners will recruit students on a competitive basis. All PABS MBt students are required to dress and act professionally, be on time and be fully engaged at all times on the worksite. Further, they are to conduct themselves according to the highest ethical standards, and to positively represent the PABS MBt program.

B. Projects at Employment Sites

Students can receive project credit at their sites of employment under the following circumstances:

- The location of the project is approved by the ICCT and the PABS MBt Program Director
- The student is assigned to a new area of responsibility (e.g. different department) for the duration of the project. Students cannot receive credit for their regular jobs and must be allowed to have the opportunity to learn new skills and obtain new knowledge

C. Site Supervision

The project site mentor will work in conjunction with the PABS Program Director to monitor the student. The site mentor and the PABS Program Director will communicate on a weekly basis to review the performance and progress of the student. The comments and contents of these updates will be logged by the Director, and made available to the student and Intercampus Coordination Team members upon request. A fellow MBt student may not act as a mentor to a classmate. In addition, projects from industrial partners are considered confidential in nature. Students will

often be required by project sponsors to sign a formal nondisclosure agreement in order to protect the intellectual property of the project sponsor.

D. Intellectual Property and Confidentiality

The full project report, containing potentially confidential information, will remain in the possession of the sponsoring company. A second report, written without any proprietary information, will be assembled after the formal project presentation and defense. This second, “public” copy of the report will be retained by the PABS Program Director in the program offices at Cal State Fullerton. In addition, a .pdf version of the public copy will be made available to the Biological Science department of the student’s home campus.

E. Compensation

Compensation for projects is allowed, but not the responsibility of the California State University, or the PABS MBt program.

F. Liability

Neither the California State University System, nor the PABS MBt program can assume worker’s comp liability the student for off-campus activities; which must be covered by the project-sponsoring business. Alternatively, low cost insurance is available at each of the PABS campuses, and may be paid by the student if the sponsoring company will not cover this cost.

COURSEWORK

A. Hours and Credits

Students must complete 480 work hours *minimum* at an approved project site. The student should sign up for the appropriate course at his or her campus in the fall semester/quarter following the project to obtain the units of course credit for the project as follows:

Campus	Course	Units
Fullerton	BIOL597	Fall Semester: 3, Spring Semester: 3
Pomona	BIO500	Fall Qtr: 3, Wtr Qtr: 3, Spring Qtr: 3
Los Angeles	BIOL599	Fall Qtr: 3, Wtr Qtr: 3, Spring Qtr: 3

B. Project Requirements

1. Identification of an appropriate MBt project site, mentor and project committee.
2. Development of Learning Objectives and a Project Plan prior to the start of the project. These objectives must be pre-approved by the PABS Program Director. After approval, the Objectives and Plan must be signed by the student, mentor, and PABS Program Director (see Appendix 1).
3. Completion of the Project Memorandum of Understanding with signatures documenting approval by the student, mentor, and PABS Program Director (see attached form).
4. Completion of the Student Consent Form with signature by the student (see attached form).
5. Completion of on-site project.
6. Completion of Student Evaluation of Project, and Mentor Evaluation of Student (see attached forms). These will also be emailed to the mentor and student prior to the end of the project.
7. Submission of the Project Portfolio that includes the Project Memorandum of Understanding with the final signatures from the site mentor, student and PABS Program Director documenting completion and Project and Presentation Evaluation Forms, completed, signed and dated by all committee members.
8. Oral Presentation of the project to Project Committee.

C. PABS Project Learning Objectives

The PABS Applied Masters Project learning objectives are intended to optimize the student and sponsor’s project experience. PABS has established that the Student

Learning Objectives (SLO's) should be met in the process of completing the project. The activities carried out by the students will vary with the needs and activities of the project sponsors, however, PABS requests that project activities be directed at achieving as many of these objectives as possible.

In order to accomplish this, several weeks prior to the start of the project, the student and the site mentor should meet to plan out the project activities. Activities must be achievable and measurable, and their descriptions should be as specific as possible. Use words such as "describe", "recognize", "identify", "employ", "interpret", "apply", "analyze", "compare", "design", "create", "evaluate", or "manage". The PABS Program Director will assist the site, if necessary, in writing up these activities.

D. Project Deviations

In some cases business circumstances may prevent the completion of the original project. In this situation, students must work with site mentors to identify an alternative project to replace that. In such cases, the student under the guidance of the site-mentor, must complete a "PABS AMP Project Deviation Memorandum". This document must be approved by the project committee, PABS Program Director, and Biology Department Chair prior to the student's commencing work on an alternative project.

Responsibilities

A. Committee

1. The AMP Committee shall consist of at least one Industrial Mentor, and at least one faculty member from the student's home campus, preferably with experience in the project topic, and the PABS Program Director.
2. The AMP Committee shall be responsible for project and student oversight and evaluation.

B. Student Time Line of Responsibilities

1. Apply and interview to appropriate AMP-sponsoring companies, as directed by the PABS Program Director.
2. When site selection is confirmed, work with the site mentor to develop and finalize the Learning Objectives and Project Plan to accomplish these objectives (student, site mentor and PABS Program Director should review and sign this document).
3. Complete all necessary forms:
 - i. Project Memorandum of Understanding
 - ii. Student Learning Objectives Activities
 - iii. Student Consent Form
4. Make final work schedule arrangements and set a project start date. Inform PABS Program Director of your schedule and start date.

Important Note: All PABS MBt students must represent the University and themselves in a professional manner and must adhere to the rules and regulations of the project site. Should there be a problem that cannot be satisfactorily resolved with your site supervisor, consult with the PABS Program Director.

C. Site Mentor

1. Help develop approve and sign the Learning Objectives prior to the start of the project.
2. Provide initial signature for the Project Memorandum of Understanding.
3. Make all needed arrangements for the student experience.
4. Insure that the student has physical space at the site.
5. Insure that the student is actively involved at the site.
6. Provide orientation, guidance and supervision to the project student.
7. Monitor the progress of the student and communicate developmental needs.

8. Provide evaluations of the student. One face-to-face evaluation should be done mid way through the project and one at the conclusion of the project.
9. Provide the final completion signature for the project Memorandum of Understanding.
10. Contact the PABS Program Director if any problem arises that is not resolved after meeting with the student.

D. PABS Program Director Responsibilities:

1. Meet with student to discuss possible sites
2. Insure all program paperwork has been completed with appropriate signatures.
3. Review developed learning objectives and activities (providing feedback where needed_ and provide the initial signature for the project Memorandum of Understanding.
4. Contact the student during the project regularly to monitor status
5. Provide the final signature for the project Memorandum of Understanding.
6. Receive evaluations of student and site.
7. Maintain ongoing files for historical purposes on students and project sites.

PABS AMP Student Learning Outcomes

Communications Skills. *The PABS Student will:*

1. Work effectively as a team member at the project site, and observe how teamwork relates to the daily operations of the department and to the company as a whole.
2. Communicate effectively with individuals at the project site.
3. Write and present project proposals and technical reports that communicate effectively with all levels of an organization associated with the project.
4. Evaluate the project experience by completing a written report and delivering a formal oral presentation on the project experience to the site mentor, site coordinator, and other academic and/or business professionals as appropriate.

Content and Contextual Knowledge. *The PABS Student will:*

1. Demonstrate and apply knowledge in a primary area of expertise.
2. Identify and critically evaluate the literature important to the project focus area.
3. Obtain a basic comprehension of the project activities as they relate to the department functions, and to the company as a whole.
4. Obtain an understanding of the driving forces behind the sponsor company's business model
5. Gain an appreciation of the constraints and opportunities afforded by ethical business principles and practices.
6. Gain an understanding of the basic project organization and management skills unique to the project area of focus.

Applications. *The PABS Student will:*

1. Apply and improve his or her existing technical skill set in the discipline area of the project.
2. Identify and critically evaluate the experimental or practical designs associated with problem solving in the project focus area.
3. Demonstrate professional behavior including conscientious and meticulous performance and a collaborative work ethic.

Conclusion:

The PABS MBt project is intended to be a rewarding and exciting educational experience. Students have the responsibility to set up and complete the experience; the PABS Program

Director, the student and the site mentor share responsibility for making the project experience successful. The PABS Program Director is available to assist students and site supervisors throughout the process. Documents and forms associated with the PABS AMP are available from the Program Director, and will be distributed prior to the start of internships in the Fall of the second year of instruction.

Graduation

To provide adequate time for the completion of Applied Masters Projects, diplomas for the PABS MBt program are issued no earlier than August after the completion of the PABS curriculum in the second year of study. Qualified students may participate in spring commencement activities at their home campus prior to the issuance of the diploma. The degree issued at each campus is Master of Biotechnology, with concentration area listed on the diploma.

Campus Calendars 2011-12
Cal State Fullerton

FALL SEMESTER 2010*

Date	Day	Event
August 19	Thursday	Academic year begins
August 21	Saturday	First day of classes
September 6	Monday	Labor Day - CAMPUS CLOSED
October 1	Friday	Initial period for filing application for admission to the fall 2011 semester begins
October 12	Tuesday	Columbus Day - CAMPUS OPEN
November 11	Thursday	Veterans Day - CAMPUS CLOSED
November 22-28	Monday-Sunday	Fall Recess - NO CLASSES CAMPUS OPEN 11/22-24 CAMPUS CLOSED 11/25-28
December 10	Friday	Last day of classes
December 11-17	Saturday-Friday	Semester examinations
December 18	Saturday	First Day of 2010-2011 INTERSESSION Session A Classes
December 24-30	Friday-Thursday	Winter Recess - CAMPUS CLOSED
December 31	Friday	New Year's Holiday - CAMPUS CLOSED
January 3	Monday	Fall 2010 semester ends; Grade reports due

SPRING SEMESTER 2011*

Date	Day	Event
January 20	Thursday	Semester begins
January 22	Saturday	First day of classes
February 21	Monday	Presidents' Day - CAMPUS CLOSED
l 3	Monday-Sunday	Spring recess - NO CLASSES; CAMPUS OPEN EXCEPT on Thurs, March31, Cesar Chavez Day
March 31	Thursday	Cesar Chavez Day - CAMPUS CLOSED
April 4	Monday	Classes resume
May 13	Friday	Last day of classes
May 14-20	Saturday-Sunday	Semester examinations
May 21-22	Saturday-Sunday	Commencement Exercises
May 27	Friday	Semester ends; Grade reports due
May 30	Monday	Memorial Day - CAMPUS CLOSED

Campus Calendars 2011-12

Cal State Los Angeles

FALL QUARTER 2011

September 22	Fall quarter; classes begin
November 11	Veteran's Day; campus closed
November 24-26	Thanksgiving holidays; campus closed
December 5-10	Final examinations
December 11-January 8	Student recess

WINTER QUARTER 2012

January 2	New Year's Day observed; campus closed
January 9	Winter quarter; classes begin
January 16	Martin Luther King, Jr.'s birthday; campus closed
March 19-24	Final examinations
March 25-April 1	Student recess

SPRING QUARTER 2012

April 2	Spring quarter; classes begin
March 30	Cesar Chavez Day observed; campus closed
May 28	Memorial Day; campus closed
June 11-16	Final examinations
June 15-16	Commencement
June 17-24	Student recess

Campus Calendars 2011-12

Cal Poly Pomona

FALL QUARTER 2011

Scheduling and Registration

April 18 - May 13	Registration Advising Period
June 27-August 4	New Student Orientation (tentative)
August 23-25	Late Orientation (tentative)
May 16-June 3	General Registration Period
August 22	Fee Bills Posted to Bronco Direct
September 2	Fees Due
Sept. 12-28	Add Period: Students register and add classes
Sept. 12-October 14	Drop Period: Students may drop classes
September 28	Last day to register and add classes, or to drop classes without course being recorded
September 28	Last day to drop units and receive refund of State University fee
October 17	First day to withdraw for serious and compelling reasons, permitted by petition only
October 16	Last day to apply for current quarter graduation

WINTER QUARTER, 2012

Academic Instruction

January 3	Classes begin for all students
January 16	Martin Luther King's Birthday—Academic Holiday
March 12-16	Final examinations
March 17-25	Spring Break
March 20	Last day to submit approved Master's Thesis/Project for binding; grades due

Scheduling and Registration

October 10-21	Registration Advising Period
October 14 & 21	New Student Orientation (tentative)
Oct. 24-November 18	General Registration Period
November 21	Fee Bills Posted to Bronco Direct
December 2	Late Orientation (tentative)
December 5	Fees Due
December 20-23 and January 3-9	Add Period: Students register and add classes
December 20-23 and January 3-24	Drop Period: Students may drop classes
January 9	Last day to register and add classes, or to drop classes without course being recorded
January 9	Last day to drop units and receive refund of State University fee
January 25	First day to withdraw for serious and compelling reasons, permitted by petition only
February 3	Last day to apply for current quarter graduation 2012

Cal Poly Pomona Calendar, ctd.

SPRING QUARTER, 2012

Academic Instruction

March 26	Classes begin for all students
March 30	Cesar Chavez Holiday – Academic Holiday
May 28	Memorial Day—Academic Holiday
June 4-8	Final examinations
June 6	Last day to submit approved Master’s Thesis/Project for binding
June 8-10	Commencement (Contact major department office for specific date and time)
June13	Grades due

Scheduling and Registration

January 30 - Feb. 10	Registration Advising Period
February 3 & 10	New Student Orientation (tentative)
March 9	Late Orientation (tentative)
February 10 - March 2	General Registration Period
February 27	Fee Bills Posted to Bronco Direct
March 12	Fees Due