

**2011-13 Cal Poly Catalog****Biological Sciences Department****MASTER OF SCIENCE DEGREE IN BIOLOGICAL SCIENCES****General Characteristics**

This degree offers a broad background in the biological sciences. The program is designed to offer sufficient breadth and depth to strengthen the student's academic understanding and improve competence for: (a) many types of biological work that require advanced training beyond the bachelor's degree; (b) careers in industry and/or civil service; (c) teaching biological sciences at the elementary, secondary, and community college levels; (d) independent research in the field of specialization; or (e) continued graduate work at other institutions.

**Prerequisites**

Admission as a conditionally classified or classified student in this program requires a minimum grade point average of 3.0 in the last 90 quarter units attempted, submission of Graduate Record Examination (GRE) scores, and submission of Biology Subject GRE score, and letters of recommendation from persons knowing your academic potential.

Information pertaining to specific departmental requirements for admission to graduate standing—classified or graduate standing—conditionally classified may be obtained from the Director of the Graduate and Research Committee (Graduate Coordinator) of the Biological Sciences Department.

**Program of Study**

The formal program of study for the degree must include 45 units of committee-approved graduate work, at least 30 units of which must be at the 500 level. Coursework must include 32 units taken within the Biological Sciences Department at Cal Poly. A grade point average of 3.0 or better is required in all courses included in the Formal Study Plan. A maximum of 6 units of BIO 590 Seminar in Biology can be used. To complete the degree the GRE Advanced Biology exam must be passed with a score of 650 or better.

**CURRICULUM FOR MS BIOLOGICAL SCIENCES**

Units

<b>Required courses</b> .....	27
BIO 501 Molecular and Cellular Biology (4)	
BIO 502 Biology of Organisms (4)	
BIO 503 Population Biology (4)	
BIO 561 Proposal Writing for Bio Research (3)	
BIO 590 Seminar in Biology (3)	
BIO 599 Thesis, including oral defense of thesis (3) (3) (3)	
<b>Electives</b> .....	18
Additional units at the 400 or 500 level. At least 3 units must be 500 level to meet the 30 unit requirement.	
	45

All 45 units must be acceptable for graduate credit and in accordance with Graduate Guidelines of the Biological Sciences Department. **Coursework must include 32 units taken within the Biological Sciences Department at Cal Poly. To complete the degree the GRE Advanced Biology exam must be passed with a score of 650 or better.** For further information, students should communicate with the Chair of the Biological Sciences Department or with the Director of the Graduate and Research Committee. *Clarification added (10/2/12)*

**MS Biological Sciences, Specialization in STEM CELL RESEARCH**

**Characteristics.** Prepares students for research careers working with stem cells. Graduates of the program are well-prepared to matriculate into stem-cell focused doctoral programs. Following completion of a PhD in a stem-cell focused program (and likely post-doctoral training), students would have job opportunities as principal investigators at universities/non-profit research institutes or as lead scientists at for profit institutions. Graduates are also well prepared for immediate employment as research specialists/laboratory managers at universities, research institutes, or private companies in the field of stem cells/regenerative medicine.

**Culminating Experience.** Students who obtain a degree in the Master of Science in Biological Sciences with a specialization in Stem Cell Research are not required to complete **the GRE Advanced Biology exam or BIO 599**. In place of the thesis as a culminating experience, students are required to complete a non-traditional Comprehensive Exam. This non-traditional Comprehensive Exam includes a 9-month internship in a stem cell research laboratory<sup>1</sup> (BMED/ASCI/BIO 593), a quarter-long project course at Cal Poly (BMED/ASCI/BIO 594), a written report of their internship research, a written report of their quarter-long project course, and an oral presentation of their internship research. Through the completion of these components, students demonstrate their “ability to integrate the knowledge of the area, show critical and independent thinking, and demonstrate mastery of the subject matter.”

<b>Required Courses</b> .....	38
BIO 501 Molecular and Cellular Biology (4)	
BIO 502 Biology of Organisms (4)	
BIO 534 Principles of Stem Cell Biology (2)	
BIO 590 Seminar in Biology (1)	
<sup>1</sup> BIO/BMED/ASCI 593 Stem Cell Research Internship (10)	
BIO/BMED/ASCI 594 Applications in Stem Cell Research (2)	
BMED 510 Principles of Tissue Engineering (4)	
BMED 515 Introduction to Biomedical Imaging (4)	
BMED 545 Cell Transplantation and Biotherapeutics (4)	
BMED 563 (2) <i>and</i> ASCI 581 (1) Stem Cell Research Seminars	
<b>Approved engineering, science and mathematics electives</b> .....	$\frac{7}{45}$

<sup>1</sup> Students will complete their internship in stem cell research laboratories at UCSD, the Salk Institute, the Scripps Research Institute, Stanford University, or Novocell Inc.