SACRAMENTO STATE

Program Proposal
Form B

Academic Group *(College)*: **NSM**	**Date of Submission to College Dean: October 13, 2010**
Academic Organization *(Department)*: **Biological Sciences**	**Requested Effective: Fall___, Spring_X_, 2011__.**
Department Chair: Rose Leigh Vines	**Contact if not Department Chair: Susanne Lindgren**
Title of the Program *(Please be specific; indicate minor, undergraduate or graduate degree, etc.)*: **Master of Science in Biological Sciences**	

Type of Program Proposal:

___X____ Modification in Existing Program:
- **_X__ Substantive Change**
- **___ Non-Substantive Change**
- **___ Deletion of Existing Program**

_____ New Programs
- **___ Initiation (Projection) of New Program on to Master Plan**
- **___ New Degree Programs**
  - **___Regular Process**
  - **___Fast Track Process**
  - **___Pilot Process**
- **___ New Minor, Concentration, Option, Specialization, Emphasis**
- **___ New Certificate Program**

PLEASE NOTE: **Form B is to be used only as a Cover Form. Additional information is requested for each of the above as noted in the corresponding procedure in the Policies and Procedures for Initiation, Modification, Review and Approval of Courses and Academic Programs found at http://www.csus.edu/umanual/acad.htm**

Briefly describe the program proposal (new or change) and provide a justification.

Summary of Changes:

- **This proposal is a modification and resubmission of the program change proposal submitted in Spring 2010. The prerequisite changes in the number of units for BIO 500 and the deletion of BIO 292 have therefore already been completed. The description of these elements have not been removed from this proposal to make clear the changes to all of the degree programs.**
- Increase the number of BIO 299 units and BIO 500 units that can count toward the Master of Science degree **(This change has already been approved at the University level)**
- Change the name of the Biological Conservation concentration to "Ecology, Evolution and Conservation"
- Change the required courses and course offerings in the new Ecology, Evolution and Conservation concentration
- Change the required courses in the Molecular and Cellular Biology concentration
- Delete BIO 292 (Biological Concepts) course that was previously required of students in Ecology, Evolution and Conservation and students with no concentration **(This course has already been deleted at the University level)**

Increase in BIO 299 and 500 units. The Department proposes an increase in the number of BIO 299 (Problems in Biological Sciences) units that may be counted toward the degree. Currently, four units of BIO 299 can be counted toward the MS degree. We propose to increase the number of BIO 299 units that can be counted toward the MS degree from four to six. Students in the graduate program routinely complete six or more units of BIO 299 during their program but receive insufficient degree credit for this work. The proposed increase in units more accurately reflects the actual time and effort a graduate student in the Department dedicates to their thesis research. We anticipate that the increase in BIO 299 units that may be counted toward the degree will decrease time to graduation for many of our MS students.

In addition, the Department proposes to increase the number of BIO 500 (Master's Thesis) units that may be counted toward the degree. Currently, two units of BIO 500 can be counted toward the MS degree. We propose to increase the number of BIO 500 units from two to four. The proposed increase more accurately reflects the actual time and effort a graduate student in the Department dedicates to writing their thesis. With these changes and a revision of course requirements (see below), the number of additional units required in each concentration will decrease from 23 to 16.

Change of name, course requirements, and course offerings in the Biological Conservation concentration. We are proposing a revision of the current Biological Conservation concentration in the MS degree program. This proposed program change is intended to allow students to devote more time to their research (i.e., increased BIO 299 units) and to better serve the interests of students and faculty in the Department of Biological Sciences. We propose 1) a name change in the concentration to Ecology, Evolution and Conservation, and 2) a concomitant change in the required coursework to align with the concentration's broader scope. As part of this process, the Department is proposing to streamline the current course offerings in the concentration by combining several courses and deleting others. This proposed program change will result in a decrease in the number of courses that students are required to take. This will result in a net decrease in departmental resources that are allocated to graduate courses.

Change of course requirements in the Molecular and Cellular Biology concentration. We are proposing a reduction of the course requirements for the Molecular and Cellular Biology concentration in the MS degree program. This reduction in course requirements is intended to allow students to devote more time to their research (i.e., increased BIO 299 units). This proposed program change will result in a decrease in the number of courses that students are required to take but increase the number of units for research. This will result in a net decrease in departmental resources that are allocated to graduate courses.

Deletion of BIO 292 (Biological Concepts). BIO 292 (Biological Concepts) is proposed for deletion because the key concepts covered in this course will be incorporated in the revised course offerings under the new Ecology, Evolution and Conservation concentration.

These Master's degree curricular changes are comparable to graduate course, research, and thesis unit requirements in other Biological Sciences MS degree programs at our sister CSU institutions.

Approvals:

Department Chair: Rose Leigh Vinis **Date:** 10-13-10

College Dean: Laurel Heffernan **Date:** 11/10/10

University Committee: [signature] **Date:** 12/14/10

Associate Vice President and Dean for Academic Affairs: [signature] **Date:** 12/20/10

COMPARISON OF NEW AND OLD PROGRAMS

New Program	Old Program
Requirements - Master of Science Degree Units required for MS: 30 – includes units required in areas of concentration. Minimum GPA: 3.0 The MS degree requires completion of 30 units of coursework with a minimum 3.0 GPA. The 30 units must include a minimum of 18 units of 200-level courses. No units from BIO 106, BIO 194, BIO 195, BIO 197A, BIO 197B, BIO 197C, BIO 198A, BIO 198B, BIO 199A or BIO 199B are acceptable toward the master's degree. No more than 10 units of BIO 299 and BIO 500 may be applied toward the 30 unit requirement. Each student who receives a Master of Science degree from the Department of Biological Sciences must submit a thesis based on original research in biology. A thesis can be based on either of the following sources of data: • data generated by the student's original research, in which the student performs the fieldwork or laboratory experiments and/or • data obtained from sources other than the student's own fieldwork or laboratory experiments, provided the data are analyzed in an original way. The use of data must result in an original contribution to the problem being investigated. All requirements for the Master's degree must be completed within seven (7) years starting from the time the first course is used to meet the master's degree requirements. *Courses in parentheses are prerequisites.*	**Requirements - Master of Science Degree** Units required for MS: 30 – includes units required in areas of concentration. Minimum GPA: 3.0 The MS degree requires completion of 30 units of coursework with a minimum 3.0 GPA. The 30 units must include a minimum of 18 units of 200-level courses. No units from BIO 106, BIO 194, BIO 195, BIO 197A, BIO 197B, BIO 197C, BIO 198A, BIO 198B, BIO 199A or BIO 199B are acceptable toward the master's degree. No more than 6 units of BIO 299 and BIO 500 may be applied toward the 30 unit requirement. Each student who receives a Master's of Science degree from the Department of Biological Sciences must submit a thesis based on original research in biology. A thesis can be based on either of the following sources of data: • data generated by the student's original research in which the student performs the fieldwork or laboratory experiments or • data obtained from sources other than the student's own fieldwork or laboratory experiments, provided the data are analyzed in a manner in which they were not previously analyzed. The use of data must result in an original contribution to the problem being investigated. All requirements for the Master's degree must be completed within seven (7) years starting from the time the first course is used to meet the master's degree requirements. *Courses in parentheses are prerequisites.*
A. Required Core Courses (10 units) (2) BIO 220 Introduction to Scientific Inquiry (2) BIO 294 series course Seminar (6) BIO 299 Problems in Biological Sciences	**A. Required Core Courses (5 units)** (2) BIO 220 Introduction to Scientific Inquiry (1) BIO 294 series course Seminar (2) BIO 299 Problems in Biological Sciences
B. Culminating Requirement (4 units) (4) BIO 500 Master's Thesis (Advancement to candidacy and chair permission of his/her supervisory committee)	**B. Culminating Requirement (2 units)** (2) BIO 500 Master's Thesis (Advancement to candidacy and chair permission of his/her thesis committee)
Additional Requirements for Concentrations Units required: 16 **No Concentration (16 units)** (2) BIO 221A Cell & Molecular Methods and Techniques (BIO 220; may be taken concurrently) **OR** (2) BIO 221B Methods in Ecology, Evolution and Conservation	***Additional Requirements for Concentrations*** Units required: 23 **No Concentration (23 units)** (2) BIO 221A Cell & Molecular Methods and Techniques (BIO 220; may be taken concurrently) **OR** (2) BIO 221B Methods in Ecology, Evolution and Conservation

(3) BIO 282 Evolution

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(11) Approved electives in Biological Sciences or supporting fields. Electives must be selected in consultation with the graduate advisor and approved at the Advancement to Candidacy meeting. Up to two additional units of BIO 294 (up to 4 total) taken as a graduate student in the program may be applied to the MS degree.

Ecology, Evolution and Conservation (16 unit minimum)

(2) BIO 221B Methods in Ecology, Evolution and Conservation (BIO 167; BIO 220 may be taken concurrently)

(3) BIO 282 Evolution

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(11) Approved electives in Biological Sciences or supporting fields. Electives must be selected in consultation with the graduate advisor and approved at the Advancement to Candidacy meeting. Up to two additional units of BIO 294 (up to 4 total) taken as a graduate student in the program may be applied to the MS degree.

(3) BIO 282 Evolution

(3) BIO 292 Biological Concepts

(15) Approved electives in Biological Sciences or supporting fields. Electives must be selected in consultation with the thesis advisor and approved at the Advancement to Candidacy meeting. Up to six units of upper division (100-level) coursework taken as a graduate student in the program may be applied to the MS degree.

Biological Conservation (23 unit minimum)

(2) BIO 221B Methods in Ecology, Evolution and Conservation (BIO 167; BIO 220 may be taken concurrently)

(3) BIO 282 Evolution

(3) BIO 292 Biological Concepts

(3) Select one of the following:

- BIO 214 Advanced Plant Ecology (BIO 160)
- BIO 260 Population and Community Ecology (BIO 160)
- BIO 269 Behavioral Ecology (BIO 160 or instructor permission)

(5-6) Select two of the following:

- BIO 270 Conservation Policy and Administration (BIO 118, BIO 173, or BIO 179)
- BIO 273 Advanced Fishery Biology and Management (BIO 173 or instructor permission)
- BIO 279 Conservation Biology and Wildlife Management (BIO 160, BIO 179; or instructor permission)

(6-7) Approved electives in Biological Sciences or supporting fields. Electives must be selected in consultation with the thesis advisor and approved at the Advancement to Candidacy meeting. Up to six units of upper division (100-level) coursework taken as a graduate student in the program may be applied to the MS degree.

Molecular and Cellular Biology (16 unit minimum)

(2) BIO 221A Cell & Molecular Methods and Techniques (BIO 220)

(3) BIO 222 Molecular Biology (BIO 184, CHEM 161)

(3) BIO 224 Genomics, Proteomics and Bioinformatics (BIO 184, BIO 222 and graduate status or instructor permission)

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(8) Approved electives in Biological Sciences or supporting fields. Electives must be selected in consultation with the graduate advisor and approved at the Advancement to Candidacy meeting. Up to two additional units of BIO 294 (up to 4 total) taken as a graduate student in the program may be applied to the MS degree.

Note: Supporting Fields: A maximum of 10 units from an approved supporting field (e.g., Chemistry, Physics, Environmental Studies, Geology, Physics) may be counted toward the degree, with graduate advisor and graduate committee approval obtained **before** taking the course(s).

Molecular and Cellular Biology (23 unit minimum)

(2) BIO 221A Cell & Molecular Methods and Techniques (BIO 220)

(3) BIO 222 Molecular Biology (BIO 184, CHEM 161)

(3) BIO 224 Genomics, Proteomics and Bioinformatics (BIO 184, BIO 222 and graduate status or instructor permission)

(5-6) Select at least two of the following:

BIO 223 Human Molecular Genetics (BIO 139, BIO 184, CHEM 161)

BIO 245 Host Pathogen Interactions (BIO 121, BIO 139, BIO 184)

BIO 247 Contemporary Topics in Immunology (BIO 149A or instructor permission)

(9-10) Approved electives in Biological Sciences or supporting fields. Electives must be selected in consultation with the thesis advisor and approved at the Advancement to Candidacy meeting. Up to six units of upper division (100-level) coursework taken as a graduate student in the program may be applied to the MS degree.

Note: Supporting Fields: A maximum of 10 units from an approved supporting field (e.g., Chemistry, Physics, Environmental Studies, Geology, Physics) may be counted toward the degree, with advisor and graduate committee approval obtained **before** taking the course(s).