#### LIFE SCIENCES - CONCENTRATION IN BIOLOGY - M.S. ASSESSMENT REPORT 2009-2010

### I. Mission of the Program

University: Education through Teaching, Research, and Service

The mission of the Biology program is to provide undergraduate and graduate students with a high quality science education that includes experience with a research and field projects. The program provides a scientific and technical background that empowers students to successfully pursue science and technology careers, or, proceed on to advanced graduate studies.

## II. Program Goals

Our goal is to develop broadly literate students with comprehensive knowledge and technological skills in the biological sciences. Our students should be able to critically analyze, communicate, and apply their knowledge and skills to the world around them. More specifically for our graduate program, our goal is to produce students who can successfully complete a research project and who are prepared for a career in biology or a related field or entrance into a Ph.D. program. **Note:** We have developed a unit specific strategic plan to implement the University's strategic plan.

## III. Program Student Outcomes

A student receiving an M.S. in Life Science with a concentration in biology will:

- 1. Have mastery of principle biological knowledge. (STUDENT TRAIT Mastery of content knowledge and skills)
- 2. Utilize scientific methodology and technology through which biological knowledge accumulates. (STUDENT TRAIT Effective use of technology)
- 3. Be able to critically analyze information and effectively impart biological knowledge with peers, mentors, and other professionals in the scientific community. (STUDENT TRAITS Effective communication skills and Critical and reflective thinking skills)
- 4. Receive a comprehensive science background essential to advance to a doctoral program and/or career in biology or related fields.

# IV. Means of Assessing if Student Outcomes for the Program are met

1. Have mastery of principle biological knowledge

#### First Means of Assessment for Outcome Identified Above:

1a. Means of Program Assessment & Criteria for Success: Course grades and evaluations; successful students will receive an average grade of "B" or better on class tests. The final exam grades, final grades, or projects in Biol 600 (Research Methods) and Adv Cell Biol (Biol640), Developmental Biology (Biol581),Bacterial Physiology (Biol505), Env Physiology (Biol610) will be used as assessment tools this year.

## Second Means of Assessment for Outcome Identified Above:

1b. Means of Program Assessment & Criteria for Success: The general knowledge component of the thesis defense will be used as the assessment tool this year.

Measure of success - 80% or more of our students will successfully meet our criteria.

2. Utilize scientific methodology and technology through which biological knowledge accumulates.

# First Means of Assessment for Outcome Identified Above:

2a. Means of Program Assessment & Criteria for Success: Thesis and Thesis Defense; Successful students will write an acceptable thesis and pass their thesis defense.

## Second Means of Assessment for Outcome Identified Above:

2b. Means of program Assessment & Criteria for Success: Course grades and evaluations of laboratory courses; Successful students will receive an average grade a "B" or better on laboratory reports and exams which include designing and carrying out experiments. The laboratory project report due at the end of Adv Topic (Biol620) (Functional Genomics) and laboratory grades for Developmental Biology (Biol581) and Bacterial Physiology (Biol505) will be used as assessment tools this year.

Measure of success - 80% or more of our students will successfully meet our criteria.

3. Be able to critically analyze information and effectively impart biological knowledge with peers, mentors, and other professionals in the scientific community.

#### First Means of Assessment for Outcome Identified Above:

3a. Means of Program Assessment & Criteria for Success: Thesis and Thesis Defense; Successful students will write an acceptable thesis and pass their thesis defense.

#### Second Means of Assessment for Outcome Identified Above:

3b. Means of Program Assessment & Criteria for Success: Graduate Seminar-successful students will receive a "B" or better in the seminar

# Third Means of Assessment for Outcome Identified Above:

3c. Means of Program Assessment & Criteria for Success: Course grades and evaluations for courses other than graduate seminar, particularly for courses involving written and oral reports; Successful students will receive an average grade of "B" or better for written and oral reports presented during these courses. Portfolio grades in Biol581, research papers and oral presentations in Bacterial Physiology (Biol505) will be used as assessment tools this year.

Measure of success - 80% or more of our students will successfully meet our criteria.

4. Receive a comprehensive science background essential to advance to a doctoral program and/or career in biology or related fields.

## First Means of Assessment for Outcome Identified Above:

4a. Means of Program Assessment & Criteria for Success: Tracking students receiving Master's Degrees in the program in 2007-2009 using faculty knowledge and/or a modified student satisfaction survey.

<u>Measure of success</u> - 75% of respondents indicating continuing their education or employed in biology or related area. 75% of the respondents will indicate that they are satisfied or very satisfied with their preparation for work or graduate school.

## V. Summary of Data Collected from the Means of Assessment (To be filled in later)

1. Have mastery of principle biological knowledge.

1a. 100% (6/6) of students in Research Methods, 60% (3/5) of students in Adv Cell Biology, 100% (4/4) of students in Environmental Physiology, 100% (2/2) of students in Developmental Biology, and 100% (3/3) of students in Bacterial Physiology received B or better for a final grade or comprehensive exam. Meets criteria for success.

- 2. <u>Utilize scientific methodology and technology through which biological knowledge accumulates.</u>
  - 2a. One student successfully completed her degree. Four other students successfully completed their oral thesis defense and are working on finishing their final thesis corrections.
  - 2b. The final laboratory grades in the following courses were: Biol620 Functional Genomics: 100% 93/3); Biol581: 100% (2/2), and Biol505: 100% (3/3). Meets criteria for success.
- 3. <u>Be able to critically analyze information and effectively impart biological knowledge with peers, mentors, and other professionals in the scientific community.</u>
  - 3a. One student successfully completed her degree. Four other students successfully completed their oral thesis defense and are working on finishing their final thesis corrections
  - 3b. All Biology (4/4) concentration students in Graduate Seminar received an A. Meets criteria for success.
  - 3c. 100% (2/2) of students in Biol581 (Developmental Biology) received an A for their Portfolio grades. 100% (3/3) of students in Biol505 (Bacterial Physiology) received an A on their final paper and at least a B or better on their final presentations. Meets criteria for success.
- 4. <u>Receive a comprehensive science background essential to advance to a doctoral program</u> <u>and/or career in biology or related fields</u>.
  - 4a. Three of our graduates are working as research technicians in a biology related area. One of our continuing students is in veterinary school and another is applying for medical school. Two other students who are close to finishing their degrees are applying for doctoral programs. **Meets criteria for success.**

### VI. Use of Data Results

All of our graduate students met our criteria for success for all of our objectives. However, we feel that there is still room for improvement in terms of writing skills. Several of our graduate classes require some type of written reports and/or research papers and students are required to turn in outlines, rough drafts, and final papers to facilitate the writing process. We also continue to encourage students to use the writing center and to take Technical Writing within the English Department if warranted. For the last two years, Dr. Edward Martinez has devoted more time in Research Methods to thesis construction and writing skills. This includes having students write a formal grant proposal outlining their proposed thesis research. For students that take Research Methods in their first semester, this is advantageous because it gets them started on their thesis research by their second semester.

The number of graduate students completing their degrees within the two year time frame is an area of concern. Several students have defended their theses and passed their oral examinations but have left campus before completing their thesis corrections. We continue to strongly encourage thesis advisors to work with students to get the thesis in a more acceptable format prior to the student's defense and physical departure from NMHU. The Department Chair is making a particular effort to work with these students and their advisors to help them complete their degrees.