EASTERN OREGON UNIVERSITY

Program Portfolio
Biology
2009-2010

Description of Program

Catalog Description: The Biology/Botany degree provides knowledge of the biological sciences necessary for students pursuing careers, graduate study, or professional study for which a baccalaureate degree is appropriate.

The courses provide knowledge needed by students in related fields, such as nursing, secondary education, wildlife, agriculture, and forestry, as well as providing knowledge desired by students majoring in other disciplines both within and outside of the School of Arts and Sciences. Other objectives include emphasizing to students the importance of experience and proficiency in several sciences; helping students develop and use precise, critical and independent thought; increasing students' perception, understanding, and appreciation of themselves and their environment; creating in students an awareness of and interest in the role of biological sciences in meeting social and economic needs; and to make available residents of Eastern Oregon the individual and combined resources of the biology faculty.

The Biology/Botany program provides knowledge of the biological sciences necessary for careers in biological research and health professions including nursing, dentistry, medicine, physical therapy, and physician's assistants. In addition, the program serves the secondary education program, the Oregon Health Sciences Center nursing program, and campus-wide GE requirements. The program's overarching objective is to provide the student with a broad, in-depth intellectual framework in a liberal arts context. Biology/Botany faculty members accomplish this by requiring proficiency in several areas of biology as well as in basic aspects of math, physics, and chemistry. Also toward accomplishing these objectives, courses help students to understand and internalize factual knowledge of the field and, beyond that, to then process that information in critical and creative ways. Underpinning the program's broad objective are the faculty's efforts to remain vital in their respective fields of expertise through maintaining active research projects that also involve undergraduate researchers. Involvement with student-oriented research has allowed Biology/Botany faculty to stay abreast of their field and keep their eyes on the future, instating curricular changes in response to the constantly evolving panorama that is the field of biology.

Recent Programmatic Changes

Besides facilities and equipment changes, the Biology program has changes in faculty. In 2005, two older faculty retired in microbiology and physiology and were replaced by molecular biologists (Cain and Corsini). This has resulted in a significant departmental shift from expertise in classical field biology to expertise in modern molecular biology. As a result of the changes in faculty, we have introduced major curricular changes aimed at modernizing our curriculum. The culmination of these changes has been the approval and incorporation (fall 2009) of a biology core the feeds two specializations (concentrations): Molecular Biology and Ecological/Organismal Biology. Most of our peer institutions have offer similar concentrations, and we are now confident that our students have the opportunities for specialization in the two main areas of modern biology.

Finally, the advent of a faculty union and a negotiated contract has reduced overload teaching. One full-time term position has been hired for anatomy and physiology and a resource person for biology lab classes. Both of these temporary hires have freed up time for the tenure faculty to pursue scholarly work with student researchers.

How Program serves the Mission of the University and needs of region

Biology/Botany: The Biology/Botany program provides knowledge of the life sciences necessary for students pursuing careers in graduate study, or professional studies. Courses also prepare students in related fields, such as nursing, secondary education, wildlife, agriculture, and forestry. The Biology program graduates the largest number of students within the science disciplines. Graduates of this program find employment in state and federal agencies; many continue on to graduate or professional schools pursuing advanced degrees in health related fields.

I. Program Objectives/Outcomes

1. **Breadth of Content Knowledge in Biology:** Students will master the basic foundational content in the field of biology and apply it to critical analysis and creative application of that content.

2. **Creative Inquiry:** Students will demonstrate the ability to design (create) and conduct experiments to answer biological questions. This process is based upon the tenets of the scientific method.

3. **Integrated Learning through Critical Thinking:** Students will integrate their knowledge (content) of biology, chemistry, physics, and social systems through critical analysis of ecosystems, biological evolution, and the biotechnological revolution.

4. **Community/Civic engagement:** Students will learn to engage in and apply scientific inquiry to conservation activities that involve the wider regional community.

.

II. Four-Year Assessment Cycle: Biology

Year	Outcome to be Assessed
Spring 2009	1. Breadth of Content Knowledge in Biology
Fall 2009-2010	1. Breadth of Content Knowledge in Biology
2010-2011	2. Creative Inquiry
2011-2012	3. Integrated Learning through Critical Thinking
2012-2013	4. Community/Civic engagement

III. Curriculum Assessment Plan

Year	Outcome	Course/Milestone Activity	Assignment/ Task (done by students)	Assessment Tool (to measure outcome)	Standards/Levels of Achievement
2009-2010	1) Breadth of content knowledge	1)BIOL 490	1)National Standardized test	1)ETS Major Field Test	**Adequate**
2010-2011	2) Creative Inquiry	1)BIOL 211 & BIOL 212	1)Written expository lab reports	1)Graded reports	**Adequate**

2011-2012	3) Integrated learning through critical thinking	1)BIOL 490	1)Written expository reports	1)Graded expositions	**Proficient**
2012-2013	4) Community/Civic engagement	1)BIOL 213 and CHEM206	1) Notebook	1)Graded notebook (journal) and reports	**Adequate**

Degree Program Outcomes Assessment

Spring 2009

Degree Program: Biology
Outcome Assessed: Breadth of content knowledge
Course / Activity: BIOL 490 (Evolution)

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Minimum Accepted Performance	Results
Recall of content knowledge in conceptual framework of modern biology.	ETS Major Field Test in Biology	1-3, Ave. score at or above national average	Average score equivalent to national average	1-10% above the national average in all categories of the test.

Note: See "Supporting Documentation" tab or for detailed records of the summary. The assessment representative for each department must archive supporting student samples

Explanation of Assignment / Activity / Prompt

The ETS Major Field Test in Biology is a professionally administered and scored standardized test used by many institutions across the nation. It tests the student knowledge of biology in nine categories (1=biochemistry and cell energetics; 2=cellular structure, organization, and function; 3=molecular biology and molecular genetics; 4=diversity of organisms; 5=animal organismal biology; 6=plant organismal biology; 7=population genetics and evolution; 8=ecology; 9=analytical skills). This test is administered as part of BIOL 490, our capstone course, but is not included in the grade for that course.

Analysis of Assessment Results

We have concluded that overall our average performance should fall within +/-10% of the national average to be adequate. A lower performance (less than -10% of national average) we consider our students to be developing, and a score of more than 10% above the national average we consider them to be to be proficient. As quantified in table below, our students have consistently outperformed the

national average, but their average remains in that +/- 10% zone.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

Strengths: This test allows us to assess our students' mastery of biology in the primary sub-fields of biology - Cell Biology, Molecular Biology, Genetics, Ecology, and Population Biology. We can also compare performance of our students with that of students across the nation. Moreover, the extensive set of assessment indicators allows us to determine where strengths of the program lie, as well as which areas might need attention.

Weaknesses: This is a standardized test and inherently carries problems of all standardized tests. These include pressure on instructors to teach to the test, inability of students to answer content questions if instructors are not teaching to the test, and the lack of study incentive that accompanies a test that is not part of the grade.

Conclusions: Our students have outperformed the national average in all categories, but for the most part remain in the zone =/- 10% above the national average.

Recommendations: In some subject areas performance is only slightly above the national average. We have concluded that this is due to curriculum structure rather than actual deficiencies in curricular content- a consequence of delivered curriculum not matching that expected by the standardized test.

Degree Program Outcomes Assessment

Fall 2009

Degree Program: Biology
Outcome Assessed (i.e. Critical Thinking): Creative Inquiry
Course / Activity: BIOL 211/BIOL 212

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Minimum Accepted Performance	Results
Designing and executing an experiment	Formal Lab Report	1-3, % at 2 or 3	70% at 2 or 3	90%

Note: See "Supporting Documentation" tab or for detailed records of the summary. The assessment representative for each department must archive supporting student samples

Explanation of Assignment / Activity / Prompt

The Assignment is a student-centered experiment. In BIOL 211 students are posed with the question “Does household bleach influence germination of radish seeds?”. In groups of two they develop hypotheses and then design and execute an experiment to answer this question in a fashion that allows assignment of statistical validity. In BIOL 212, students re-design and re-execute the experiment based upon results from the first experiment. Data listed in the table above was collected from the second lab report written after the experiment had been repeated during the second term of the Principles series (BIOL 212).

Analysis of Assessment Results

The lab report is scored as follows: 5 points introduction and abstract, 5 points materials and methods, 10 points results, 10 points discussion. For a given student, a score of 70% on this report is considered adequate, less than 70% is developing. 85% and above is considered proficient. 38 of 42 students scored in the adequate or proficient range.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

Strengths: This assignment allows the student to engage in formal hypothesis development and creative design of an experiment to answer a question about the world around them. This is carried out in a team environment. Since laboratory experiments are always repeated multiple times, the re-execution of this experiment in the second term of the principles series models an authentic science experiment.

Weaknesses: Individual thinking is not promoted by team situations, and poor students may ride on the labors of hard-working colleagues. Also, students are not well equipped to design the experiment in a fashion that fosters treatment of data with simple statistics.

Conclusions: This is an effective and authentic introduction to the realities of scientific inquiry.

Recommendations: In the future we need to add a short introduction to basics statistics to our custom lab manual for the class.

Key Programmatic Assessments

As previously mentioned, the Biology program has instated a self-assessment plan aimed at providing feedback which allows us to enhance student learning. To accomplish this we have begun to implement a course assessment inventory for two courses: the first term of majors biology (BIOL 211), and our capstone course, Evolution (BIOL 490). We have also been administering a national standardized test in our capstone course (Evolution) to better assess the degree of learning and retention that is occurring in our students. In addition, we have begun to track invested student study time vs. test score for our Principles of Biology series in an attempt to better understand time investment and management by students enrolled in rigorous science curricula.

Current Programmatic Assessment Data/Reflections/Recommendations

The new science building, erected in 2002/2003, provided new teaching facilities that allow Biology faculty to better serve students, including computer-integrated projection systems in the large lecture halls and faculty-designed biology laboratories. For example, all but one of the botany courses are now taught in active learning classrooms with a student-centered, inquiry-based pedagogy, instead of segregating lab and lecture times. Each class session begins with a brief introduction of the day's topic, and then students move, individually or in pairs, through three to five different learning stations in any sequence, using microscopes, some whole specimens, and/or their texts, journal articles, or other reference materials to complete the tasks and maintain results in their laboratory notebooks. At the end of each session, the entire class meets together to discuss and review the material covered that day. In these courses, assessment includes a practical component in which students are asked to demonstrate critical thinking skills learned or practiced in the course. Such popular courses help students learn about biology and also how to continue learning about biology after they leave EOU. We have also introduced Process Oriented Guided Inquiry Learning (POGIL) into our Biology 100 and 200 series. This is a formalized group learning strategy initiated in Chemistry programs across the nation that has been endorsed and funded by the National Science Foundation. The didactic strategy involves three steps, taken through question sets, that lead to understanding of conceptual models. The initial questions familiarize the student with the elements of the model. The second set of questions lead the student to seek the interrelationships between the elements of the model, and the third set of questions require the student to apply the newly gained conceptual knowledge to a new situation. Currently, four of our full time faculty are employing this approach, which has involved development of in-class worksheets and extensive assessment of student performance.

Instruction

The biology program began two years ago to perform a thorough assessment of student performance by administering the ETS Major Field Test in Biology to all graduating seniors in the program. The results are shown in the following two tables:

Year of Exam		Adjusted Scores of Senior Class in Indicated Areas				
		Overall	Subscore 1	Subscore 2	Subscore 3	Subscore 4
2005-2006		153	54	53	54	52
2006-2007		160 (152)	57 (53.0)	61 (52.7)	60 (52.6)	59 (52.1)
2007/2008		160(155)	58(53.8)	59(53.4)	59(53.2)	59(53.3)
2008/2009		155(153)	58(54.0)	53(53.7)	56(53.1)	54(53.3)

Table 1. Performance of Senior Class on the ETS Major Field Test for Biology in Indicated Years. National average is indicated parenthetically. Subscore categories are as follows: 1=Cell Biology, 2=Molecular Biology and Genetics, 3=Organismal Biology, 4=Population Biology, Evolution, and

Ecology. National mean scores, based on 7,533 respondents and 255 institutions, are indicated in parentheses (national rankings were unavailable in 2005-2006 due to changes in the exam in that school year). Overall scores are out of 200; subscores are out of 100.

Year of Exam	Adjusted Scores of Senior Class in Assessment Indicators								
	1	2	3	4	5	6	7	8	9
National (’07)	43.2	55.1	45.7	48.6	58.8	44.9	53.7	56.0	52.7
2005-2006	45.7	56.5	45.7	50.8	60.9	43.5	62.7	50.7	55.9
2006-2007	44	64	55	62	61	53	63	62	61
2007/2008	49(43.0)	61(55.3)	53(45.8)	54(49.0)	62(58.8)	58(53.2)	66(53.6)	60(56.1)	59(52.6)
2008/2009	51(43.0)	58(55.0)	49(45.7)	56(48.4)	61(58.5)	46(44.4)	58(53.2)	57(55.9)	53(52.4)

Table 2. Performance of Senior Class on the ETS Major Field Test Assessment Indicators for Biology in Indicated Years. National average is indicated parenthetically. Assessment Indicators are as follows: 1=biochemistry and cell energetics; 2=cellular structure, organization, and function; 3=molecular biology and molecular genetics; 4=diversity of organisms; 5=animal organismal biology; 6=plant organismal biology; 7=population genetics and evolution; 8=ecology; 9=analytical skills..

The results are relatively clear: in general categories, our students outperform at least half, and in some cases 60 percent or more, of all students and institutions nationwide. The test is compartmentalized enough, however, to show us where improvements to curriculum can be made and/or current offerings should be expanded or modified. Our students perform less robustly in the areas of biochemistry, cell energetics and biology, and molecular biology, and are not as strong in organismal and population biology as they should be. To address this we have created two separate "tracks" in the biology program, one of which encompasses molecular and cellular biology and the other focused more towards ecological, organismal, and population biology, with an emph issues. These tracks would allow students to specialize, focus, and learn a particular area of biology in depth to become much more prepared, rather than becoming the "jacks of all trades" we currently graduate.

Programmatic Assessment: Synthesis and Recommendations

In response to the accreditation report, the biology department has instated a self-assessment plan aimed at providing feedback which allows us to enhance student learning. To accomplish this we have implemented a course assessment inventory for two courses: the first term of majors biology (BIOL 211) to assess our program level outcome (PLO) Creative Inquiry, and our capstone course, Evolution (BIOL 490), to assess our PLO Breadth of Content Knowledge. To assess our Creative Inquiry category, we have begun to To assess breadth of content knowledge, we have been administering a national standardized test in our capstone course (Evolution) to better assess retention of essential content knowledge that is occurring in our students.

As mentioned above, we have also introduced major changes into the biology curriculum, and are now offering a Molecular Biology and an Ecological and Organismal Biology concentration.

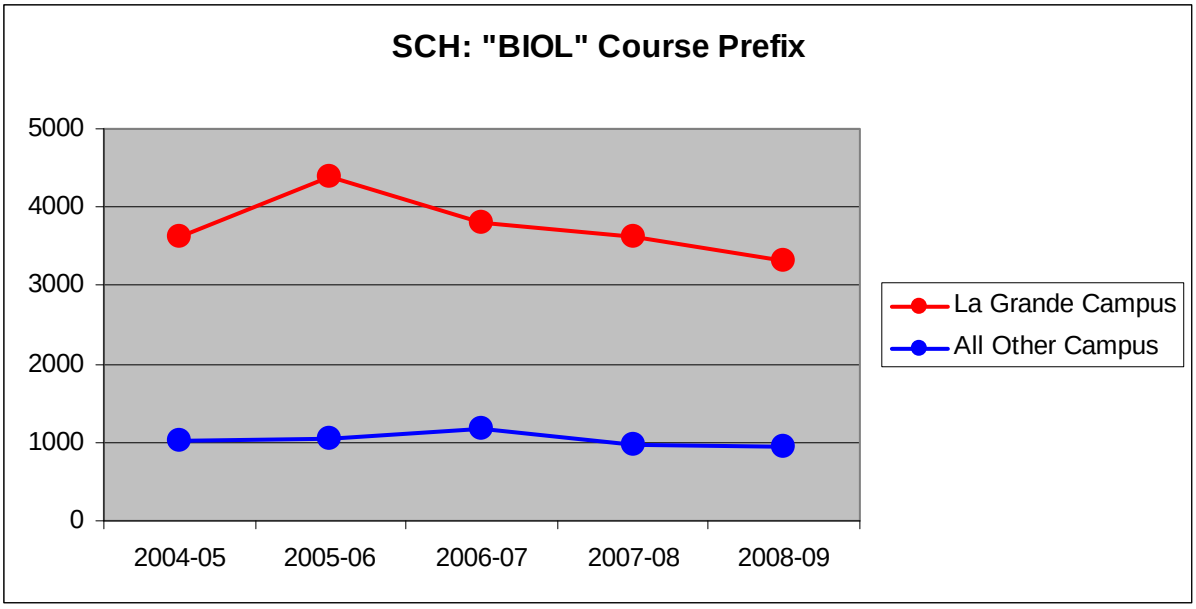
Student Accomplishments

- Tarna Armstrong – 2006 graduate in Biology – currently teaches Biology at Hermiston High School, Hermiston, OR
- Elisha Adkins: winner of the full $5000 Phi Kappa Phi graduate fellowship – April 2007. Elisha will also be attending Oregon State University's School of Veterinary Medicine - Fall 2008
- Heide Chamberlain- undergraduate co-author with Corsini on manuscript 'Characterization of Modern Turtle Death Sites for Comparison with late Eocene and early Oligocene Turtle Sites' Accepted summer 2008.
- Haruyo Matsuyama will attend University of Missouri-Columbia to work on a Master of Science in Molecular Biology – Fall 2008
- Robert Barker will attend the Ohio College of Podiatric Medicine - Fall 2008
- Lucas Ohmes- Skeen Award recipient to conduct summer research at Friday Harbor Labs - Summer 2008
- Gary Truman- Blinks Fellowship- University of Washington for Underrepresented groups in science - 2008
- Ozy Zerbajadi and Amanda Justesen- Scholarships to attend summer Neuroethology Course at Friday Harbor Labs – 2008
- Arden Perkins - Steen Fellowship –summer 2008

Enrollment and Program Performance

Eastern Oregon University

5 Year Student Credit Hours Generated by 'BIOL' Course Prefix

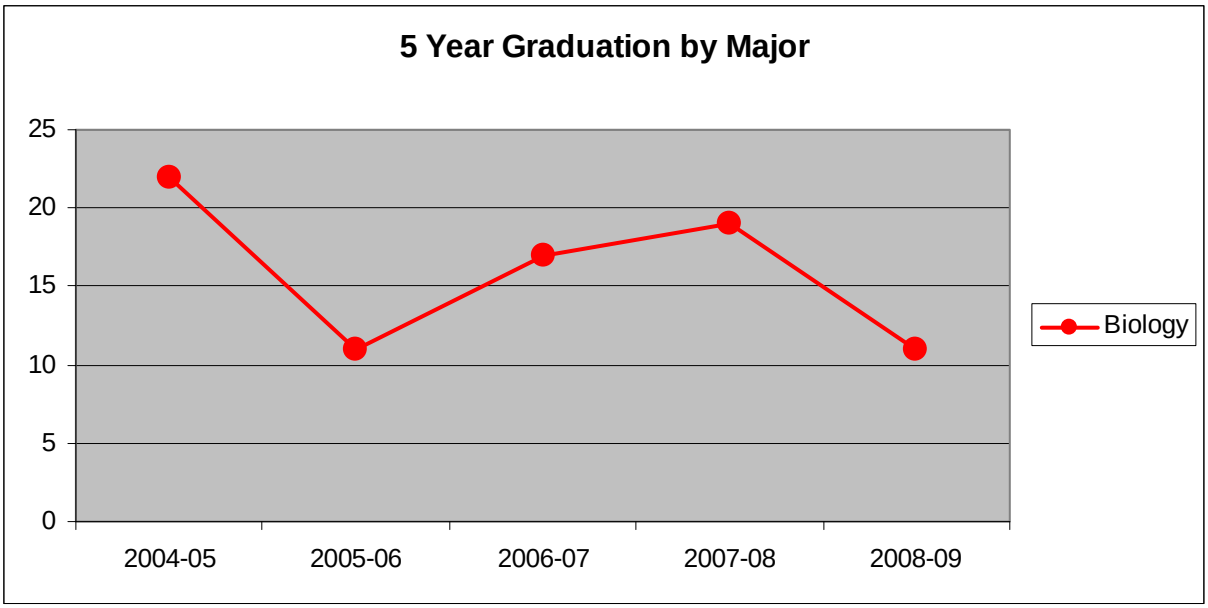


	2004-05	2005-06	2006-07	2007-08	2008-09
La Grande Campus	3620	4393	3795	3628	3325
All Other Campus	1022	1058	1185	973	937

Total	4642	5451	4980	4601	4262

*SCH includes all terms effective end of term

Eastern Oregon University
5 Year Graduation by Major



	2004-05	2005-06	2006-07	2007-08	2008-09
Biology	22	11	17	19	11

Commentary on Enrollment and Graduate Trends

The 5 year average for Biology student credit hour is 3827.6 which is well above the student credit average of 1008.8 for all other campuses. On average, biology graduates 16 students per year. These students go on to graduate schools or acquire work with state or federal agencies.

Program and Course Scheduling Requirements

FALL YEAR 06-07

Course	Load Hours	Mean Enroll
BIOL 101	3	115
BIOL 211	5	66
BIOL 211L	0	66 (4 sections)
BIOL 231	4	65
BIOL 231	4	53
BIOL 231 L	0	118 (6 sections)
BIOL 235	3	23

FALL YEAR 07-08

Course	Load Hours	Mean Enroll
BIOL 101	3	45
BIOL 101	3	46
BIOL 211	5	61
BIOL 211L	0	61 (4 sections)
BIOL 231	4	64
BIOL 231	4	48
BIOL 231 L	0	112 (6 sections)
BIOL 234	4	12
BIOL 234 L	0	12
BIOL 235	3	22

BIOL 421	4	8

WINTER YEAR 06-07

Course	Load Hours	Mean Enroll
BIOL 102	3	57
BIOL 212	5	38
BIOL 212L	0	38 (3 sections)
BIOL 232	4	101
BIOL 232 L	0	101 (5 sections)
BIOL 433	5	14
BIOL 433 L	0	14
BOT 202	5	19

SPRING YEAR 06-07

Course	Load Hours	Mean Enroll
BIOL 103	3	35
BIOL 104	1	30 (2 sections)
BIOL 213	5	33
BIOL 213 L	0	33 (2 sections)
BIOL 233	4	72
BIOL 233 L	0	72 (4 sections)
BIOL 234	4	32
BIOL 234 L	0	32 (2 sections)
BIOL 334	5	14
BIOL 357	4	31

Major Course Requirements

FALL YEAR 06-07

Course	Load Hours	Mean Enroll
BIOL 211	5	66
BIOL 211L	0	66 (4 sections)
BIOL 317	5	20
BIOL 317L	0	20 (1 section)
BIOL 347	5	6

BIOL 421	4	16

WINTER YEAR 07-08

Course	Load Hours	Mean Enroll
BIOL 102	3	39
BIOL 212	5	44
BIOL 212L	0	44 (3 sections)
BIOL 232	4	90
BIOL 232 L	0	90 (5 sections)
BIOL 433	5	22
BIOL 433 L	0	22
BOT 202	5	20

SPRING YEAR 07-08

Course	Load Hours	Mean Enroll
BIOL 103	3	31
BIOL 104	1	18 (2 sections)
BIOL 213	5	41
BIOL 213 L	0	41 (2 sections)
BIOL 233	4	71
BIOL 233 L	0	71 (4 sections)
BIOL 234	4	36
BIOL 234 L	0	36 (2 sections)
BIOL 334	5	13
BIOL 357	4	19

FALL YEAR 07-08

Course	Load Hours	Mean Enroll
BIOL 211	5	61
BIOL 211L	0	61 (4 sections)
BIOL 317	5	12
BIOL 317L	0	12 (1 section)

BIOL 421	4	8
BIOL 431	5	27
BIOL 445	3	2

BIOL 421	4	16
BIOL 431	5	21
BIOL 445	3	2

WINTER YEAR 06-07

Course	Load Hours	Mean Enroll
BIOL 212	5	38
BIOL 212L	0	38 (3 sections)
BIOL 318	5	15
BIOL 318 L	0	15 (1 section)
BIOL 323	5	11
BIOL 323 L	0	11 (1 section)
BIOL 350	4	5
BIOL 341	4	32
BIOL 341 L	0	32 (1 section)
BIOL 432	5	7
BIOL 432 L	0	7
BIOL 433	5	14
BIOL 433 L	0	14
BOT 201	5	19

WINTER YEAR 07-08

Course	Load Hours	Mean Enroll
BIOL 212	5	44
BIOL 212L	0	44 (3 sections)
BIOL 318	5	5
BIOL 318 L	0	5 (1 section)
BIOL 323	5	16
BIOL 322 L	0	16 (1 section)
BIOL 321	2	9
BIOL 341	4	25
BIOL 341 L	0	25 (1 section)
BIOL 410	3	2 (Molecular bio)
BIOL 432	5	10
BIOL 432 L	0	10
BIOL 433	5	22
BIOL 433 L	0	22
BOT 201	5	20

SPRING YEAR 06-07

Course	Load Hours	Mean Enroll
BIOL 213	5	33
BIOL 213 L	0	33 (2 sections)
BIOL 357	4	31
BIOL 358	1	20
BIOL 334	5	14
BIOL 342	4	34
BIOL 342 L	0	34 (1 section)
BIOL 410	4	4 (Microscopy)
BIOL 410	4	3 (Neurobiology)
BIOL 410 L	0	3 (Neurobiology
BIOL 490	3	14

SPRING YEAR 07-08

Course	Load Hours	Mean Enroll
BIOL 213	5	41
BIOL 213 L	0	41 (2 sections)
BIOL 322	5	12
BIOL 322L	0	12 (1 section)
BIOL 357	4	19
BIOL 358	1	19
BIOL 334	5	13
BIOL 342	4	22
BIOL 342 L	0	22 (1 section)
BIOL 410	4	4 (Microscopy)
BIOL 410	3	4 (Virology)
BIOL 490	3	18

- A total of 8 students for a total of 20 credits of research BIOL 401 was taught 2006-2007
- A total of 16 students for a total of 40credits of research BIOL 401was taught 2007-2008
- A total of 9 students for a total of 26 credits of Practicum/Internship BIOL 409 was taught 2006-2007

Staffing

- Karen Antell, Ph.D. in Botany, teaches biology, botany, and supporting courses for rangeland resources; maintains the greenhouse; curates the herbarium research collection; chairs the Rebarrow Forest board; and engages students in research into local ecosystems.
- Shaun Cain, Ph.D. in Zoology and specializing in cellular and organismal neurobiology, teaches anatomy and physiology, cell biology, neurobiology, and neuroethology, and engages undergraduate students in research into neurotransmission in the slug.
- Joe Corsini, Ph.D. in Microbiology, teaches biology, microbiology, immunology, and virology, as well as a microbiology service course for the OHSU nursing program; involves students in a variety of paleontological and microbiological studies; is also involved in outreach activities with local K-12 schools, the National Park Service, and the US Forest Service.

- Laura Mahrt, Ph.D. in Zoology and specializing in herpetology, teaches service anatomy and physiology courses for the nursing program via DDE, as well as herpetology, mammalogy, comparative anatomy, animal behavior and ecology; is conducting a long-term study on the endangered spotted frog; and is extensively involved in community outreach.
- Bonnie Postovit, M.S. Zoology & Physiology, teaches on-campus lectures and labs in human anatomy and physiology—a prerequisite course for nursing and dental hygiene students, and an important element of the Physical Activity & Health major.
- John Rinehart, Ph.D. in Genetics and specializing in molecular genetics, teaches genetics, nursing genetics, the general education biology series, invertebrate zoology, and molecular biology; provides research experiences to undergraduates; and collaborates with the US Forest Service.
- Maurizio Valerio, Ph.D. in Natural Sciences, Master in Zoology, teaches biology laboratories for the general education biology series and microbiology laboratories for the nursing program; he also teaches history of science and is extensively involved in a diverse array of community trainings and outreach activities.

Faculty Accomplishments

Instruction is enhanced by faculty outreach activities. For example, Karen Antell cooperates with the Oregon Department of Fish and Wildlife, is involved in the Ladd Marsh replanting project, and co-organizes with Laura Mahrt the Girls in Science event every year; Joe Corsini presents workshops for a local children's program, Think Link Science Saturday, and cooperates with the National Park Service Service and U.S. Forest Service on paleontology projects; Laura Mahrt volunteers for the Regional High School Robotics and High School Math competitions annually and cooperates with the Oregon Dept. of Fish and Wildlife on turtle and spotted frog projects; John Rinehart cooperates with the U.S. Forest Service; and Shaun Cain conducts science lectures

and discussions with kids at local public schools through the Friday Harbor K-12 Outreach Program.

Instruction is also enhanced by faculty research. For example, most recent faculty research includes: Karen Antel's 2007 abstract and poster at the Wildlife Society Meeting, "Macroinvertebrates in Bear Creek, Longley Meadows," John Rinehart's 2006 publication of a study entitled "Genetic structure of *Dendroctonus mexicanus* (Coleoptera: Curculionidae: Scolytinae) in the Trans-Mexican Volcanic Belt," Laura Mahrt's 2005 publication with C. Nowak of "New county record of *SCAPHIOPUS INTERMONTANUS* (Great Basin Spadefoot) in Union county Oregon" in the *Herpetological Review* 36:335, Joe Corsini's 2006 publication of manuscript entitled "Paleoenvironmental implications of size, carapace position, and incidence of non-shell elements in White River turtles" in the international journal *Palaeogeography, Paleaeoclimatology, and Paleaoecology,* and Shaun Cain's 2005 publication of a study entitled: "Immunochemical analyses of magnetically responsive neurons in the mollusc *Tritonia diomedea*" in the *Journal of ComparativePhysiology.*

In addition to research, Biology faculty are also actively involved in earning grant funding for research projects. John Rinehart wrote two successful grants, both Joint Venture Agreements with the US Forest Service, with a combined total value of US$291,238.00. Joe Corsini has submitted two grants to the National Science Foundation RUI section, one a Fossil Turtle grant and the other a Molecular Virology grant, with a total of $900,000 requested. Shaun Cain has also worked on two grants, one to the NSF entitled *Magnetic Field Sensor in the Marine Mollusk, Tritonia. Where Is It and How Does It Work?* and the other entitled *Gridless TEM Sample Supports*, with the total requested $376,295.

Minimum Staffing Requirements
Total SCH Required per academic year (General Education and service courses and major courses)

Total-------load hours

1) Current assessment of Faculty Based on the current faculty in Biology, the following total FTE are available:

    Total = 5.69 FTE (4 tenure, 1.69 fixed term)

2) Efficiency Ratios

Load/Faculty On Campus

Based on the 2008-09 SCH, the ratio of SCH to faculty in BIOL course prefix is _____
Student load hours/1.0 FTE = _____ load hours per faculty member.

Total SCH: 4,262

ON Campus SCH: 3,325

ONLINE SCH: 881

ON SITE SCH: 56

SCH/Faculty Need

On campus _____cr hr/ 36

Summary Recommendations/Observations

The Biology program is strong in terms of teaching, as is evidenced by the botany program's shift to an integrated lab/lecture format. In addition, many of our students are involved with undergraduate research projects. At any one time during the year, 15-25% of our students are engaged in undergraduate research. And, the proposed molecular biology degree will effect a shift of upper-division courses to low enrollment, project-style pedagogy.

The Biology program has made progress in efforts to assess teaching and student learning. Outreach continues to be exemplary, with faculty involved in community science outreach projects such as Think Link, Science Fair judging, high school robotics competitions, cooperation with state agencies such as the Oregon Department of Fish and Wildlife, and cooperation with federal agencies such as the National Park Service.

Faculty members are concerned about many social issues that revolve around biology: the degradation of the environment, medical technology, agricultural biotechnology, climate change, and alternative energy, to name a few. They have yet to instate tools for assessing their impact on student awareness and their ability to reach out to residents of Eastern Oregon. In the future they will attempt to assess the program's impact on student attitudes and awareness of social issues through surveys and questionnaires. These questionnaires will be administered to entering freshman and then again when these individuals graduate, providing us with an indicator in the changes in perception as student proceeds through the program.

While the Biology undergraduate research program is established, it lacks sufficient vitality to provide for all interested students. In the future, faculty will pursue dialogue (with EOU administration) aimed at attaching resources to provide consistent high quality research experiences to all Biology graduates. The discussion will revolve around the resources required for this task: time (faculty), space, equipment maintenance and reagent budgets, and hiring a biology preparatory technician.

Administrative Review of Program (Dean Marilyn Levine)

Administrative Assessment of program portfolios will consist of three areas of commentary: assessments conducted relating to student learning outcomes; comments on enrollment indicators; program goals and observations. If appropriate other observations will be offered.

1. Assessment of Program Outcomes:

The content assessed in the field test shows EOU students within the proficient range. The reflection on the assessment is interesting in that the faculty suspect that scores will increase more with the new concentrations in the biology program. This should be tracked consistently. The second assessment measures the design and execution of an experiment. The assessment rubric is well scaled and distributed across the components, and clearly the students understand

the experimental at adequate and proficient rates (38 out of 42 students). The assessment allowed the program to isolate the component of statistics in the training of students that needs attention.

Because the program has undergone program changes, the Biology Faculty have been very deliberative about assessing student learning and have collected systematic testing data since 2005. They have specifically tested new and innovative teaching and learning approaches such as POGIL (Process Oriented Guided Inquiry Learning), and have extensively focused on assessment. The program reform put in place this past year has been informed by these test results.

2. Enrollment Indicators:

The course enrollments for biology are continually robust and the courses are crucial to the pre-professional and biology majors. In general the Biology enrollments and graduate rates have, in declined during the past three years. I suspect that the decline in the graduation rates from 2006-2009 may have reflected the lack of the more usual concentrations in the field. If so, then the new major concentrations might generate an increase in majors, sch, and graduation rates.

3. Program Goals and Observations:

The Biology faculty is to be commended for the breadth of their pedagogy, scholarship, and service. They have responded to changing conditions by delivering consistently solid teaching and research. The new concentrations in Biology were developed after a multiyear process of assessment and reflection. In addition, the new interdisciplinary Environmental Studies concentration will provide more opportunities for robust growth that will strengthen sustainable growth at Eastern Oregon University.

The one area that will need attention is providing resources for the advanced research expectations in a capstone experience. These are issues that need analysis and planning in the future.

Other Observations:

The Biology program portfolio is well done. My only recommendation might be to affix two appendices – a checklist of the two new biology concentrations and one for the environmental studies concentration.