## CALL FOR COURSE PROPOSALS FOR INCLUSION INTO CORE CURRICULUM

**To propose a course for inclusion into the AC General Education Course List (Core Curriculum) please complete the following areas of inquiry. Please review the description of the Core Objectives (General Education competencies) from the Texas Higher Education Coordinating Board.**

**Course under Consideration:** BIOL 1411 Botany

**Catalogue Description of the Course:**

A survey of biological concepts and principles. Incorporating molecular, cellular, genetic, morphological and physiological approaches applied to the Prokaryotae, Protista, Fungi and Plantae kingdoms.

**Foundational Component Area:** Life and Physical Sciences

**Course Student Learning Outcomes:**

1. Compare and contrast the structures, reproduction, and characteristics of plants, algae,and fungi. 2. Describe the characteristics of life and the basic properties of substances needed for life. 3. Identify the principles of inheritance and solve classical genetic problems. 4. Describe phylogenetic relationships and classification schemes. 5. Identify the major phyla of life with an emphasis on plants, including the basis for classification, structural and physiological adaptations, evolutionary history, and ecological significance. 6. Identify the chemical structures, synthesis, and regulation of nucleic acids and proteins. 7. Identify the substrates, products, and important chemical pathways in photosynthesis and respiration. 8. Describe the unity and diversity of plants and the evidence for evolution through natural selection. 9. Compare different sexual and asexual life cycles noting their adaptive advantages. 10. Describe the reasoning processes applied to scientific investigations and thinking. 11. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data. 12. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory. 13. Communicate effectively the results of scientific investigations.

| | |
|---|---|
| **Communication Skills** | |
| Brief Description of Assignment and/or Activity to fulfill Course Objectives: | Students will design a dichotomous key for identification of different local plants. |
| Direct Assessment Method<br>As applied to above Assignment/Activity | Rubric, |
| Brief Outline of Assessment Method(s) | As one component of this activity, students will each make a PowerPoint presentation to explain the design of their identification key and its application to one set of target species. The rubric for this portion of the activity is designed to measure effective presentation and communication skills. These include a demonstrated organization and delivery of content, and the use of appropriate sources, documentation, and visual design elements. Handouts of student presentations will be submitted to the Assessment Committee. |
| Benchmark/Target: | 60% of the students will effectively communicate the general characteristics and application of a dichotomous key. |
| **Critical Thinking Skills** | |
| Brief Description of Assignment and/or Activity to fulfill Course Objectives: | Students will design a dichotomous key for identification of different local plants. |
| Direct Assessment Method<br>As applied to above Assignment/Activity | Rubric, |
| Brief Outline of Assessment Method(s) | As one component of this activity, students will provide a written explanation justifying their character choices used to identify and differentiate plant species. The rubric for this portion of the activity is designed to evaluate the reasoning ability of students, based on species characteristics, for species identification. Student reports will be provided to the Assessment Committee. |
| Benchmark/Target: | 60% of the students will have developed the reasoning ability and identification skills to develop a guide that enables an untrained adult to correctly identify a group of local plants. |
| **Empirical and Quantitative Skills** | |
| Brief Description of Assignment and/or Activity to fulfill Course Objectives: | Students will design a dichotomous key for identification of different local plants. |
| Direct Assessment Method<br>As applied to above Assignment/Activity | Rubric, |

BIOL144

| | |
|---|---|
| Brief Outline of Assessment Method(s) | As one component of this activity, students will determine the diversity and numbers of identified species in their sampling locale. They will compare their total diversity and average numbers with those of other students from different locales. The rubric for this portion of the activity is designed to evaluate the primary data and to compare those with data from other areas. Student reports will be provided to the Assessment Committee. |
| Benchmark/Target: | 60% of the student groups will have demonstrated the quantitative skills needed to acquire and effectively analyze experimental data. |
| **Teamwork** | |
| Brief Description of Assignment and/or Activity to fulfill Course Objectives: | Students will design a dichotomous key for identification of different local plants. |
| Direct Assessment Method<br>As applied to above Assignment/Activity | Rubric, |
| Brief Outline of Assessment Method(s) | As one component of this activity, student groups will assess, and then integrate their sub-sets of identification information into a larger, more comprehensive dichotomous key. Each group will then develop a master guide for particular plant species of a given area, using the same, or novel, character features. The rubric for this portion of the activity is designed to evaluate the groupsâ€™ abilities to effectively integrate information and develop a robust guide to species identification. Student guides will be provided to the Assessment Committee. |
| Benchmark/Target: | 60% of the student groups will demonstrate the ability to develop a comprehensive dichotomous key. |

Robert Dillon

*III: Institutional Initiatives*

PART D: Core Curriculum Assessment – Program Outcomes

Complete this Section ONLY for Programs Directly Responsible for Core Curriculum Courses

Instructions: On the Annual Review, questions 1-4 will be completed by the designated department chair or program coordinator. However, each course submitted for inclusion in the core curriculum should respond to question 5 (parts a-g) and supply the documentation outlined in #6 to your department chair or program coordinator.

5. The "Call for Course Proposals for Inclusion" contains a description of each assignment/activity, direct assessment method, etc. for each of your department's/program's courses in the core curriculum.
   For each course approved for core curriculum inclusion, provide the following information:
   a) Provide a link to or copy of your data results and/or a summation of your results for each required competency for each core curriculum course in your program.

      Stapled to this page.

   b) Did you meet your benchmark/target in each course? If not, do you need to adjust your benchmark or adjust the instruction to meet the benchmark?

      No. I need to adjust my instruction to meet the needs of the students.

   c) Provide information on your data collection strategy (e.g. each faculty member collected data, sampling of student work collected across sections used, etc.):

      Each faculty member assigns a lesson agreed upon by a committee that addresses all key objectives.

   d) Please explain how your results were evaluated (e.g. a team evaluated the data,
      data was collected from every student in the course via Blackboard, etc.):

Data was collected from student groups that worked on the project independently.

e) How do you ensure your results are not biased and are reliable (i.e. inter-rater reliability)?

These assignments are as-is submissions from students on their first try.

f) Please list the facts you feel contributed to your results (Analysis):

Students were given assignments that scaffold them to this assignment. Therefore, student success is a direct measure of my scaffolding pedagogy.

g) How have you or will you improve student learning in each course based on the
most recent assessment results?

I will improve student results using a scaffolding approach.

6. For each core curriculum course and each core objective, please include a copy of the assessment instrument and five randomly selected, evaluated assessment samples with this form. Some examples of things you may include with your submission are as follows:

- **Embedded Questions** – Copy of possible question bank and copy of five student work samples that include questions from the question bank
- **Juried Assessment** – List of members on juried panel and copy of five panel evaluations. If student performance, picture or work, etc. is available, include that with your submission as well.
- **Pre-Post Test** – Copy of pre-test/post-test questions and five samples of student work from pre-test and five samples of same students' work from post test
- **Rubric** – Copy of rubric and copy of five student work samples
- **Other Types of Assessment** –Use the above bullets as a reference point for what you may wish to provide. Please contact the Director of Institutional Effectiveness with specific questions.

Also, if it is not clear, please identify on your student work the portions of the student work that address the required THECB objective/s.

***Hypothosis***

The slopes of the first set of worm trials would have no big differnence from the than the second set of trials

***Null Hypothosis***

The average slopes of the hot water trial were going to be much bigger than the Ice or room temperature trials

Methods

We took 20 worms and put them in a plastic container for each cellular respiration experiment
I bathed the container in an ice bath for 20 minutes and recorded the skin cell give off from the worms with a gasseous detector
I did the same thing but only in a room temperature container with no surrounding influences and a situation where the worms were surronded by 32 degree celcius water
I changed the container every time I did a trial whether it was ice, hot water or nothing except room temperature
I got the slope of the gas graph from the computer I was using from every experiment and recorded it
I then repeated everything and got a second set of data
I then used both sets of data to find the average slopes for all three experiments
I then got the data from the other four groups experiments

**Results**

| My results | Group 1 | Group 2 | Group 3 | Group 4 |
|---|---|---|---|---|
| **Average slopes** | Ice Bath = 7.749 | Ice Bath = 4.200 | Ice Bath = 76.52 | Ice Bath = 68.26 |
| Slope of Ice Bath = 56.99 | Room Tem. = 6.869 | Room Tem. = 5.501 | Room Tem. = -6.046 | Room Tem. = 59.00 |
| Slope of R.T. = 36.15 | Tap water = 21.440 | Tap water = 14.260 | Tap water = 183.9 | Tap water = 174.5 |
| Slope of Water = 66.79 | | | | |

***Conclusion***

The slopes of the experiments prove that the worms give off a moderate or no amount of skin cells when in a cold enviornment, so it is inconclusive
They give out almost nothing when in room temperature and an extravagant amount when in a hot temperature enviornment.

Hypothesis: At a colder temperature the $CO_2$ production will drop because their respiration rate will slowdown, and the higher temp gets more. $CO_2$ will be produced because of the increase in respiration.

Null: There is no connection between temp. and cellular repiration.

Method: We started out w/ 20 worms in a plastic container. We put the container into a 4° C ice bath for 10 min and calcualted the $CO_2$ produced. Then moved the worms to a new container and left them at 21°C room temperature for 10 min while calculating the $CO_2$ again. We then put them in another new clean container and left them in warm water 32°C and calculated $CO_2$ again. we wnet through this cycle twice to make our table.

# PART D: CORE CURRICULUM ASSESSMENT – PROGRAM OUTCOMES

## *ONLINE ANATOMY & PHYSIOLOGY*

*AMANDA R. PENDLETON*

a) ***Provide a link to or copy of your data results and/or a summation of your results for each required competency for each core curriculum course in your program.***

Data for six out of ten online Anatomy and Physiology courses are attached to this report.

b) ***Did you meet your benchmark/target in each course? If not, do you need to adjust your benchmark or adjust the instruction to meet the benchmark?***

Benchmarks were met for teamwork (60% of all students show competency) in five out of six of the online Anatomy & Physiology courses in which rubrics were used to evaluate student outcomes. Four of the six courses showed a very high level of teamwork (above 80%), while one barely passed the benchmark (63.6%). The one that did not achieve the benchmark was close to it at 58.3%.

Rubric design did not adequately assess other competencies (communication, empirical and quantitative skills, critical thinking) so it is unclear whether benchmarks were met. However, over 60% of students in each course showed 'competent' or 'proficient' performance in these areas. More specifically, most group projects showed proficiency in communication. However, only competency was achieved by most groups in critical thinking. Most groups showed at least a competent level of empirical and quantitative skills. However, whether groups achieved proficiency was quite variable in the different sections.

Benchmarks will not be adjusted in the future. Rather, assessment methods will be redesigned and instruction improved.

c) **Provide information on your data collection strategy (e.g. each faculty member collected data, sampling of student work collected across sections used, etc.):**

A problem requiring critical thinking and group work was assigned. This problem was identical for all Anatomy & Physiology 1 and all Anatomy & Physiology 2 sections. Students constructed their responses in a common google document provided by the course coordinator for all online Anatomy and Physiology sections. This document tracked individual student contributions by student ID number. Students also used the google document comment feature and a group discussion board on Blackboard to coordinate their responses. Once their answers were assembled, students submitted their final product to the course Blackboard site for grading.

Two rubrics were provided to online instructors for two separate quiz grades on the project. One rubric assessed overall student participation and was given as an individual grade. The other rubric assessed all four competencies (communication, empirical and quantitative skills, teamwork, critical thinking) on the group project as a whole. One grade was then assigned to the entire group, with some modification for individuals based on participation.

The course coordinator for online Anatomy and Physiology then used individual rubrics from each instructor's course to generate data for this report. Because only three out of five faculty members used the common rubrics, data from only six out of ten online Anatomy and Physiology courses are included here.

***d) Please explain how your results were evaluated (e.g. a team evaluated the data, data was collected from every student in the course via Blackboard, etc.):***

The course coordinator for online Anatomy and Physiology viewed the rubrics for each individual's participation and for each group project for every course in Blackboard. The percentage of individuals scoring above a 'C' for participation in each course was calculated and used to determine if the teamwork benchmark was met. The percentage of group projects scoring 'novice', 'competent' or 'proficient' in each course was also calculated. It was unclear whether the benchmark should be considered as the percentage of group projects scoring at least 'competent' or the percentage scoring at least 'proficient'. Therefore, the communication, empirical and quantitative skills, and critical thinking competencies could not be thoroughly evaluated. The 'teamwork' competency assessed in the group rubric is not reported here, since it was thought that the individual assessment was a better evaluation. Redesigned rubrics will be used in future courses.

***e) How do you ensure your results are not biased and are reliable (i.e. inter-rater reliability)?***

The course coordinator provided common rubrics for assessing student competency development to all online instructors to reduce bias.

***f) Please list the facts you feel contributed to your results (Analysis):***

Student participation was generally low in two out of six sections, despite student populations showing similar distributions on a learning and study strategies inventory. Because online content was identical in all sections, the difference in participation may be due to webcam proctoring of exams in the two lower-scoring sections. Students in these proctored sections earned lower grades on exams and a higher withdrawal rate and non-participation were seen in all areas of the course.

Communication may have been generally proficient because students had to communicate effectively to understand each other's ideas and generate a common product. Thus, errors in communication may be corrected mostly through the peer-editing process. However, empirical and quantitative skills, as well as critical thinking, appear to not self-correct as easily in a group setting. This project was not staged and did not allow formative instructor feedback; therefore, students did not receive the mid-project corrections necessary for higher competency development in those areas.

***g) How have you or will you improve student learning in each course based on the most recent assessment results?***

<u>Rubric redesign</u> – Clearly, rubrics must be redesigned to ensure proper evaluation of competency development. This redesign will include removing the 'teamwork' criterion from the group project. Thus, teamwork will be an entirely individual grade in the future. Additionally, rubric categories will be expanded such that achievement levels will be labeled 'A-level work', 'B-level work', etc. These new categories will allow the course coordinator to calculate the percentage of group projects achieving at least 'C-level work' for each competency. This number will then be used to determine whether the 60% benchmarks are met.

<u>Further reduce bias</u> – The course coordinator will better communicate with instructors about the necessity of rubric use when assigning grades. Additionally, she will provide instructors with sample student work, graded by rubric, to better ensure that all instructors are using rubrics in a similar

manner. Finally, she will solicit feedback to identify questions, conceptual problems, or technical issues associated with rubric use.

*Assignment redesign* – The group assignment will be redesigned based on principles learned in Amarillo College's recent problem-based learning workshop. Specifically, the project will occur in multiple stages, with instructor feedback at each stage, to better help students achieve competencies. Other principles, such as asking students to identify what they know and what they don't know about the topic, will further help competency development. Finally, students will use concept mapping to better help them make the connections needed for critical thinking. Redesigned assignments will be piloted only in Anatomy & Physiology 2 courses, prior to wider implementation in all Anatomy & Physiology courses.