APR Instructional Biology 2022-23 Latest Version

Annual Program Review for Biology, reviewing the 2022-23 Academic Year

APR Instructional

Annual Course Student Learning Outcome Data : Version by **Franz, Carl** on **01/31/2024 23:42**

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
BIO101 - Principles of Biology I		
1. Identify the characteristics that define life, distinguishing various life forms. (Active from Fall 2015)	70.00%	100.00%
2. Analyze structures and functions of atoms, molecules, and cells. (Active from Fall 2015)	70.00%	100.00%
3. Diagram flow and expression of biological information at the molecular, cellular, and organismic levels. (Active from Fall 2015)	70.00%	100.00%
4. Diagram how energy is transformed in various organisms and used physiologically at the cellular and molecular levels. (Active from Fall 2015)	70.00%	100.00%
5. Apply analytic techniques of the scientific method to evaluate information from texts, journals, and popular media (Active from Fall 2015)	70.00%	100.00%
BIO102 - Principles of Biology II		
1. Identify general patterns of change in organisms over time via microevolution and macroevolution, and apply these patterns to analyze adaptations of particular organisms. (Active from Fall 2015)	70.00%	100.00%
2. Identify the characteristics that define life, and those that distinguish various life forms and taxa. (Active from Fall 2015)	70.00%	100.00%
3. Diagram structural and functional components of major plant systems in important plant taxa. (Active from Fall 2015)	70.00%	100.00%
4. Analyze levels of organization and important structures and processes in populations and ecosystems. (Active from Fall 2015)	70.00%	100.00%
BIO103 - Principles of Biology III		
1. Identify the characteristics that define life, and those that distinguish important protist and animal life forms. (Active from Fall 2015)	70.00%	100.00%
2. Describe or draw structures, functions, and processes of important animal tissues and organ systems. (Active from Fall 2015)	70.00%	100.00%
3. Evaluate the importance of tissues, organs, organ systems, and hierarchical function to individual animals to key animal taxa. (Active from Fall 2015)	70.00%	100.00%
4. Analyze animal adaptations and current events in animal and protist biology. (Active from Fall 2015)	70.00%	100.00%
BIO110 - Introduction to Cell and Molecular Biology		
1. Analyze the characteristics that define life and diagram those that distinguish various life forms. (Active from Fall 2019)	70.00%	100.00%
2. Build models to reflect the hierarchy of atoms, molecules, and cells in the transfer and expression of biological and genetic information at various organismic levels. (Active from Fall 2019)	70.00%	100.00%
3. Diagram structures and functions at the cellular and molecular levels to show how energy is transformed biologically. (Active from Fall 2019)	70.00%	100.00%
4. Evaluate basic factual and conceptual biological information, data, and current issues. (Active from Fall 2019)	70.00%	96.97%

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
BIO111 - Introduction to Plant and Animal Biology		
1. Inventory major components of earth's biosphere and explain how physical and chemical factors influence life. (Active from Fall 2015)	70.00%	100.00%
2. Construct models showing how the relationships of organisms to their environments result in genetic change over evolutionary time, propose evolutionary processes, and diagram phylogenetic relationships of main taxa of life forms. (Active from Fall 2015)	70.00%	100.00%
3. Compare structures and functions used by various organisms to maintain homeostasis in their respective environments. (Active from Fall 2015)	70.00%	100.00%
4. Model the important biotic and abiotic structural and functional components of populations, communities, ecosystems, and biospheres. (Active from Fall 2015)	70.00%	100.00%
BIO120 - Introduction to Human Anatomy and Physiology		
1. Identify basic structures and functions of the systems of the body. (Active from Summer 2021)	70.00%	0.00%
2. Compare and contrast the functions of different areas of the brain. (Active from Summer 2021)	70.00%	0.00%
BIO120 - Introduction to Human Anatomy and Physiology		
Compare and contrast the functions of different areas of the brain. (Active from Fall 2015)	70.00%	66.67%
Outline the differences in the digestive and respiratory systems. (Active from Fall 2015)	70.00%	66.67%
BIO149 - Ecology		
1. Describe or draw basic structure, function, and dynamics of biotic and abiotic components of natural systems. (Active from Fall 2015)	70.00%	66.67%
2. Relate organismic structure and function to elements in the abiotic environment and to relationships, identifying resulting key adaptations. (Active from Fall 2015)	70.00%	66.67%
3. Evaluate local and global ecological characteristics and issues. (Active from Fall 2015)	70.00%	66.67%
4. Illustrate the interdependencies of natural and human-created systems by using modeling techniques. (Active from Fall 2015)	70.00%	66.67%
BIO201 - Botany		
1. Model plant structure and function at the molecular, cellular, and organismal levels. (Active from Fall 2015)	70.00%	85.71%
2. Diagram patterns of plant diversity in major taxonomic groups, and predict the basic taxonomy of a plant using its morphological characteristics. (Active from Fall 2015)	70.00%	71.43%
3. Integrate structure and function of plants and their interactions with the abiotic and biotic environment to analyze patterns of evolutionary diversity in plants. (Active from Fall 2015)	70.00%	71.43%
BIO203 - Human Anatomy & Physiology I		
Compare and contrast the different tissue types present in the human body. (Active from Fall 2015)	70.00%	71.93%
Differentiate lipids, carbohydrates, proteins, and nucleic acids. (Active from Fall 2015)	70.00%	75.44%
Distinguish the surface features and location of the different bones in the body. (Active from Fall 2015)	70.00%	73.68%
Compare and contrast the different structures of the central nervous system. (Active from Fall 2015)	70.00%	68.42%
Diagnose the different toxins and disease conditions with reference to nerve transmission. (Active from Fall 2015)	70.00%	71.93%
BIO203 - Human Anatomy and Physiology I		

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
1. Identify body directions, regions, and body planes or sections. (Active from Summer 2021)	70.00%	0.00%
2. Compare and contrast the different tissue types present in the human body. (Active from Summer 2021)	70.00%	0.00%
3. Distinguish the surface features and location of the different bones in the body. (Active from Summer 2021)	70.00%	0.00%
4. Identify different structures and functions of the integumentary, skeletal, and nervous systems. (Active from Summer 2021)	70.00%	0.00%
5. Compare and contrast the different structures and functions of the brain. (Active from Summer 2021)	70.00%	0.00%
BIO204 - Human Anatomy and Physiology II		
1. Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system. (Active from Summer 2021)	70.00%	93.75%
2. Evaluate the different endocrine response scenarios. (Active from Summer 2021)	70.00%	87.50%
3. Label gross anatomy muscles as they relate to movement of the human body. (Active from Summer 2021)	70.00%	87.50%
4. Identify structures and functions of immune system, and heart. (Active from Summer 2021)	70.00%	87.50%
5. Identify the effects of various factors regulating stroke volume and heart rate, and the role of autonomic nervous system in regulating cardiac output. (Active from Summer 2021)	70.00%	87.50%
BIO204 - Human Anatomy and Physiology II		
Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system. (Active from Fall 2015)	70.00%	0.00%
Evaluate the different endocrine response scenarios. (Active from Fall 2015)	70.00%	0.00%
Label gross anatomy muscles as they relate to movement of the human body. (Active from Fall 2015)	70.00%	0.00%
Correlate the different aspects of the cardiovascular system. (Active from Fall 2015)	70.00%	0.00%
Construct and run an experiment comparing the heart rates of athletes and non-athletes. (Active from Fall 2015)	70.00%	0.00%
BIO205 - Human Anatomy and Physiology III		
1. Identify and give the location of major arteries and veins in the systemic circulation. (Active from Summer 2021)	70.00%	96.55%
2. List and explain the factors that influence blood pressure, and understand how blood pressure is regulated. (Active from Summer 2021)	70.00%	93.10%
3. Identify specific anatomical and physiological components of the cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive systems. (Active from Summer 2021)	70.00%	93.10%
4. Compare and contrast the functions of glomerular filtration, tubular reabsorption, and tubular secretion. (Active from Summer 2021)	70.00%	96.55%
5. Complete a group research project and report on assigned diseases. (Active from Summer 2021)	70.00%	96.55%
BIO205 - Human Anatomy and Physiology III		
Analyze the function of all portions of the respiratory tract to its gross and microscopic anatomy. (Active from Fall 2015)	70.00%	0.00%
Compare and contrast the functions of glomerular filtration, tubular reabsorption, and tubular secretion. (Active from Fall 2015)	70.00%	0.00%
Diagram chemical digestion with the major substrates and products of this process. (Active from Fall 2015)	70.00%	0.00%

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
Do group research and report on an assigned disease process. (Active from Fall 2015)	70.00%	0.00%
BIO210 - Microbiology		
1. Compare and contrast the characteristics of bacteria, fungi, protozoans, helminths, and viruses. (Active from Fall 2015)	70.00%	85.71%
2. Evaluate the different physical, chemical, and medical means to control microbes. (Active from Fall 2015)	70.00%	85.71%
3. Diagnose correctly the different pathological conditions manifested in humans as to the causative microbe. (Active from Fall 2015)	70.00%	85.71%
4. Demonstrate good descriptive techniques with regard to macroscopic and microscopic work. (Active from Fall 2015)	70.00%	100.00%
5. Solve the unknown laboratory component. (Active from Fall 2015)	70.00%	100.00%
BIO212 - Zoology		
1. Diagram patterns of diversity in major animal taxonomic groups using cladistics and phylogenetics, and relate taxonomy to evolutionary processes and animal structural, developmental, and functional characteristics. (Active from Fall 2015)	70.00%	85.71%
2. Relate acquisition, flow, organization and uses of information, energy, and nutrients in animal systems to their structure, physiology, behavior, and environments. (Active from Fall 2015)	70.00%	85.71%
BIO141A - Birds of the Lake Tahoe Basin		
1. Integrate structural, behavioral, and functional characteristics of birds in order to visually identify birds both in the laboratory and the field to the species and family levels, and to relate evolutionary adaptations of birds to their habitats. (Active from Fall 2015)	70.00%	100.00%
2. Differentiate between field bird songs and calls and recorded songs and calls in the laboratory in order to identify birds at the species level. (Active from Fall 2015)	70.00%	100.00%

APR Questions Tableau : Version by **Franz, Carl** on **01/31/2024 23:41**

Using the Data Provided (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/LTCCProgramReviewSummary?:iid=1) please provide the number of students (headcount) that are served by the discipline.

For the 22-23 academic year, there were 140 F2F and 100 online students, for a total of 240 students served.
Using the Data Provided (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/Demographics?:iid=1), identify the populations served by the discipline. Are there any inconsistencies? Does the Population served reflect the population of the college? If not, why, and how can the discipline serve a population more reflective of our community?

The Race/Ethnicity of students enrolled in biology courses is predominantly Latina/o/x (84 students), White (102 students), and Multi Race (14 students). This tracks with the overall population of the college.
Using student success data (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/SuccessRatesOverall?:iid=1), identify any trends in successful completion of courses.
Are there particular courses (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/SuccessRatesbyCourse?:iid=1) students are struggling in?
Are there any demographics that are less likely to complete certain courses in the discipline?
What steps need to be taken to support students and the department in meeting its equity obligations?

I remain optimistic that further implementation of the HSI STEM grant will help close the success rate gap between Latina/o/x and White students. In addition, faculty should be cognizant of potential language barriers that exist between instructors and students, where English isn't the primary language, and devise creative methodologies to bridge that barrier. Incorporating Spanish-speaking embedded tutors could also be an effective way to span that language barrier.
Are there any courses lacking Title V Updates?
If so, how many and why?
(Please check your courses in eLumen for the most recent list of courses that require updates.)

Yes. There are 6: BIO101, BIO102, BIO103, BIO110, BIO111, BIO149. The majority of these courses are taught by a faculty member who was on leave last spring. I am working with this faculty member this quarter to update these.

Describe the approach to scheduling in terms of offering a balance of Face to Face (F2F) and Online opportunities for students.

The majority of biology courses offered are Face to Face. This is primarily due to the requirement of Face to Face labs, which are challenging to offer a meaningful experience in an online modality. Often, an online lab will not transfer to four year institutions. BIO111 has been offered online since 2020. BIO110 is the only biology course offered all four quarters of an academic year. It is typically offered online for 2 of the 4 quarters due a paucity of instructors available to teach Face to Face.
Are there any insights specific to this discipline regarding scheduling modality in terms of success rates, student retention, or course cancellations?

Since most of the courses in Biology are Face to Face, there is not much data to review.
Are the full-time faculty teaching the courses with the most face to face students? Why/why not?

Yes. The highest enrolled courses are in Anatomy and Physiology, which is taught by full-time faculty. The General Biology series (BIO101, 102, and 103) are also among the highest enrolled courses and are taught by full-time and part-time faculty depending upon instructor availability.
Are staffing levels adequate to fulfill the purpose of the program?

Absolutely not. We have a full time instructor on reduced load and adjuncts are extraordinarily difficult to find due to the combined high cost of living and low compensation. A person with an MA or PhD in Biology has far more lucrative options than part-time adjunct work. This poses staffing challenges every quarter. With Dual-Enrollment ramping up, we have been unable to fullfill the desired number of chemistry sections asked for by the high school. Until we have more faculty in biology, we will not be able to provide any Dual-Enrollment courses to the high school.
What professional development opportunities have faculty in this discipline taken advantage of? Are there any unmet professional development needs?

Last year, a faculty member went on sabbatica to provide comprehensive tutorial guides for our Anatomage Table. Currently, another faculty member has been given approval to receive units for developing a standardized OER lab manual.
Where applicable, outline and explain any budget shortfalls for this discipline.

The Biology budget has been successively trimmed compared to pre-pandemic years. The budget was $593 higher in 2019 than it is now. In addition, the 2024 budget is exactly the same as the 2023 budget. This does not adequately reflect the rise in shipping and materials costs of the last 5 years.Our Lab Technician who does the ordering has estimated a 20% inflation increase on shipping and materials in only the lasy 2-3 years. Also, many of our specimens, lab equipment, and A&P models have received significant wear and tear and should be replaced. Antiquated and worn out materials will sharply contrast inside a brand new laboratory facility and hamper the student's ability to receive a top-notch educational experience. We also are running low on glassware, which students inevitably break over the years, creating a shortage.With the acquisition of the new microtome, we accrued the cost of an annual service and maintenance contract of $1,137.74. We also have several other new pieces of equipment and lab techniques that have been acquired and developed over the last few years (e.g. shaking incubator, fluorescent microscope, Polymerase Chain Reaction) that will require purchasing reagents on a regular basis for proper implementation. Considering this is new technology to the Biology department, it has not been considered in previous budgets. Also, reagents for labs throughout the diverse range of Biology courses have only increased in price.
If additional financial resources are needed, please describe how they will increase student success, retention, or completion.

Additional resources are needed to implement these technologies that are new to the Biology department at LTCC, but should have been standard years ago. We are behind the 8 ball, compared to other institutions, when it comes to the technological experience we provide to students. I have been working hard over the last few years to introduce new techniques and equipment in order to steer the biology program closure to state of the art.
The shaking incubator will allow students to grow bacterial cultures more efficiently, and will allow new techniques like tissue fixation to occur. The microtome will introduce students to the hands-on technique of preparing their own tissue slides for microscopical analysis. This, in turn, will train them an invaluable skill that could transfer to a job as a lab technologist. Polymerase Chain Reaction (PCR) is a technique that amplifies small amounts of nucleic acid (DNA and RNA) in large enough amounts to study. The COVID PCR test is done this way, forensic scientists use it to study DNA from crime scenes, and PCR analysis is done virtually in every scientific lab in the world. Therefore, knowing how to perform PCR will prepare students for transfer to 4 year institutions, as well as numerous employment opportunities.
Using the SLO Data above, are there any SLOs for any particular courses that students are not successfully understanding? How do you plan to address this?

The BIO101, 102, and 103 courses are looking good. A large percentage of students are displaying "Complete Understanding" with no reports of "Little to no understanding".
What are the major strengths of your department?

One major strength is the passion and care that all of our current full time and part time faculty put into education. It's clear that everyone loves teaching. The needs and personal lives of students going to community college are different from many who attend 4 year institutions, and I'm proud that the biology faculty recognize this by providing a combination of rigor and sensible flexibility.
We are on the verge of moving into a completely refurbished laboratory, which will significantly improve student experience (especially when compared to the current set up in the G building). I'm confident instructors will be increasingly motivated and refreshed to be in a state of the art facility, and we will have a unique opportunity to revamp our laboratory inventory and curricula to better reflect the new lab.
In what ways could your department improve to better meet the needs of the College and support student success?

Science, more so than many other disciplines, changes and grows at an immense rate. Staying current in our instructional and technological methodologies is crucial to providing students with an updated and state of the art educational experience.
While we are making strides towards these goals, I believe we can embrace this even further.
What are the biggest challenges your department may face in making these improvements?

Some limitations exist that are beyond the control of the college. Being state of the art is costly, and while the new biology lab will be an absolute game changer for student experience, certain technologies are simply outside the budget of a small community college.
Also, it's easy for faculty to become set in their ways to some extent, making the adoption of new modalities and technologies challenging.

Identify any other questions, comments, suggestions, or concerns you may have.
No Value

Dean Review : Version by **Williams, Sarah** on **02/05/2024 18:16**

Sarah Williams