# Program Review - Life Sciences

## 2019 - 2020

**1. Department Goals - Current Progress:** Goal #1: Address deficiencies that create barriers to offering high quality science education.

1. Full-time night Laboratory Technician – Science (Biology dedicated)
   - a. unresolved; position not received

Lack of progress on this goal is a **SAFETY ISSUE**.
Lack of progress on this goal is a **CLASSIFIED EMPLOYEE WORKLOAD ISSUE**.
Lack of progress on this goal contributes to **EXTRA COSTS** associated with equipment misuse.
Lack of progress on this goal contributes to **EQUITY DISPARITY** for night student population.

Per the LRCEA negotiated job description “Laboratory Technician – Science” (2007-2008), the laboratory technician “provides training for instructors...in stockroom operation”, and “meets with science faculty... to assist in the design and development of experiments and demonstrations”. This support is currently unavailable to night instructors.

This situation diminishes desirability and relevance of night laboratory courses, and if continued, will diminish accessibility to night laboratory courses. This situation is contrary to FLC Strategic Plan (draft) Goals 1, 2, 4, and 5.

See previous years’ ADP narratives for repeated and detailed explanations of the urgent need to address this.

2. EDC lab equipment for A&P classes
   - a. unresolved; funding not received

Lack of progress on this goal creates an **EQUITY DISPARITY** for the EDC population.

The core physiology recording instrumentation, purchased in the early 1990s, has reached the limit of its useful lifespan after ~25 years. Not only is the equipment no longer functioning properly, it is significantly dated and not on par with that used at the main campus and the other Los Rios colleges.

This situation diminishes desirability and relevance of EDC A&P courses. This situation is contrary to FLC Strategic Plan (draft) Goals 1, 2, 4, and 5.

See previous years’ ADP narratives for repeated explanations of the need to address this.

**Goal #2:** Expand capacity to offer high quality science education.

1. Hiring full-time faculty
   - a. new full-time microbiology faculty member began Fall 2019
   - b. new full-time A&P faculty member prioritized to number 12 out of 19 during Fall 2019 prioritization

2. Science Center funding
   - a. yet to be fully institutionalized
   - b. funding has not kept pace with increased utilization by students
3. Modernize, update, and maintain lab teaching and learning resources
   a. Operating budget increases have not kept pace with added sections and new full time faculty
   b. Equipment purchases have not kept pace with either end-of-useful lifespan or advancing technologies

4. Making FLC a destination college for science
   a. Progress slowed due to lack of resources

5. Increase course offerings that will support other disciplines and CE programs
   a. BIOL 100 new to college launched Fall 2019; FTE allocated to expand offering at EDC and RCC in subsequent semesters

6. Improving the learning experience at EDC
   a. Increased number students participating in Science Skills
   b. Growing resources available in the Science Corner

7. Provide students additional options for advanced study and experiences
   a. New research grants and education abroad
   b. Summer cadaver course

8. Collaboration with area universities
   a. CSUS CURE grant collaboration
   b. UCD collaborations

Detailed explanations for the above goal subsets are available in previous year ADP.

2. Department Goals - Future:

   High quality science education is accessible to students, desirable to students, and relevant to students. Science education with these qualities leads to increased enrollment, retention, and persistence, particularly among disproportionately impacted populations.

GOAL #1: Address deficiencies that create barriers to offering high quality science education.

1. Full-time night Laboratory Technician – Science (Biology dedicated)
   a. Links to FLC Strategic Plan (draft) Goals 1, 2, 4, and 5
   b. Need identified in SLO assessment
   c. Need identified indirectly in pSLO assessment via demand for more upper level course offerings
   d. Resource required: permanent classified position

2. EDC biology lab equipment
   a. Links to FLC Strategic Plan (draft) Goals 1, 2, 4, and 5
   b. Need identified in SLO assessment
   c. Resource required: one time only equipment funding; increased operating budget for consumables

GOAL #2: Expand capacity to offer high quality science education.

1. Accessibility
   a. Increase number and diversity of course offerings
      i. Links to FLC Strategic Plan (draft) Goals 1 and 2
      ii. Need identified in pSLO assessment
      iii. Resource required: FTE; full-time faculty hires; lab space; operating budget increases; active-learning lecture rooms
   b. Advocate for institutionalizing Science Center resources
      i. Links to FLC Strategic Plan (draft) Goals 1, 2, and 5
      ii. Need identified in student success data analysis
      iii. Resources required: FTE, permanent and temporary classified staffing and student help; support spaces; operating
2. Desirability

a. Pursue opportunities to inspire and engage students in and out of the classroom
   i. Links to FLC Strategic Plan (draft) Goals 1, 2, 3, 4, 5
   ii. Need identified in pSLO assessment
   iii. Resources required: biology lab equipment and operating budget increases; Science Center extracurricular operating budget; garden equipment and operating budget increases; reliable field trip transportation and related operating budgets; indoor and outdoor soft spaces; cold and warm water aquaria for new marine biology course

3. Relevance

a. Offer laboratory and field experiences that reflect current practices in biology-related professions
   i. Links to FLC Strategic Plan (draft) Goals 1, 2, 3, 4, 5
   ii. Need identified in pSLO assessment
   iii. Resources required: biology lab equipment and operating budget increases; garden equipment and operating budget increases; reliable field trip transportation and related operating budgets; computers capable of running current scientific software

3. Special or Long Term Projects:

New science building
Lab – lecture pay parity
Methods courses (certificates, tech prep mentoring)
Coordinator positions (Lab, Instructional, Science Center)
Learning community expansion (Association/Academy/Foundation; destination for science students; pathways - feeder, internal, university/community partners)

4. Department/Discipline Plans - Curriculum and Course Sequencing:

NEW COURSE PLANS

Non-majors: Marine Biology is currently in tech review; evolutionary biology under consideration
Pre-allied health: pathophysiology and pharmacology under consideration
Methods: variety of lab methods courses under consideration

COURSE REVISIONS

Non-majors: Three field studies course, BIOL 382, 388, 389, and 390 will be reviewed this year; all other courses are current regarding full review; limited resources, such as equipment funding and operating budgets and lab tech staff, are significant barriers to keeping curriculum relevant, appropriate, and current

DISTANCE EDUCATION

Multiple non-majors lecture courses have been offered as hybrids; BIOL 100, new to FLC this year, is approved for fully online; rigorous online accessibility standards make developing distance education modalities exceptionally challenging for a highly graphic discipline

ACCESS

Core majors and non-majors courses are offered every semester, and times are rotated between day and night and staggered across sites; collaborative scheduling among 400 level science and math classes helps minimize course conflicts; limited resources, such as available lab space and lab tech staff, are significant barriers to expanding course offerings

5. Program Development & Revision:

The Biological Sciences: Pre-Nursing A.S. Degree was deleted and the new Pre-Health Occupations A.S. Degree (Allied Health Department) assumed its role, while being more inclusive of the many different types of pre-allied health students served

6. Percent of SLOs assessed:

100% of ongoing courses have been assessed; 2 new-to-college courses offered for the first time Summer 19 and Fall 19 have yet to be assessed; 3 courses are up for their 6-year review this year and will be assessed the next time they are offered

7. Course SLOs - Synopsis:

Courses assessed during 2018-2019 include BIOL 310 General Biology (non-majors lecture and lab); BIOL 380 & 384 Natural History Field Studies (Coastal & Forest Ecosystems); and BIOL 410 Principles of Botany (majors lecture and lab)

For the field studies courses, the SLO assessed was “Explore career options as a professional naturalist, park ranger, or biological...”
technician” and 90 to 100 percent of students met the SLO.

For the General Biology and Principles of Botany courses, the SLOs assessed were laboratory skills related, with 50 percent and 20 percent of students respectively meeting the SLOs; faculty articulated several barriers to authentic laboratory experiences necessary for students to meet SLOs; comments highlighted the concern that not only are students not adequately prepared with practical skills for STEM fields, conditions that hinder accessibility, desirability, and relevance may discourage students from pursuing STEM fields; areas of student performance in need of improvement were not further delineated since the deficiency lies with college resources.

8. Course SLOs - Strategies for Improvement/Maintenance:
Plan for improvement relative to SLOs addressed in this Program Review: persist in resubmitting requests for laboratory resources, which include a full-time night biology lab tech, increased operating budgets, and current equipment.

9. Program SLOs - Synopsis:
Per the Graduate Exit Survey results available through OIR, both the Biological Science A.S. and the Biological Science AS-T degrees garnered favorable pSLO assessments, averaging 4.67 and 4.23 respectively, with trends of improvement each successive year; comments related to the most valuable aspects of the programs centered around faculty and real-world, hands-on experiences, particularly those beyond the classroom; the most commonly expressed barriers were related to availability of upper level courses.

10. Program SLOs - Strategies for Improvement/Maintenance:
Plan for improvement/maintenance: the new science building will bring much needed lab space and enable increased upper level course offerings; additional lab tech staffing, operating budget, and equipment will be requested to support these added courses; additional operating budget will be requested to support expanding real-world, hands-on experiences, including those in the field.

11. Improving Course and Program Success Rates - Data Analysis:

EFFICIENCY MEASURES

For success, retention, and productivity, Biology is on par with FLC overall, and performs better than FLC overall for fill. When the data is disaggregated, courses that need attention regarding efficiency measures include non-majors, hybrid, and RCC; these courses lag behind other Biology courses and FLC as a whole in success, retention, fill, and/or productivity.

SUCCESS & EQUITY

Biology achievement gaps are higher compared with FLC overall in the African American, Native American, and foster youth demographics.
When the data is disaggregated, the largest achievement gaps occur in biology majors, biology non-majors, hybrid, and RCC for the African American population.

Looking at efficiency measures and success & equity data, there is a need to investigate potential achievement barriers for African Americans, the RCC student population, and students enrolled in hybrid courses. Likewise there is a need to investigate potential achievement barriers for African Americans pursuing biology majors coursework.

12. Improving Course and Program Success Rates - Strategies and Resources Needed:
Biology will work with OIR to better elucidate evidence of lower achievement among certain populations.

Biology will continue to advocate for resources for the Science Center. The concept of the Science Center is modeled after programs well documented to boost student success, including that of DI populations. Since its inception at FLC, the Science Center has indeed demonstrated positive impacts on student achievement. Biology will contribute to planning the full-concept build out Science Center that will occupy the new science building.

Biology will continue to promote inclusive excellence and advocate for resources that enable DI populations to succeed in biology courses and programs. Broadening Participation in the Life Sciences: Current Landscape and Future Directions (2016)

13. Suggestions for Improving the ADP/PR process:
Facilities are an important resource. Incorporating facility resource requests into the ADP/PR will disseminate these needs to a broader audience and hopefully contribute to better planning.
Hot links to relevant support data from within question prompts.
Ability to format text.

Thank you for the opportunity to provide feedback.

14. Is your ADP complete and ready for review by the Dean and Vice President?: N/A - Completing Program Review

Program Review Questions (skip if not completing program review)
15. **Mission Statement:**
We prepare lower division students for transfer to higher education institutions, entry into vocational programs, and science-related employment, while developing critical thinking skills and fostering a lasting appreciation of biology. We are a team of professionals who share enthusiasm for pioneering outstanding biology programs and creating an educational environment that is welcoming and supportive for all students.

We value teaching methods that maximize student success
We value interdisciplinary knowledge and skills.
We value inquisitiveness and scientific skills.
We value stimulating learning environments.

16. **Pre-Requisite and Co-Requisite Validation:**
All existing course prerequisites have been validated in the past six years during full curriculum review.

17. **Maintaining Program Currency:**
Curriculum review cycles and articulation agreements ensure course and program currency.
The field of biology is evolving rapidly, and lacking sufficient resources presents challenges for maintaining currency of the laboratory component.

18. **Evidence of Program Relevancy:**
Biology remains among the most popular, impacted, and recommended majors at transfer institutions. Additionally, biology courses form the core of most prerequisites for allied health programs.