

Chemistry

2019 Program Review

MJC Program Review 2019

Modesto Junior College's Program Review process is divided into 3 sections:

- Program Analysis (SWOT Analysis)
- Goal Setting and Activities
- Resource Request

Program Analysis

Internal Strengths

1. What strengths does the analysis of student data reveal?

The number of students completing the program and transferring to a four-year institution is increasing. The term-to-term retention rate of students from fall to spring semester (83%) is comparable to the regional rate (85%) and surpasses the overall MJC rate (67%). The percentage of Hispanic students in the program matches the MJC population (52%). The percentage of Hispanic students completing the program (58%) surpasses the MJC population (52%).

2. Are there specific aspects of the program that are exemplary or could serve as a model?

We have worked hard to maintain state-of-the-art instrumentation as well as a high level of exposure to computerized data collection and analysis in order to ensure that our students can compete at four-year institutions or in an industrial setting. Microscale techniques are used in our organic chemistry labs in order to reduce costs of material procurement and disposal as well as to minimize our impact on the environment.

3. What do others see as the program's strengths?

Chemistry faculty and staff are highly visible and involved in science community outreach activities through the college, Great Valley Museum, and individually (e.g. Science Olympiad, Wild Planet Day, Maker Hoopla, Science Nights, MAPS, Science Colloquium, classroom demonstrations).

4. How well are students meeting program learning outcomes, skills, or competencies; and how are they relevant to careers in your discipline or industries for which you help prepare students?

Our students are doing very well (above 80% success) at meeting the following PLOs: score the national median or higher on American Chemical Society General Chemistry Exam (full year), use of NMR, IR, and other spectrum to determine an unknown organic compound.

Internal Weaknesses

5. What gaps are observed by reviewing the student data?

The percentage of white, non-Hispanic male students enrolled in the program (27%) is lower than that of the college as a whole (35%); we will observe this gap over the next 2 years.

6. What disproportionate gaps need to be addressed?

It appears that success rates do vary across student populations, but we do not have enough data from some populations in order to come to any meaningful conclusions.

7. What are areas in which the program could improve? (curriculum, scheduling, modality, other?)

Increase number of students enrolled in and receiving awards in the program across all student populations. Increase student awareness of career opportunities, research, internships, etc. Decrease the waiting lists for class sections.

8. Where are there gaps in the program on how students are meeting learning outcomes, skills, or competencies?

According to the Program Review Dashboard data, our students are showing a gap (less than 70% success) for the following PLOs: Use of quantitative and/or qualitative analysis techniques to determine an unknown in a general chemistry laboratory setting, successfully transfer to a 4-year college or university and/or begin work in an entry level chemistry technician position.

External Opportunities

9. Where are potential opportunities for expansion, improvement, or new program development?

Enhanced techniques for analysis of low-level contaminants in air, soil, and water, as well as increased awareness of and concern for the environment, represent a significant opportunity for growth in the areas of environmental and analytical chemistry. Explosion of careers in chemistry with biological applications, such as forensic science and genetic testing, will result in continued increase in demand for higher level courses.

10. What are some industry or disciplinary trends that could enhance the program?

Availability of more open resources will expand the variety of learning aids available at low cost to students, removing financial barriers for many of our student populations.

External Threats

11. How are changing resources, technology, employer, or transfer requirements affecting the program's ability to serve students?

Constant improvements in technology, along with a limited budget, make it difficult to expose students to the equipment they are likely to encounter in the workplace.

12. What are some current industry or disciplinary trends that could have a negative impact on the program?

Chemistry jobs are very scarce in this area, and the ones that exist are on the low end of the pay scale. This results in a very low exposure of young students to the possibility of a career as a scientist, and a small number of college students pursuing this goal. Another result of this culture and mindset is the lack of science companies recruiting and locating in this area, which simply reinforces the problem.

13. What other obstacles does the program face?

The intense pressure to reduce the amount of time required to complete a program necessarily de-emphasizes the role of more advanced, high-level courses. Higher level, lower enrolled courses should be valued according to the essential service they provide to students seeking technical careers, not according to funds directly generated for the college. Low program numbers make collection and analysis of data difficult.

Goal Setting and Activities

Goals

| Program Goal | Mission Alignment | Area of Focus |
|---|---|-----------------|
| 1. Increase the number of program awards and the number of students successfully transferring to four-year institutions, especially among underrepresented populations. | Equity | Curriculum |
| 2. Increase the percentage of students who have hands-on experience with analytical instrumentation. | Workforce Needs | Curriculum |
| 3. Reduce the number of waitlist students who are not added during the first class period. | Programs / Services based on Scholarship of Teaching and Learning | Student Support |

Activities

| Activities | In Support of Goal # | Outcome or Deliverable |
|--|----------------------|--|
| Spend class time reviewing chemistry department awards offered at MJC, their requirements, and possible resulting career pathways. | Goal #1 | Increased number of students in program and greater awareness of educational and career opportunities. |
| Evaluate equipment and replace and/or repair deficiencies. | Goal #2 | Increased percentage of students with hands-on experience with analytical instrumentation. |
| Increase the number of lab activities that utilize advanced instrumentation. | Goal #2 | Increased percentage of students with hands-on experience with analytical instrumentation. |
| Increase participation in STEM night outreach. | Goal #1 | Increased number of students in program and greater awareness of educational and career opportunities. |
| Increase faculty | Goal #3 | Decreased waitlist numbers |

Resource Requests

| Category | Request | Activity # | Estimated Cost |
|--------------|---|------------|----------------|
| Prof. Devel. | College administration and support staff investigate local career opportunities in order for faculty to become more familiar with them, perhaps even meeting with or touring around local companies. | 1 | 1000 |
| Equipment | 24 Melting Point Apparatus 3 UV/vis Spectrofluorometers Microscale Equipment 30 DC variable power supply (ask Joe) 24 Hot Plates Balances | 3 | 94500 |
| Equipment | 6 Spectronic 200 24 sets Vernier Probes 30 Vernier probes, constant current ICP/MS HPLC Chemistry equipment maintenance | 3 | 197000 |
| Equipment | Chemistry equipment maintenance Professional cleaning 90 MHz NMR probe Dual pre/pwr Amplifier 90 MHz NMR Professional cleaning 60 MHz NMR probe Dual pre/pwr Amplifier 60 MHz NMR Mag temp controller/heaters for 60 MHz NMR Alternative to 60 MHz NMR upgrade above - trade-in 60 MHz for refurbished instrument | 3 | 62000 |

| | | | |
|------------|--|---|--------|
| Technology | Chem Draw software | 3 | 1700 |
| Technology | Printer for Equipment Room 3D printer, eg., Creality Ender 3 Pro | 3 | 1850 |
| Technology | 30 Surface Pro | 3 | 30000 |
| Personnel | Full time faculty | 5 | 100000 |
| Personnel | Assistant Stockroom Technician | 5 | 50000 |
| Facilities | Follow through on lecture hall projector upgrade | 2 | 0 |
| Other | Allow the pursuit of research by students in independent study courses | 3 | NA |