Proposal Title: Computers for Chemistry

Originator and Position: Rosaleen Gibbons, Assistant Professor of Chemistry, Dept Chair of Physical Sciences

Area Dean: Carlos Tovares

Campus: San Jacinto and Menifee Valley

Area Vice President: Rudolph Besikof

Budget Account Code: Click here to enter text.

*Total Amount Requested: $80,000

*Please complete all applicable portions of “Section VI - Projected Expense File” now to determine the “Total Amount Requested” above.

Please check:

| One-Time Funding: ☒ | On-Going Funding: ☐ | Safety: ☐ |

1.) For what are you asking?  2.) Why is the request timely and important?  3.) Where was the need identified? Please answer these three questions in 250 words or less. See instructions for further explanation.

Chemistry is requesting one-time funds to purchase 64 Microsoft Surface Pro4 computers with a charging station locking cabinet for use in the classroom, the lab, and for fieldwork at SJC and MVC. These computers will enhance the development of an active-learning environment for students taking chemistry courses at MSJC by facilitating increased opportunities for in-class, laboratory, and field-related research, collaborative learning, data collection, and interactive assessment of results to focus on student-centered learning. This request is timely and important because chemistry faculty are currently engaging students with experiential learning activities in which students are required to have computational access to reference information, experimental methods, online resources, collaborative chemistry websites, and virtual lab exercises. Chemistry students are hampered by the fact that the lab currently has only one computer and this sole computer is not a portable model that could be useful in the classroom and in the field. The need for currency of educational technology in chemistry is defined on page 17 and page 26 of the 2015-2016 Chemistry APA.

Section I – Program Review and Learning Outcomes - 20 points possible

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1.) Identify support from your 2014-15 Comprehensive Program Review (CPR) or 2015 – 16 Annual Program Assessment (APA) for this request (8 points). [Link to Program Review](#)

This RAP request for computers is supported by Chemistry’s 2015-2016 Annual Program Assessment in which average chemistry success rates drop below the program average rate by as much as 10.5% with an extreme low in SP2013 (CHEM107) that is 28% below that of the program rate. We attributed these lower success rates to a number of factors including technology limitations on page 17 of the APA, which states, “Teaching a new generation of community college students who have been engaged in active learning during elementary, middle, and high school academics requires updated equipment and facilities.” “Chemistry students need current educational technology in the form of portable computers for use in lab and fieldwork to enhance the development of an active-learning environment and facilitate increased opportunities for research, collaborative learning, data collection, and interactive assessment of results.” On page 26 of the Chemistry APA, computers are identified as one of the three greatest needs, “The need for currency of educational technology in chemistry is imperative.” “...it is impossible to teach scientific literacy in STEM without currency...” “Chemistry students need Microsoft Surface Pro computers with a charging station locking cabinet for use in the classroom, the lab, and for fieldwork at MSJC.” While the SJC library classroom has approximately 20 computers for student use, they are located across campus from the chemistry building where students must over-see experiments while performing computational analyses of the data; not to mention, fieldwork is not possible with immobile campus-based computer technology, which hinders students from performing real-world research activities. MVC struggles with similar issues. Based on these determinants, Chemistry is submitting a RAP for Microsoft Surface Pro4 computers for student use. Computer access will help improve the research opportunities for students and ultimately lead to better success and retention rates across all chemistry course offerings. By supporting these needs, the administration will help Chemistry empower students and improve success.

2.) How will this request help improve student learning in the course and/or program (12 points)? [Link to Learning Outcomes](#)

ILOs

**Scientific Awareness: The student will possess an awareness of the physical and biological principles related to science.** – The equipment being requested above supports the investigation of physical principles through online resources and interactive computational programs.

**Social Awareness: The student will demonstrate societal awareness.** – The equipment will allow students to investigate real-world phenomena and the anthropogenic impacts on National resources.

**Responsibility: The student will display personal and civic responsibility.** – The equipment will connect student data to research objectives and associated data published by the EPA and USGS in the local area and across the Nation.

Chemistry PLOs

Demonstrate the ability to apply scientific inquiry to problem solving, including relationships between science and human activities. – The equipment will put current projects with related data and results at the student’s fingertips, so they can evaluate how, where, and when professional scientists form collaborative investigations and what main points to consider in formulating goals and objectives.
Chemistry CLOs
**Chem 100, 101, 102, and 107 CLOs** identify chemical reactions and prediction of products and/or theoretical yields as important student outcomes, and this equipment would allow hands on opportunities to satisfy these learning outcomes by providing visual aids, interactive websites and virtual tools for students to engage in performance enhancement and data interpretation of real-world collaborative projects.

**Chem 112 CLOs** identify spectral analysis as a method to analyze chemical functional groups and molecular size. The equipment we are requesting would make it possible for students to access real-time structural spectra and evaluate functional groups via a computational assessment tool both independently and within a collaborative group.

**Chem 113 CLOs** require students to conduct syntheses and this equipment would allow students to compare and verify their products with literary sources and online 3-dimensional programs.

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**Section II – Alignment with Institutional Priorities via the Strategic Plan - 25 points possible**

1.) How is your request aligned to the strategic goals below? Check all (typically 2 – 6 goals total) that apply. Click [here](#) for the 2016-17 Prioritization Allocation Rubric (PAR) for points-weighting during scoring.

**2014-17 Strategic Plan Goals**

| ☒ | 1. Reduce time to completion of student educational goals and increase degree, transfer and certificate completion. |
| ☒ | 2. Drive institutional decision-making using internal and external data to inform planning and prioritize resources. |
| ☒ | 3. Refine staffing plan and process |
| ☒ | 4. Improve fiscal responsibility that is sustainable for the long term |
| ☐ | 5. Identify sustainability strategies to improve efficiencies in processes district-wide |
| ☐ | 6. Expand and improve student involvement in campus life |
| ☒ | 7. Promote quality of institution through enhanced communication within the community (internal/external) |
| ☒ | 8. Enhance the overall campus life experience |
| ☒ | 9. In an effort to serve students build bridges between instructional services, student services and administrative services |
| ☒ | 10. Increase the College’s visibility, value and recognition in the service area |
2.) Please describe the connections between the goals you checked and your proposal (200 words maximum):

By fostering innovation and promoting the scholarship of teaching and learning, this technology will provide greater access to collaborative research opportunities with four-year institutions and universities, improving success and transfer (Goal 1). This equipment will accentuate data-driven institutional decision-making by impacting how department learning outcomes are taught and assessed (Goal 2); not to mention, contribute to the facilitation of Learning Outcomes by providing tools to improve teaching and learning at the program and institutional levels (Goal 3). This RAP is fiscally sound because it encourages a paperless campus by adoption of more electronic devices (Goal 4). Funding this RAP also enhances communication within the community since students will have opportunities for collaborative research projects that impact the area (Goal 7). Tablet computers will also enhance the overall campus life experience since they meet the goal of providing facilities that enhance student engagement and increase student awareness of services and activities using other technologies (Goal 8). These computers will “build bridges between instructional services” by “increasing professional development” in STEM (Goal 9). The College’s visibility, reputation, and recognition will improve in the local community as a site that is valued for innovative teaching practices and educational technology (Goal 10).

Section III – Alignment with Institutional Plans - 15 points possible

Explain how your proposal is supported by the following plans: 2009-16 Educational Master Plan (4 points), Distance Education Plan (4 points), Technology Plan (4 points) and/or Facilities Master Plan (3 points). Link to Plans

Pages 294 and 295 of the Educational Master Plan define the need to keep up with the growing demands of laboratory-based courses. Funding of this RAP will further that goal. We seek to acquire high quality, robust computer equipment for student use in our program that will meet the technology requirements of the College community as reflected by both the Educational Master plan, and the Technology Plan. The use of technology such as tablet computers is supported by the Technology Plan, which describes the mission of the Information Technology Department as providing “an institutional computing environment that manages and maintains accurate, reliable, and efficient technology services for the success of the College community” (page 2). The administrative unit outcomes listed on the same page emphasize the need to support “a technology infrastructure that is conducive to student learning and College operations, by providing an institutional computing environment that is robust, reliable, (and) secure.” These statements also support the Distance Education Plan in which currency in computational equipment is a necessary characteristic of DE and student success. Students at SJC and MVC will be able to collaborate with students at four-year institutions and universities, sharing and discussing data and results of common projects. The Facilities Master Plan goals include creating “campuses that strongly support student learning and contribute to a high standard of student life” as
well as creating “campuses and facilities that promote increased student-faculty interaction and interdisciplinary and collaborative learning.” In line with the Facilities Master Plan, this equipment strongly supports student learning and promotes increased student-faculty interactions and interdisciplinary collaborations in STEM as faculty will facilitate student learning by encouraging instructor-student interactions through authentic research investigations and data analysis.

Section IV – Goals and Measurable Outcomes – 30 points possible

1.) Describe your goal(s) for this project (10 points). How will this improve student learning or enhance institutional services? For a review of goals, see pp. 18 – 20 of a presentation via this link.

Goal 1 – Create a more equitable learning environment on SJC and MVC for chemistry students to access and utilize in-class and field-related computational technology. Goal 2 – Encourage student success by providing students with an active-learning environment in which they can access and evaluate real-world, real-time phenomena from the perspective of course-based knowledge; Goal 3 – Facilitate experiences in which SJC and MVC students can collaborate with each other and with transfer institutions by sharing knowledge and ideas; Goal 4 – Assess student interest throughout the process in real time to determine whether active participatory learning is happening to encourage student retention; Goal 5 – involve full-time and part-time faculty in regular communication regarding implementation of experiential learning methodologies in chemistry courses.

2.) What are the measurable outcomes for this RAP (10 points)? That is, how will progress toward meeting your goal(s) be identified and/or measured? Click here for learning outcome reference materials.

Measurable outcome for Goal 1 – Purchase 32 tablet computers for SJC, and 32 tablet computers for MVC use in chemistry. This will be the first time on SJC and MVC that students who are enrolled in chemistry can utilize computers for purposes of in-class research assignments, and group projects.

Measurable outcome for Goal 2 – Analyze institutional data of the chemistry success rates and compare these data to previous semesters. Measurable outcome for Goal 3 – Analyze institutional data of the chemistry department transfer rates and compare these data to previous academic years. Measurable outcome for Goal 4 – Analyze institutional data of the chemistry retention rates and compare these data to previous semesters. Measurable outcome for Goal 5 – Collaboratively design, develop and distribute new classroom, field, and laboratory activities that incorporate use of the new computer technology to full-time and part-time chemistry faculty.

3.) Explain how your outcomes are tied to your CLOs/PLOs/AUOs/SLOs (10 points).

Outcome for Goal 1 (purchasing the computers) corresponds to ILOs for scientific awareness, social awareness, and responsibility, as well as the chemistry PLOs that site relationships between science and
human activities since the equipment requested in this RAP supports investigation of physical principles through interactive online programs, which support real-world anthropogenic impacts to natural resources in the local area and across the Nation. **Outcome for Goal 2** (analysis of chemistry success rates) corresponds to PLOs that emphasize the ability of students to demonstrate application of scientific inquiry to problem solving and course related CLOs because measuring student success correlates directly to the breadth and depth of knowledge that can be demonstrated. CHEM100, 101, 102, 107, 112, and 113 CLOs are designed to assess demonstrated application of chemistry concepts, and the measurable outcome for Goal 2 provides an active learning environment in which students may apply course-based knowledge to real-world science. **Outcome for Goal 3** (analysis of transfer rates) corresponds to ILOs, chemistry PLOs, and chemistry CLOs because transfer students have engaged across disciplines at our institution and have developed skills and abilities associated with various levels of academic responsibility and scientific literacy. Facilitation of collaborative experiences using advanced technology will support a bridge for MSJC transfer students. **Outcome for Goal 4** corresponds to ILOs for scientific awareness, social awareness, and responsibility, as well as the chemistry PLOs that emphasize the ability of students to demonstrate application of scientific inquiry to problem solving and course-related CLOs. Student retention correlates to both cognitive and non-cognitive skill sets, including perseverance and a sense of community and personal support. **Outcome for Goal 5** relates to all aspects in which student-faculty-staff-administrative aspects of professional development affects outcomes.

### Section V – Implementation Plan – 10 points possible

What are the steps that you will take or need to be taken to implement this proposal?

1.) Who is in charge of implementing the project (2 points)? SJC: Rosaleen Gibbons; MVC: Farah Firtha

2.) What are the projected start and end dates (2 points)? Fall 2016 – Spring 2017 to assess potential changes in learning outcomes, then ongoing each academic year.

3.) What other departments will need to assist with the acquisition/implementation of the project (2 points)?

   Classroom Technology, Career and Technical Education, Purchasing, Facilities

4.) When will the outcomes be measured (2 points)? Throughout and at the conclusion of each semester

5.) How will you measure the desired outcomes (2 points)? Surveys, reports, assessments, exams, and CLOs

### Section VI - Projected Expense Profile
For the object codes and titles below, please indicate the monetary amounts requested.

Object Code 4XXX
Supplies and Materials: Computers.  Amount requested: 80,000
Supplies and Materials: Click here to enter text.  Amount requested: Click here to enter text.
Supplies and Materials: Click here to enter text.  Amount requested: Click here to enter text.

Object Code 5XXX
Services: Click here to enter text.  Amount requested: Click here to enter text.
Services: Click here to enter text.  Amount requested: Click here to enter text.
Services: Click here to enter text.  Amount requested: Click here to enter text.

Object Code 6XXX
New Equipment/Building or Site Improvements: Amount requested:
New Equipment/Building or Site Improvements: Click here to enter text.  Amount requested: Click here to enter text.
New Equipment/Building or Site Improvements: Click here to enter text.  Amount requested: Click here to enter text.

(S2) Subtotal from Non-Personnel Requests: Click here to enter text.

Total Proposed Budget (sum subtotals (S1) and (S2) above): $80,000

3. Secondary Effects (if this proposal is approved)

If a Classified/Administrative Personnel Prioritization Request is being submitted in tandem with this RAP, what additional space, if any, is needed to accommodate this position: Click here to enter text.

For equipment and technology requests, will additional space be needed to accommodate the requested equipment? If so, where is the proposed location? No

Will requested equipment require maintenance agreements or support personnel? If so, what the projected costs? None

Please list future year anticipated needs and estimated financial needs. NOTE: This section refers to any anticipated funding not addressed by this RAP but required in the future. This will not be automatically funded. A new RAP must be completed in the future.

Fiscal Year: Click here to enter text. Anticipated need: Click here to enter text. Estimated amount: Click here to enter text.
Fiscal Year: Click here to enter text. Anticipated need: Click here to enter text. Estimated amount: Click here to enter text.
Fiscal Year: Click here to enter text. Anticipated need: Click here to enter text. Estimated amount: Click here to enter text.