Dear Ventura College Sabbatical Leave Committee,

This application for sabbatical leave is my first application for any leave since joining the faculty at Ventura College in 2015 (*Criterion 8.11.C.(2)e*). During the past eight years, I have gone through the formal tenure process (2015-2019), served as Academic Senate President (2020-2023), and taught eight different courses (most including lecture and laboratory) in the Biology department. I am applying for sabbatical leave to grow professionally as a faculty member by reflecting and focusing on my ability to teach Human Physiology to my future students and to support my departmental colleagues at VC and throughout the district.

Introduction

During my time at VC, I have regularly taught Human Physiology, PHSO V01, a 4 unit lecture and laboratory course primarily intended for students on the allied health professions academic track. As the second in a three-course series (ANAT V01, PHSO V01, and MICR V01), Human Physiology provides students with an overview of the functions of all human organ systems in health and disease, as well as introducing students to scientific experimental design, lab techniques, and associated math and chemistry principles.

Since at least 2015, this course has benefited from robust instructional, lab technician support, and facilities on the main Ventura College campus. However, two major opportunities for development exist for which there has not been available time or resources to develop: 1) a singular lab manual for use in the laboratory portion of the course, and 2) the ability to teach Physiology lab outside of the existing dedicated lab space on VC's main campus.

The purpose of this sabbatical leave application is to address these two opportunities, and the main sections of this application are organized around these two opportunities. As a continued introduction to this proposal, these two opportunities are framed in light of the criteria listed in the Agreement between Ventura County Community College District and Ventura County Federation of College Teachers AFT Local 1828, AFL-CIO dated July 1, 2022 through June 30, 2025.

This proposal will provide tremendous value on instruction and service to students (*Criterion 8.11.C.(2)a*) as it will result in a teaching and learning document (PHSO V01 Lab Manual) that will be intended for use by all instructors and students at Ventura College for this course. Table 1 below lists the number of sections offered over the past 5 years in the three pre-allied health courses, along with the maximum number of students served by these courses (24 students per section). PHSO V01 total are listed in **bold**.

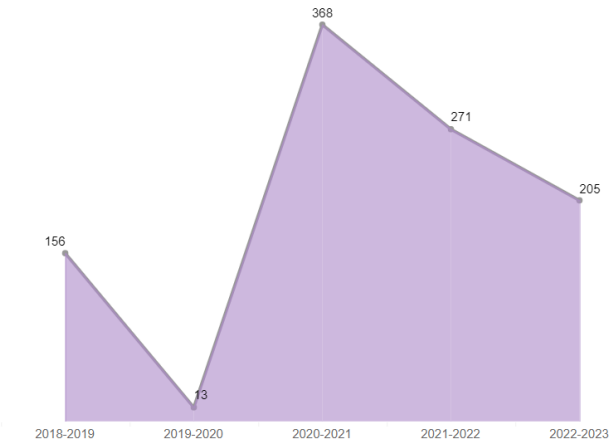
Table 1. Number of sections and students served by the three VC pre-allied health courses over the past five years.

	Number of Sections Offered			Max. # Students Served		
Year	ANATO V01	**PHSO V01**	MICRO V01	ANATO V01	**PHSO V01**	MICRO V01
2019-20	34	**20**	16	816	**480**	384
2020-21	47	**21**	14	1128	**504**	336
2021-22	47	**30**	19	1128	**720**	456
2022-23	31	**24**	21	744	**576**	504
2023-24*	33	**22**	19	792	**528**	456

**Includes scheduled Spring 2024 sections*

About 550 students each year are served by Ventura College's PHSO V01 courses. As mentioned earlier, this course is one of the three core courses that prepare students for a future training and careers in the pre-allied health professions. In 2018, I and my departmental colleagues authored a certificate of achievement to provide our students a tangible, measurable outcome for completion of the academic preparation related to the pre-allied health professions. Figure 1 below is data from VC's Institutional Effectiveness on the number of certificates awarded for the past five years.

Figure 1. Number of Pre-Allied Health Certificate awards over the past five years.



Award	18-19	19-20	20-21	21-22	22-23
Pre Allied Health-CERT	156	13	368	271	205

This sabbatical proposal will support the 550 students a year that enroll in PHSO V01, and the hundreds of students each year that complete the Pre-Allied Health Certificate.

The mission of the VCCCD is to "provide students, in its diverse community, with access to comprehensive quality educational opportunities that support student learning and student success." *Criterion 8.11.C.(2)c* for the sabbatical leave committee will judge this proposal's consistency with this mission. The creation of a PHSO V01 lab manual will enhance the educational opportunities and support for all Ventura College Human Physiology students. The

exploration and development of laboratory resources, equipment, and teaching strategies for use in a low-support lab environment have the potential to extend the ability of the VC Biology department to offer PHSO V01 at our East Campus. This would give our East Campus students the opportunity to take two of the three pre-allied health courses, as we've offered ANAT V01 courses for the past several years at the VC East Campus.

Finally, *Criterion 8.11.C.(2)d* asks the Sabbatical Leave Committee to assess whether the outcomes are achievable and measurable within the timeframe of the designated sabbatical leave. This proposal is for a sabbatical leave during the Spring 2025 semester. Opportunity 1, the PHSO V01 lab manual, is the primary measurable outcome of this proposal. With the planned move to a 16 week semester, there will need to be 16 labs in the lab manual, and each of these may represent reorganization of material that had been grouped differently during the 17.5 week semester. January 2025 to May 2025 will be ample time to research, curate, collaborate, and write a lab manual with 16 robust, extensible, and student-centered lab exercises. Opportunity 2 is more of a "stretch goal" portion of this proposal, and the ambitious plans will be pursued in tandem with the research and writing on the lab manual portion of the proposal. However, even if opportunity 2 does not immediately result in a measurable outcome such as the ability to offer PHSO V01 at East Campus, the research involved will allow me to provide the Biology department valuable information for discussion and development of future plans.

Opportunity 1) Develop a singular lab manual for PHSO V01.

The labs for PHSO V01 are effective, flexible, and time-tested. However, in their current form, their delivery format consists of sundry weekly handouts, Canvas uploads, instructor presentations, and other diverse formats and delivery methods. Additionally, they are sourced from various instructors, publishers, and equipment suppliers. Because of this rich variety of materials, students in PHSO V01 labs taught by different instructors may experience differences in lab experience throughout the semester. Lab support technicians have faced increased workload due to differences of approach by instructors who may approach each lab slightly differently. Instructors new to Ventura College may find it challenging to begin teaching PHSO V01 labs with such piecemeal and variable instructional materials.

A single lab manual for use by all instructors, lab techs, and students would alleviate some or all of the challenges listed above. One example of such a manual is the BIOL V01L lab manual, collectively revised annually by BIOL V01L instructors. This manual is successfully used by students, instructors, and lab techs each semester.

However, development of a common lab manual is an enormously time-consuming effort, requiring at least three things: A) compilation of all current and previously used labs, B) curation of additional Human Physiology labs used successfully at other VCCCD colleges, regional Community College labs, and other higher education institutions nationwide, and C) synthesis of these labs into a common format, graphical identity, and voice, and packaging this into a publishable/printable version appropriate for distribution to all stakeholders.

1A) Compilation of prior/current lab exercises.

The current labs include custom handouts developed by individual instructors on a semester-by-semester basis. These have been shared and heavily modified to an extent that can result in students receiving diverse experiences from other students within and across semesters of instruction. Compiling the common themes, lab practices, and technical requirements of these often *ad hoc* labs is the first challenge of creating a PHSO V01 lab manual.

Compiling all currently-used labs is perhaps the most straightforward of the goals of this sabbatical leave proposal, and would take no more than a few days of work to gather material that already exists across my own electronic document archives.

A second challenge is to incorporate materials in a way that is useful for students but does not violate copyright or intellectual property rights of the publisher. One primary example of this is the use of the Biopac data acquisition and analysis software system in many of the labs. Because the equipment and instructional materials are proprietary, it will be a significant challenge to incorporate any of these materials into a VC lab manual—which would ideally be a ZTC (Zero Textbook Cost) resource that would be released via a Creative Commons or other appropriate open license.

1B) Curation of additional laboratory exercises

While the currently-used laboratory exercises are time-tested and work well, it would be presumptive to conclude that they are the best or the only labs that would be valuable to our students. Human Physiology is a course that is taught at both other colleges in the district, and is likely taught at every community college in the state, if not the entire country. There are certainly creative, effective lab exercises that have not been tried out at VC, and an exploration of what other colleges are doing in their physiology laboratories would be an important step in authoring a brand-new lab manual.

As part of my initial research, I will request or obtain the lab manuals/materials used by the Biology departments at Moorpark and Oxnard colleges, as well as a few other colleges throughout the state.

The Association of Biology Laboratory Education (ABLE) is a national educational research organization that holds regular meetings and workshops, and publishes the proceedings of these meetings. I've attended these meetings in the past, and have occasionally browsed their publications for ideas to incorporate into my own teaching. Devoting one week to a deep literature exploration of this and other education research journals will allow me to more systematically explore the current research and pedagogical strategies for teaching Human Physiology in a laboratory setting.

1C) Synthesis of labs into a formal document

The PHSO V01 Lab Manual will be a 16 chapter document. Each chapter will represent one weekly lab and will include 1) one introductory information page for students with summary details of the organ system being investigated, 2) one page of lab supplies and technical setup information for use by lab technicians and instructors, 3) the full protocol of the lab, with safety and other precautions prominently highlighted, 4) experimental and data analysis instructions guiding the students to meaningful interpretation and conclusions based on the completed lab activities, 5) clear, succinct disposal and cleanup instructions, and 6) sample lab report pages appropriate for student use while completing the lab.

Opportunity 2) VCEC PHSO V01 - Develop a low-facility-requirement version of PHSO V01 for use in settings that do not yet enjoy the benefits of the dedicated lab space of the VC main campus.

Many of the human variables of interest to physiologists can be measured with no special equipment or training whatsoever. If you have a clock and the ability to take a pulse through palpation (e.g., through your radial arteries at the writs), you could do any number of experiments in which heart rate was the dependent variable. With that same clock, you could time exercise duration or measure breathing rate. With a paper printout of a Snellen eye chart and astigmatism test, you could perform rudimentary vision tests. With the flashlight of a cell phone, you could determine changes in pupillary diameter indicative of healthy intracranial pressure.

However, many physiological variables require specialized measuring tools and equipment. At the most extreme end of technical requirements–and likely beyond the scope of an introductory lab course on human physiology–would be a full laboratory panel of blood solutes and cell counts. This would require tens of thousands of dollars in equipment and personnel and would in effect be a medical diagnostics facility–again, far beyond the scope of any introductory human physiology course.

It would benefit the students and Ventura College as a whole if PHSO V01 was able to be offered at our East Campus, a space that is currently without several of the key materials and facilities that would be required. In between the two extremes of zero specialized equipment needs, and investing in a full medical diagnostics training facility, a compromise would involve identifying the minimum low-cost, high impact equipment needed to teach physiology lab in nearly any space. In order to begin teaching physiology at VCEC, we would need to A) modify the labs to decrease reliance on certain facilities and lab technical support, and/or B) increase the facility and support provided to VCEC.

2A) Modify/develop labs for use in a low-resource and support environment.

As described above, many human experiments can be done with little to no specialized equipment at all. The labs that currently require such specialized equipment largely involve measurement of **chemical** or **electrical** variables.

Chemical variables are measured in our current labs using pH meters, micropipettes, and other tools that range in price from modest to substantial. In addition to these tools, working with chemicals also requires sinks, safety equipment, and a careful consideration for the storage, transport, and/or disposal of any hazardous chemicals. In order to use any type of chemicals in a lower-resource-intensive setting such as a non-purpose-built space at our current East Campus, the labs must be rethought and reorganized to use less expensive equipment, less hazardous chemicals, and less reliance on infrastructure such as industrial sinks or glassware. One strategy for this has been successfully used by our department! During 2020, several instructors for some of our lab courses developed "kitchen chemistry"–type laboratories for students to complete in their own homes. Some of these relied on kits that our support staff created and that the students took home. All of these labs relied on non-hazardous chemicals, and inexpensive equipment that could be sourced for all students at a reasonable price. Components of these labs could be modified into appropriate East Campus Human Physiology labs.

Electrical variables are recorded using somewhat resource-intensive system called Biopac. This system is one of several commercially available systems that commonly use a personal computer, a data acquisition unit, and many peripheral equipment items, some of which also require consumables like single-use skin electrodes or mouthpieces. The requirement of a computer adds a dimension of necessary tech support that is available on the main VC campus, and not as readily available at our East Campus. To address this, alternate means of recording and analyzing electrical physiological variables will be explored. Biopac and other companies offer stand-alone hand-held units that perform most if not all of the same measurements and analysis as the full system, but I have not been able to use one of these units to evaluate its effectiveness or ease-of-use by students. Alternately, the hobbyist "maker" community has several exciting projects devoted to recording the same variables as the commercial student equipment—these projects are comparably inexpensive, but can require substantial technical, computer coding, and other expertise that a pre-allied health student would not be expected to develop in the course. I plan on evaluating many of these hobbyist projects for suitability for use in a classroom.

2B) Survey and document VCEC facility and lab technical support opportunities.

It would be easy to summarize this section with just "Hire an East Campus Physio Lab Tech!", but the budgetary and human resources realities mean that some research and planning would be needed to explore the possibilities. This final section of my sabbatical leave proposal is for a budget analysis project for the VC Science Division and Life Sciences Department. This research will produce actionable analysis related to the feasibility of hiring additional laboratory support staff for our East Campus.

My first source of information for this research will be Departmental and Divisional Budgets for the past five years. This information should be readily available, and will be how I compare course offerings (see Figure and Table 1 above) to the dollar amount budgeted and spent on

these courses directly and indirectly. My second source of information for this research will be Program Review submissions, resource requests, and funded items from all departments in the Science division for the past five years. This data will highlight the priorities that faculty, staff, and administrators have placed on instructional, support, and equipment in the Sciences at VC. My final source of information for this budget research will be the several grants that have been applied for, granted, and perhaps in-development. The S:AIL in STEM HSI grant that VC recently received has a wealth of information on the VC East Campus projects, Anatomy laboratory needs and budgets, and all of this information has the potential to inform how and when our department solicits additional budgetary support from the VC and VCCCD administration for increased support staff for our East Campus Biology students.

Conclusion

Thank you for your work reading through this year's sabbatical leave proposals! I look forward to presenting this proposal either in-person or via Zoom, at the Sabbatical Leave Committee's discretion, along with answering all questions you have either during the Q&A following my presentation, or at any time via email. The sabbatical leave opportunity at VCCCD is an exciting aspect of being a faculty member at this district. I hope to take part, and I hope my proposal and (if I'm chosen) project are able to support our students in the ways I've outlined above.

Dan Clark