**Academic Program Review 2010**
**Executive Summary: Department of Physics**
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The Department of Physics was included in the eighth cycle of academic program review for the 2009-2010 academic year. Included in the program review process was the composition of a self-study document based on faculty analysis and a visitation by an external reviewer. Dr. Kenneth Krane served as the external reviewer and read the self-study, interviewed faculty, staff, administration, and students, and submitted a separate analysis.

The departmental self-study completed by the faculty and staff is the major document for this program review. This complex document reveals the strengths and challenges through the departmental perspective and reflects the commitment of the department for self-analysis, reflection, and evaluation. The institutional expectation is that the department and college administration will use the self-study document, the dean's report, and an executive summary as guides for the next several academic years as the department addresses the recommendations. Since this process requires an enormous amount of time and effort from all participants, it is necessary to ensure that the results are used to inform decisions and future courses of actions. Therefore, the department faculty/chair and College of the Sciences Dean will be expected to provide a summary of activities undertaken during the 2010-2011 academic year as a result of the program review.

It should be noted that Dean Johnson's analysis is very thorough and detailed. His report summarized the essential elements of the program review findings, strengths, and recommendations. Initially, the dean's report was to serve as the sole administrative executive summary as it was believed sufficient. An additional executive summary was felt at the time to be redundant. However, after request by the department chair for a separate administrative executive summary and further reconsideration, the following summary is provided. It is believed that this executive summary adds value to the process and provides additional depth and context for departmental faculty and the Dean to celebrate commendations and also move ahead in addressing noted challenges and recommendations. The department chair and college administration will be expected to provide a summary of activities undertaken since the 2009-2010 academic year as a result of the program review. This report will be due to the provost by October 1, 2012.

**Summary Analysis**

The self-study document as submitted by the Department of Physics was well written, organized, and informative. It is clear that a great deal of time and effort went into the completion of the self-study and the process itself. The department should be commended for their organizational efforts in this regard. It can also be determined from reading the self-study report, the observations of the reviewer, and the summary comments of the college dean that the department has several strengths and challenges. The purpose of this summary will be to emphasize some of the points made by Dean Johnson and the reviewer and provide additional commentary and focus to areas they may not have addressed in their analysis.

1. Mission - The mission of the department seems primarily focused on quality instruction including service to general education and major students with an emphasis on disciplinary key concepts and skills development. Of course, this is positive. However, while the basis of any academic department and mission is primarily effective student learning and teaching, the department should consider other important aspects of its functions and efforts and relate those to its stated mission. The department goals and efforts are clearly beyond teaching and learning. It would be recommended that service and engagement to the university, professional societies, and local communities be included as an element of mission.

2. Program Offerings - The department offers two majors (B.S. and B.A.) and two minors. Included is an option for students to participate in a dual-degree physics/engineering program. Although the two majors are geared for unique purposes, the student learning outcomes are the exact same between them. Since the degrees differ in terms of purpose and content requirements (almost by 30 credits), an effort should be made to differentiate some of the outcomes. The department will want to reflect as to what students may develop differently in terms of knowledge, skill, and/or attitude and make this clear. Another option might be to reconsider the need for both degrees, particularly in light of the low number of graduates for the B.A. program (see #3).

3. Enrollment - Data was provided for the number of degrees awarded. The B.A. degree ranged from no graduates (2 out of the 5 years examined) to a maximum of 2 students in one year. The B.S. degree ranged from 2-6 graduates per year. The physics minor ranged from 1-5 student completions while the astronomy minor ranged from 1-2 student completions per year. Based on comparative data for the major, the number of graduates equals or exceeds other comparable university programs. This is heartening given the small number of graduates recorded each year at CWU. No data was provided for the number of majors or minors. This gap in the self-study, perhaps due to the lack of input from IR, is unfortunate. This information should be tracked and can be critical and relevant in examining trends and success for department recruitment and retention initiatives. The department needs to make sure this data is easily available as it moves forward, and given the current small numbers, it would be beneficial to create and better track a more personalized/detailed enrollment database that might be used to facilitate communication with program participants and alumni. In any case, there seems to be a fairly identified need for increased enrollment in all programs. This seems particularly acute for sustaining the B.A. major and both minors. Communication and partnering between the department, college, and enrollment management units is critical in realizing enrollment growth.

4. Departmental Goals and Assessment – The department has developed sound and achievable goals including appropriate student learning outcomes. The department has undertaken a laudable continuous improvement approach to examining goal attainment through various methods of assessment. The department has received yearly feedback in terms of its student learning outcome assessment approaches from faculty peers through yearly student learning outcomes reporting. The department seems to use this feedback and what it has learned to improve its assessment processes and curriculum. The department is a leader in the college and at CWU in terms of department and student learning outcomes assessment. This is a major departmental strength (as described in Appendix E and F).

5. Teaching Load & Performance – 158-175 WLU have been available for instruction over the review from 6-8 full and part-time faculty. Physics faculty do teach and are engaged in curriculum and teaching outside the dept. (Science Honors, Douglas Honors College and Science Talent Expansion Program, Project Teach at Kent). In addition, the percentage of release time from teaching was predicted to increase in 10-12 (see Table A1.). While positive in terms of other department goals and college/university priorities, the impact on SCH generation needs to receive consideration and careful analysis so as not to limit course offerings and curricular creativity within physics, especially since the mission of the department seems centered on effective teaching and learning in that context. It should be noted and the department commended on streamlining teaching efficiency through combining a course and lab.

6. Faculty – Faculty are reportedly productive in terms of teaching, research, and service. In terms of teaching, effectiveness is determined by a variety of methods (student evaluation of instruction (SEOI), peer evaluations, awards, student performance in graduate school, feedback from other departments). In examining student perceptions of effectiveness (SEOIs), the department showed consistently lower than college and university means for this area. It is unclear as to why this is based on the department's own description of employing varied and effective methods. It would be suggested that a closer analysis of SEOI results be undertaken to understand student's perception of teaching impact, particularly in relation to specific teaching elements and various demographics (instructor, course level, gender, etc.). Although only one piece of evidence, it is important to understand areas that are perceived by students to be lower than others. In addition, no data was provided in terms of peer evaluations. The idea of examining teaching by other faculty (i.e., peers) is positive. Indeed, the issue is one beyond the department and needs to be examined at the college and even university levels. Devising appropriate instruments for observation and evaluation could go far in impacting the teaching and learning process. The department is encouraged to continue this process and be engaged in broader discussions as they occur at the college and university.

7. Students – Physics majors are regularly engaged in research and related dissemination activities (publications, grants, posters, oral presentations). In addition, there was ample evidence provided that students do successfully enroll in graduate school, get employment, and receive a variety of awards. In addition, it should be noted that CWU's SPS chapter and Astronomy club is regularly and nationally recognized. These data reflect a healthy, motivated, well-mentored and high-achieving student body. This is major departmental strength.

8. Facilities & Equipment – There is consistent documentation and commentary from the department, external reviewer and Dean that there is inadequate space for teaching, storage, and research. It is anticipated that much of the need will mitigated through Science Phase II. Needs beyond that which may be solved through the new building should continue to be addressed through continued planning within the college and university planning processes. It seems there are also significant needs in terms of equipment for instruction, research, and outreach. It is critical that the college and department develop a plan in coordination with

institutional processes that maximize its revenue and budget for such acquisitions and maintenance once purchased. Grants, fundraising, and the use of other revenues (summer school) need be a departmental priority in building the breadth of equipment necessary for productive department functioning particularly in relation to research and outreach. The Dean is encouraged to work within the Provost's Council to develop a process by which equipment can be obtained and maintained. Based on the significant needs of the college and university, this should prove to be an activity that could have immediate and far-reaching impact.

9. Library and Technological Resources – The library seems to be meeting most departmental needs. This is positive considering the diminishing budget affecting all areas of the campus, including the library. Faculty seem to use Blackboard and publisher created sites as a means for distributing course materials, etc. The department is encouraged to use the Online Learning Office (i.e., see Dr. Chris Schedler) and Online Librarian (Ms. Geri Hopkins) for developing means to enhance face-to-face instruction utilizing web-mediated instructional aids. There was mention of the need for updated software. The comments made earlier in terms of equipment obtainment (#8) and maintenance are relevant here as well.

Overall, the department should be commended for writing a strong report. Indeed, except for some minor improvements (e.g., enrollment data), the report writing should be a model to others in terms of completeness and quality. The department should also be commended for engaging in a strong model of continuous improvement and striving towards meeting professional standards of "best practice." Student achievement and focus are paramount in the department's mission, goals, and results. Faculty are clearly dedicated to the students they work with and are model to others in terms of engaging undergraduates in research. Although the department has several strengths, there are also areas of needed focus. One of the most pressing is the review of the B.A. and B.S. degrees, particularly in terms of goal differentiation and enrollment. This analysis will assist the department, college, and university to determine potential program redundancy and relevance. Another pressing issue is the lack of adequacy in terms of space for teaching, storage, and research. A related but equally important concern is with the obtainment and maintenance of needed equipment. Both areas have particular meaning and importance to the long-term sustainability of the department and college, especially when considering the current environment of diminishing state resources and funding. The need for the department and college to create new funding opportunities through grants, fundraising, and other entrepreneurial activity cannot be overstated. Also, developing processes to prioritize the replacement, upgrading, and funding of equipment is needed at the department, college, and university levels. These efforts have the potential to strengthen and sustain the department in spite of a continually diminishing state budget.