5-Year Review Summary, Physics Department

1.0 BACKGROUND

At its meeting on December 6th, 2018, CAPR invited Prof. Erik Helgren from the Physics Department to discuss the program’s 2017-18 five-year review. Following this meeting, the liaison to the department/program, Kevin Kaatz, History Department, worked with Prof. Helgren, the writer of the 5-year review to complete the following summary.

2.0 CHECKLIST OF DOCUMENTS SUBMITTED WITH THE 5-YEAR REVIEW

- Self-Study (pp. 4-59)
- Five-year plan (pp. 60-76)
- External reviewer’s report (pp. 77-85)
- Program response to the external reviewer’s report (pp. 85-90)

3.0 CAPR ANALYSIS/EXECUTIVE SUMMARY

BRIEFLY DESCRIBE THE PROGRAM(S), NUMBER OF STUDENTS SERVED, FACULTY AND REFER TO FIVE-YEAR REPORTS FOR ADDITIONAL INFORMATION. CAN BE COPIED AND INSERTED FROM THE 5-YEAR REVIEW:

The Physics Department offers a B.S. and a B.A. degree and the department (like all departments at the university) spent a significant part of the last four years preparing for semester conversion. The full-time faculty, whose teaching loads have gone up nearly 30% since their last 5-Year Review, now numbers 5 (up from 4). It has 36 majors (up from 26 in 2009, which is above average for Physics baccalaureate programs across the US) and the faculty also teach a wide variety of General Education courses/labs. The External reviewer noted that student satisfaction was very high. The faculty, called ‘engaged and energetic’ by the external reviewer (p. 84), are highly involved in publishing and research and brought in over 2 million dollars in outside funding since the last 5-Year Review.

3.1 DISCUSS THE STRENGTHS AND ASSETS OF THE PROGRAM WITH RESPECT TO FACULTY, STUDENT SUCCESS, CURRICULUM, PROGRAM ENHANCEMENT, ASSESSMENT PLANS AS WELL AS NOTABLE ACCOMPLISHMENTS.

The Physics Department has a very active faculty, both in terms of teaching loads and in terms of research and publishing. They have received significant faculty awards that includes grants and other funding. The total dollar amount for these is $2,177,875 (pp. 11-13) as well as having applied for funding for two other projects that could total nearly $700,000. Many of the faculty have also received internal grants. The list of publications and other faculty awards is impressive (pp. 14-15) The students in the department have certainly benefitted from such active faculty.
Noting that the major has grown from 26 majors to 36, a significant number of these students have been recognized through various awards and recognitions. It should also be noted that many of their graduates have gone on to be accepted into Ph.D. and M.S. programs as well as being employed in their fields and teaching K-12.

The faculty have also been highly involved in curriculum and program enhancements. Since the last 5 Year Review the department has created a new minor in Astronomy (which started in Fall 2018). They revised their B.A. program in order to accommodate students who need to take remedial math at the beginning of their university education. The students can now take all their upper-division courses in one year. The Physics minor was streamlined to allow students the option to minor without having to change their major. Students take physics courses by way of the majors themselves, majors from other departments (mostly science-related) and, as mentioned above, through general education offerings. The 5-Year Report also contains information about program assessment (32-39). Briefly, the department has 6 program learning outcomes that are aligned to four out of the five Institutional Learning Outcomes. The Curriculum Map is provided as well as the assessment tools and more importantly, the summary of the assessment findings (pp. 36-39). Significantly, the 5-Year Review notes the areas that the department plans on focusing on, based on its assessment results. One goal is to improve the test scores on nationally-normed exams. It also plans to include more in-class presentations, peer evaluations and a more systematic approach to problem solving.

3.2 DESCRIBE THE KEY ISSUES AND/OR CONCERNS THAT WERE CENTRAL TO THE FIVE-YEAR YEAR REVIEW PROCESS AND HOW THE DEPARTMENT/PROGRAM PLANS TO ADDRESS THEM;

There were several key issues and concerns noted in the 5-Year review process. One was the race/ethnicity of the students and the male/female ratio for their majors. 35% of their majors were Hispanic and this “quite notable” (p. 46) for the field of physics. It also noted that the ratio of males/females was 4:1. These low numbers reflect the field of physics and the sciences in general. The department has hired 3 female faculty members since the last 5-Year review in hopes to remedy the 4:1 ratio. Another concern is the lack of space, especially for faculty members. Each of the tenured/tenure-track faculty shares an office with sometimes up to 5 lecturers. Related to lecturers, the report notes that many of the courses are taught by them (70% in 2016). The goal is to increase the number of full-time faculty teaching the major courses. The department has completed four searches in five years since the last review. Another concern is related to the high teaching loads which directly impacts research output (p. 74). It is hoped that they can hire at least 2 more tenure-track faculty over the next 5-year review cycle, to help alleviate these issues. The External Reviewer also noted that the heavy work load and recruiting new faculty were key issues.
3.3 NOTE THE PROGRAM’S VISION FOR THE NEXT FIVE YEARS AND WHAT THE PROGRAM HOPES TO ACCOMPLISH.

The 5-Year Report notes several things the Physics Department hopes to accomplish in the next five years (p. 60). Ten goals are listed, including creating an RTP departmental manual, incorporate high impact practices and invest in a state-of-the-art lab. The department also plans on using its assessment results to improve the entire program (p. 40ff). It also plans (and has been doing for years) to incorporate students into research projects, increase advising for students (and the External Reviewer notes that this is already a highlight for the department), and increased efforts in retention and recruitment of students.

3.4 PROVIDE CONCRETE STEPS ON HOW THE PROGRAM PLANS TO ACHIEVE ITS VISION IN THE NEXT FIVE YEARS.

The 5-Year report give several concrete steps the department plans on doing to achieve its vision. A significant part of the future for the curriculum (see above, 3.3) is related to the semester conversion. Along with this is the department’s plan on future assessments of its PLOs/ILOs, plans to increase student success (pp. 70ff), to increase the number of majors to 50 by keeping a rigorous program, getting students involved in research, and maintaining/enlarging their recruiting program. The department also plans on asking for new tenure-track hires.

4.0 CAPR RECOMMENDATION(S) FOR CONTINUATION OF THE PROGRAM:

Continuation without modification. The Department of Physics meets or exceeds every one of the rationales given for this category (p.4 of the CAPR Academic Program Review, 16-17).