Memorandum of Understanding

This MOU has been read and approved by:

Department Chair: Prashanth Jaikumar
Prashanth Jaikumar
Date: 10/26/2023

Dean, College of Natural Sciences & Mathematics: Curtis Bennett
Curtis Bennett
Date: 10/26/2023

Vice Provost Academic Programs: Jody Cormack
Jody Cormack
Date: 10/26/2023

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Memorandum of Understanding
Department of Physics and Astronomy,
College of Natural Sciences and Mathematics
October 2023

This Memorandum of Understanding outlines the consensus reached by the Department of Physics and Astronomy, the College of Natural Sciences and Mathematics, and the Division of Academic Affairs, based on the recently conducted program review (Self-study in April 2022, External review report in April 2022, and UPRC report in March, 2023). It describes the goals to be achieved, and the actions to be undertaken by all parties to this MOU to achieve these goals, during the next program review cycle. Progress toward goals is to be addressed in an annual report.

The Department offers the following degrees: B.A. in Physics; B.S. in Physics with an additional Option in Material Sciences; an MS in Physics with additional Options in Applied Physics and Computational Physics; and an M.S. in Professional Physics. The Department also offers a Minor in Physics.

Although the last program review was in 2016, the Department did not receive their MOU until 2020. The recommendations from the MOU have been partially met by the Department, with the understanding that the pandemic and the shortened time after the MOU has affected their ability to respond accordingly to all recommendations.

Strengths were identified in the reports.

- The program goals and outcomes are well aligned with the State of California economic, workforce, and civic needs with graduates finding employment as engineers, analysts, or programmers. They have clear plans for the future in alignment with campus initiatives to reduce equity gaps and DFW rates as well as investigate curriculum redesign;
- Faculty actively collaborate with scientists and mathematicians outside the department. Furthermore, the department has received grants from the NSF and the DOE to acquire advanced scientific equipment to promote faculty-student collaborations in industrial and research settings;
- The APS selected the department as one of five APS Bridge sites nationwide to prepare URM graduate students in Physics to be ready to enter PhD granting institutions. The department partnered with other programs/industries, such as the Cal-Bridge program and Google, to support the URM students.
- The Physics department serves indirectly as a retention and graduation engine for other departments and Colleges (specifically COE) by ensuring low DFW rates for the introductory Physics sequence.

Concerns or Opportunities for Development were noted in the reports.

- Since 2018 the Department has included over 19 FTEF, which is a return to 2012-13 levels after a dip to ~17 FTEF in 2014. The increase in FTEF includes fewer T/TT faculty than in the past, and therefore the T/TT density has decreased to ~66% which affects research and service. It was also noted that the Department needs faculty members with expertise in experimental material science and diverse backgrounds.
- Graduation rates are low for the undergraduate FTFY (range from 6.3%-31%) however most students enter the program as transfers in their junior year. The 2-year graduation rate of the graduate program declined in the years 2017-2020 from 23.5%-->17.6%, after an increase in the previous five years from 4.3%-23.5%. The graduate programs also declined from 23.5%-->17.6%. The undergraduate average is lower than the college and university averages, but it is noted that the small numbers of FTFY students lead to a large fluctuation when there is a change in only a few students. Time to graduation may also be an issue for graduate students, with most students needing 3 years to graduate. The program should consider reducing the requirements to allow completion in 3 years. If the program requires 3 years to complete, then program must make this clear to students, and spread course requirements over those three years to allow for financial aid.
- Although indirect assessment is being completed at the undergraduate and graduate levels, there is little direct evidence to assess the PLOs of each degree.
- The external reviewers had some specific curricular recommendations for the Department to consider, including continuing to offer Analytical Mechanics in both semesters in order to avoid bottlenecks for the program, removing the Analytical Mechanics requirement for the Electrodynamics class (students can take this class at the same time with Analytical Mechanics), and to consider having both Electrodynamics I & II and Quantum mechanics I & II on a Fall - Spring schedule.
- The Department spends a significant amount of its operational budget on daily maintenance or replacement of lab equipment.

It is therefore agreed that the Department of Physics and Astronomy will:

1. Develop a strategic hiring plan for tenure-track faculty members with consideration for faculty members who have retired or are in the faculty early retirement program (FERP), prioritizing diversity among hiring and considering a focus on faculty members with expertise in experimental material science;
2. Analyze graduation rates for undergraduate FTFY/Transfer and Graduate populations, mitigating any potential barriers and working toward GI 2025 goals and a 2-year graduate student rate;

3. Develop a comprehensive assessment plan for undergraduate and graduate programs in order to complete annual assessments using direct and indirect methods and report on closing the loop activities to illustrate that continuous learning outcome data are used to inform decision making. Provide an update of the assessment plan on year 1, then provide an annual update each year thereafter (due June 1) on progress made towards MOU actions to the CNSM dean, the Vice Provost for Academic Programs, and the Coordinator of Program Review and Assessment. Your review cycle will therefore be from 2023-2030. A comprehensive self-study will be due June 2030 for a 2030-2031 Academic Year review process;
4. Consider curricular recommendations from the external reviewers, including those connected with Analytical Mechanics and sequences in Electrodynamics and Quantum mechanics;
5. Explore the operating budget in terms of resources and technology in partnership with the College, reassessing the possibility of lab fees for GE physics classes.

It is therefore agreed that the College of Natural Science and Mathematics and University will:

1. Work with the Department on implementing a strategic hiring plan according to available resources;
2. Work with the Department on resource allocations in the areas of labs and technology according to available resources.

This MOU has been read and approved by:

Chair for the Department of Physics and Astronomy: Prashanth Jaikumar
Dean for the College of Natural Science and Mathematics: Curtis Bennett
Vice Provost Academic Programs: Jody Cormack