Saint Louis University
Program Assessment Annual Reporting

It is recommended program assessment results be used to *celebrate achievements of student learning* as well as to *identify potential areas for future curriculum improvement*.

Please email this completed form as an attachment to ***thatcherk@slu.edu***
CAS PROGRAMS: Please email this completed form by July 1 to Donna LaVoie lavoiedj@slu.edu

1. **Degree Program(s) included in this report: PHYS BA and PHYS BS**
2. **Department: Physics**
3. **School/Center/College: Arts and Sciences**
4. **Name(s): William D. Thacker**
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Instructions: Please answer the following **five** questions to the best of your ability for each degree program offered within your department.

1. Summarize your **assessment activities** during the past year for each degree program and how this work relates to the established assessment plan *(e.g. what program outcomes were assessed, faculty discussions, new survey design, data collection, revised assessment plans or learning outcomes, etc.).* Please include how Madrid courses/program were involved.

The annual assessment meeting was held June 12, 2019. In accordance with the schedule set by the assessment plan the following two outcomes were assessed:

2. Students will design and conduct experiments and analyze and interpret data.

3. Students will collaborate effectively on teams.

Data is given in Appendix 2.

Senior Capstone Experience: Students complete a research project encompassing at least three semesters at the conclusion of which they give an oral presentation in a department seminar. At the end of the seminar the physics faculty meet to discuss and assess the presentations.

2. Describe specific **assessment findings** related to the **learning outcomes** assessed for each degree program, including any pertinent context surrounding the findings. Please include the **learning outcomes themselves**. *(e.g. Our goal was that 75% of students performed at the "proficient" level of competency in problem solving, using a new scoring rubric. 81% of students performed at the "proficient" level in problem solving, exceeding our expectations.)* Do not include student-level data. Data included in this report should be in aggregate. Please include how Madrid courses/program were involved.

Students meet or exceed expectations in outcomes

2. Students will design and conduct experiments and analyze and interpret data, and

3. Students will collaborate effectively on teams.

(See Appendix 2: outcome 2 average = 3.2; outcome 3 average =3.25). Moreover, no individual scores fall below 3 Meets Expectations.

**Please attach any tables, graphics, or charts to the end of this report.*

3. Describe how assessment **feedback** has been provided to students, faculty, and staff. *(e.g. report for faculty, executive summary for the dean, web page for students, alumni newsletter, discussion with students in class or club event, etc.)*

This report will be sent to the Associate Dean and will eventually be posted on the website http://www.slu.edu/the-office-of-the-provost/assessment-of-student-learning/program-level-assessment/college-of-arts-and-sciences , where it can be viewed by faculty, staff, students, and alumni.

4. In what ways have you **used assessment findings** to celebrate student achievements and/or to improve the curriculum this past year? *(e.g. prizes to students, hosting student parties, changes to curriculum, student projects, learning goals, assessment strategies, etc.)*

	We do not use assessment findings to celebrate achievements of individual students, but rather to improve the program in general and student achievement in particular. Continuous improvement - Student Outcomes 4 (Students will communicate effectively and professionally in oral and written formats) and 5 (Students will be able to discuss contemporary issues in science and technology): Students complete a three-semester research project labeled Physics Research I, II, III and give an oral presentation at the end of Physics Research II and a final presentation at the end of Physics Research III. This year (2017-18) two students gave Physics Research II presentations in the fall and Physics Research III presentations in the spring. During a physics faculty meeting following the Research II presentations , it was noted that the students were using technical jargon without being able to explain what it meant and the talks were overly complicated and bogged down with technical details. We decided that the research supervisor of each student should intervene with a set of recommendations to the student: • Never use a technical term you cannot explain, • Focus on the big ideas, • At least the first several minutes of a technical presentation should be understandable to a general audience,

- The student should practice the talk in front of her/his supervisor.

When the Research III presentations were given one student showed much improvement, demonstrating a broad knowledge of the subject and the ability to convey complex scientific ideas clearly and concisely. Unfortunately, the other student made the new mistake of listing pages of computer code in the presentation, in an effort to clarify the student's own contribution to the research. I believe that this student was busy with other assignments and exams and there was not enough time for the research supervisor to intervene successfully.
Overall, the Physics Research presentations were much better this year (2018-19).

5. Describe any changes to your assessment plans, or any challenges or educational experiences with the **assessment process** this past year that you would like to share.

No changes have been made this year.

*Please submit any **revised/updated assessment plans** to the University Assessment Coordinator along with this report.*

Appendix 1

Physics Assessment Rubrics

Outcome\Level of Attainment	1.Below Expectations	2. Progressing to Expectations	3. Meets Expectations	4. Exceeds Expectations
1. Students will apply the principles of physics to problems of fundamental and practical interest.	Not able to apply physics principles.	Can apply physics principles to simple problems with guidance.	Can apply physics principles to problems of increasing complexity	Can apply physics principles to problems beyond the classroom
2. Students will design and conduct experiments and analyze and interpret data.	Not able to conduct experiments or analyze data	Can conduct experiments and analyze data with direction	Can design and conduct experiments and analyze data with minimal direction	Can design and conduct experiments and analyze data independently. Demonstrates

				innovative thinking.
3. Students will collaborate effectively on teams.	Does not work well in groups	Contributes minimally to the efforts of a group	Participates actively in various aspects of group work	Works productively in groups, and inspires others
4. Students will communicate effectively and professionally in oral and written formats	Unable cogently to express ideas orally and in writing	Able to express simple ideas with some clarity	Able to express complex ideas with clarity	Able to express complex ideas with clarity and make connections among related ideas
5.Students will be able to discuss contemporary issues in science and technology	Not able to discuss contemporary scientific and technological issues in context.	Able to discuss such issues with guidance.	Able to discuss such issues on his/ her own clearly and concisely	Has a broad knowledge of current issues and conveys ideas clearly and concisely.
6.Students will be able to formulate numerically and solve scientific problems utilizing at least one programing language or environment	Not able to formulate a scientific problem as a set of numerical steps; and not able to produce code to solve it	Able to convert a scientific problem into numerically accessible steps with some assistance, code it and obtain results	Able to convert a scientific problem into numerically accessible steps, code it and obtain results. Investigate results and analyze errors.	Able to convert a scientific problem into numerically accessible steps, providing multiple alternative routes, code them and obtain results. Investigate results and analyze errors and optimize approaches.

Appendix 2

Physics Assessment Data

Outcome\Level of Attainment	Courses and Assignments used for Assessment. Results on four-point scale given in Appendix 1, initial pairs designate students.
1. Students will apply the principles of physics to problems of fundamental and practical interest.	

2. Students will design and conduct experiments and analyze and interpret data.	Modern Physics Lab Students measured a magnetic hysteresis curve Level, TM 3, DM 3, KM 3, KM 3, RS 3 Optics Lab Students setup a Michaelson Morley interferometer, collected data, analyzed and interpreted their results. NS 4 TE 4 CB 3 Experimental Physics Students designed, built, and used four point probe measurement station using a 3D printer and LabVIEW. NT 3 Nanoscience Frontier Students designed an experiment to grow carbon nanotubes and evaluated their morphology. AK 3 Average=3.2
3. Students will collaborate effectively on teams.	Analog and Digital Electronics Students worked in a group for the final project mentioned previously. MB 3 DK 4 KM 3 NS 4 RS 3 Modern Physics Lab Students measured a magnetic hysteresis curve FS 3 MB 3 Students researched, designed, synthesized, analyzed, and reported on the results of their findings in a group fashion. AK 3 Average=3.25
4. Students will communicate effectively and professionally in oral and written formats	
5.Students will be able to discuss contemporary issues in science and technology	
6.Students will be able to formulate numerically and solve scientific problems utilizing at least one programing language or environment	