

Program Assessment Report 2017-2018

Program Name: **Neuroscience**

Program Learning Outcome:

2).Evaluate and interpret data using standards appropriate in the field of Neuroscience.

1. Identify the artifact(s) (i.e. student work or outputs) that you used to assess the PLO. [Projects, papers, presentations, portfolios, exam questions, specific assignments, capstone work]

Artifacts: **Presentations**

Other artifact(s) posters on independent research

[Click or tap here to enter text.](#)

2. Identify the instruments (e.g. rubrics, surveys, spreadsheets, statistical software) used to assess the artifact(s) (i.e. the way in which student output are analyzed).

Instruments: **Rubrics**

Other instruments Used

[Click or tap here to enter text.](#)

3. Describe program collaboration to plan, implement and use the results of assessment.

This past year the Neuroscience Program faculty spent two monthly meetings and two special additional meetings reviewing and discussing previous assessment results which led to development of this year's rubric and selection of artifacts. At the end of the spring semester, three faculty from the Program specifically collaborated on reviewing the artifacts and analyzing the data for NEUR330 this semester. At the end of the spring semester, two faculty from the Program specifically collaborated on reviewing the artifacts and analyzing the data for NEUR358 from the fall semester. Over the course of the year Neuroscience faculty will review the assessment plan at different monthly meetings so that all faculty can give feedback and timely adjustments can be made from assessment data gathered.

Explain the results of the assessment activities.

NEUR330: students were assessed on their first and second class presentations of their independent research project on "evaluation and interpretation of the data" they were presenting. The analysis section of the presentation was separately scored to assess this aspect of the presentation.

Prediction/analysis (each was worth one point)

Outlines data that will be collected and statistics that may (are) used

Predicts alternative hypothesizes

Give implications of the data

A scale of 1-3 (3 being highest) was used to score and an average of all students' scores was calculated as a percentage (individual score/3*100. n=44 students)

The first presentation's average score for this aspect of their presentation was 50% while for the second presentation this increased to 76%. The average score was 72% for their research poster at a public presentation at the completion of their research project.

NEUR358: students were assessed on their interpretation of the data presented in a primary research article during the student's presentation to the class. A rubric scoring several factors including student's accuracy on data interpretation was used. A scale of 1-3 (3 being the highest) was used to score and an average of all students' scores was calculated as a percentage (individual score/3*100, n= 23 students). The average score for this aspect of their presentation was 80%.

4. Where applicable, outline the steps you will take to make improvements to the program based on the results of assessment activities identified in #3.

NEUR330: There was good improvement from the first to second presentation on analysis however it levels off for the final poster presentation. This could be that this is a difficult aspect of the assignment and/or there is less available time between second class presentation and completion due to end of semester workload increases. It could be that from first to second presentations the students better understand the analysis tools, but once they actually collect data and have to do the analysis, they are not prepared to handle unusual circumstances that arise during the experiment and make modifications. This is likely made more difficult with less time at the end of the semester and they are unable to use their training from the first half of the class.

To improve the score the time between second presentation and completion of project analysis needs to be re-examined. Students need to have a better idea of a range of potential "types" of data they will collect so they are better prepared to handle the analysis particularly when time is short at end of the semester. Analysis is one of the toughest tasks for students and one way to improve on this is to include better preparation before they come to NEUR330. The Neuroscience faculty has discussed adding training of analysis techniques to NEUR231L which students take the semester before starting NEUR330 and the methods course will then work to give them application practice. The four faculty involved in NEUR231L and NEUR330 will meet to discuss how to best coordinate their methods in the time they have in each course. The Neuroscience faculty is also in discussion with the Psychology Department on options to include in the PSYC210 (statistics) course to assist our students in using statistical tests in their understanding of data.

NEUR358: Neuroscience faculty discussed this course at monthly program meetings and since NEUR358 is a senior year course (for mastering aspects of PLO#2) a percentage of

90% is the benchmark. In order to gain improvement a number of changes likely need to be made. At this time, the one section has been full and so feedback and pre-presentation work with students has been limited by this. Starting this fall, 2018, there will be two sections which for this fall will not each be full, so it will be more likely to give each student more time. In addition, time will be built into the course schedule to review "interpretation of data" before their presentations. Other primary research papers that the entire class reviews during class time can be used as practice runs for students to hone their skills on "interpretation of data" before they give their individual presentations. Discussion with other Neuroscience faculty will work to have time embedded into other earlier courses (beginner and comprehensive levels).

Program Assessment Report 2017-2018

Program Name: **Neuroscience**

Program Learning Outcome:

3). To design, conduct, and analyze laboratory research in neuroscience.

Identify the artifact(s) (i.e. student work or outputs) that you used to assess the PLO. [Projects, papers, presentations, portfolios, exam questions, specific assignments, capstone work]

Artifacts: **Presentations**

Other artifact(s)

research project completion

5. Identify the instruments (e.g. rubrics, surveys, spreadsheets, statistical software) used to assess the artifact(s) (i.e. the way in which student output are analyzed).

Instruments: **Rubrics**

Other instruments Used

survey of completion

6. Describe program collaboration to plan, implement and use the results of assessment.

This past year the Neuroscience Program faculty spent two monthly meetings and two special additional meetings reviewing and discussing previous assessment results which led to development of this year's rubric and selection of artifacts. At the end of the spring semester, three faculty from the Program specifically collaborated on reviewing the artifacts and analyzing the data for NEUR330 this semester. At the end of the spring semester, two faculty from the Program specifically collaborated on reviewing the artifacts and analyzing the data for NEUR358 from the fall semester. Over the course of the year Neuroscience faculty will review the assessment plan at different monthly meetings so that all faculty can give feedback and timely adjustments can be made from assessment data gathered.

Explain the results of the assessment activities.

NEUR330: The completion of a research project was met by 100% of the students (n=44).

Students were also assessed on their first and second class presentation of their independent research project on "hypothesis development" and "experimental design" of their independent research project. As noted above, a rubric with three items for each area was scored for each student's first and second presentation (and the poster presentation included " experimental design" also). A scale of 1-3 (3 being the highest) was

used to score and an average of all students' scores was calculated as a percentage (individual score/3*100, n=44).

| <u>the average score across all sections</u> | <u>Hypothesis</u> | <u>Experimental Design</u> |
|--|-------------------|----------------------------|
| first presentation scores | 56% | 47% |
| second presentation scores | 83% | 73% |
| Poster presentation | n.a. | 67% |

In both "hypothesis development" and "experimental design" there is a low average score at the start of class, but a sizable increase by the second presentations. This is not surprising since students don't have much awareness of setting up actual experiments in their sophomore year but appear to be learning during the class. However, as seen in PLO#2 with "interpretation of data", there is a drop off by the completion of the project of "experimental design" (note that "hypothesis development" was not assessed at the end of class poster presentation since not applicable to that point in project). As mentioned in PLO#2. this could be due to little time between the second-class presentations and completion due to the end of the semester workload increase. More time may be needed for students to deal with sudden modifications needed in the experiment, particularly in the re-design of the experiment. It could be that from first to second presentations the students better understand the "what" they need to do, but once they actually begin collecting data and finding their design not to work, changes are difficult to make at that late time in the semester.

7. Where applicable, outline the steps you will take to make improvements to the program based on the results of assessment activities identified in #3.

Giving the opportunity to "conduct" independent research projects to all of our students is one of the keystones of NEUR330. So, while this might seem a simple assessment of the course, the 100%, indicates that all students in this required course completed a research project. In the future, we will work with the Dean to continually provide the resources in the Budget to meet this growing demand as lab consumables' price increase. In addition, the entire faculty will discuss how each of them guides their own individual students in their own research labs so that the course faculty can take advantage of this expertise.

To improve the "hypothesis development" score at the beginning of class the Neuroscience faculty has to discuss and develop more spots in earlier course where this might be stressed so that students are better prepared right at the start of the class. However, students do improve to the 80% benchmark that the faculty have discussed and decided upon.

To improve the "experimental design" score, the time between the second presentation and completion of the project needs to be examined. Students need to have a better idea of a range

of potential problems that might arise so that they can more easily modify their experiments. In addition, projects likely need to be in the experimental stages earlier in the semester so that there is less pressure on the students. Designing an experiment is difficult and even tougher when adjusting the design on the fly as you find certain items don't work. The Neuroscience faculty have discussed more focus on better preparation for each upcoming course in our required curriculum. More time in NEUR111 in their first year and more in NEUR231L in fall sophomore year will make students aware of design problems (have NEUR330 students come back and tell their horror stories) so that they can adjust quicker in the NEUR330 class time.