PROGRAM REVIEW – CURRICULUM PACKET

2018-2019

ASTRONOMY

This report includes course student learning outcome (cSLO) assessment summaries from 2015-16 to 2017-18.

COURSE OFFERINGS

Table 1. Course offerings per academic year from 2015-16 to 2018-19

Course Name	2015-2016	2016-2017	2017-2018	2018-2019
ASTR G100	x	x	x	x
ASTR G100L	x	x	x	x

COURSE ASSESSMENT STATUS

Fully Assessed ↑ Partially Assessed ↔ No Assessment ↓

Table 2. Course Assessment Status between 2015-16 and 2017-18
*No enrollment data between 2013-14 and 2018-19

Course Name	Total cSLOs	No. cSLOs Assessed	Assessment Status		Last Term Offered
ASTR G100	5	5 out of 5	Fully Assessed	↑	Spring 2019
ASTR G100L	4	4 out of 4	Fully Assessed	↑	Spring 2019

Table 3. cSLOs that were not assessed between 2015-16 and 2017-18

Course Name	cSLO Name	cSLO to Assessed

cSLOs are Fully Assessed

DATA EVALUATION

Table 4. cSLOs assessed and corresponding Data Evaluation.
*Denotes historical cSLOs.

Course Name	cSLO	Semester Assessed	cSLO Data Evaluation
ASTR G100	cSLO 1	Fall 2015	SLO #1:86% of students were able to demonstrate an understanding of the historical aspects involved in the development of astronomy into their operational framework.
ASTR G100	cSLO 1	Fall 2015	The students were taught the history of most major developments in astronomy. The historical exam questions tested mostly rote ability, which aids in checking--up of student review the basic material. • Exam 1 had 12 questions acting as a baseline for subsequent tests. The mean percentage of correct across all questions was 56%. Exam 2's mean being 65%. The mean for exam 3 was 65%. The students showed an improvement of their rote--based knowledge of the historical content of the course. Almost ¾ of the students showed achieved this requirement by the end of the course. This is an acceptable percentage. The main factor factors that influence the students' results was the inclusion of practice problems based on last semester's class.

Course Name	cSLO	Semester Assessed	cSLO Data Evaluation
ASTR G100	cSLO 1	Spring 2016	88% of students were able to demonstrate an understanding of the historical aspects involved in the development of astronomy into their operational framework.
ASTR G100	cSLO 1	Spring 2016	63% reached the goals completely in one class and (with a grade of A) while 40% reached the goals completely in another class (with a grade of A) 22% reached the goals competently in one class (with a grade of B) while 32% reached the goals competently in another class (with a grade of B). 15% reached the goals passably (with a grade of C) in one class while 28% reached the goals passably (with a grade of C) in another class.
ASTR G100	cSLO 1	Fall 2016	SLO #1:91% of students could demonstrate an understanding of the historical aspects involved in the development of astronomy into their operational framework. SLO#2: 80% of students could distinguish the various instruments used in modern astronomy, and explain how data is collected and analyzed into their respective operational framework, 86% of students who answered questions pertaining SLO #1 and #2 reached the goal.
ASTR G100	cSLO 2	Fall 2015	SLO#2: 80% of students were able to distinguish the various instruments used in modern astronomy, and explain how data is collected and analyzed into their respective operational framework, 83% of students who answered questions pertaining SLO #1 and #2 reached the goal.
ASTR G100	cSLO 2	Spring 2016	82% of students were able to distinguish the various instruments used in modern astronomy, and explain how data is collected and analyzed into their respective operational framework, 85% of students who answered questions pertaining SLO #1 and #2 reached the goal.
ASTR G100	cSLO 2	Spring 2016	63% reached the goals completely in one class and (with a grade of A) while 40% reached the goals completely in another class (with a grade of A) 22% reached the goals competently in one class (with a grade of B) while 32% reached the goals competently in another class (with a grade of B). 15% reached the goals passably (with a grade of C) in one class while 28% reached the goals passably (with a grade of C) in another class.
ASTR G100	cSLO 3	Fall 2016	SLO 3:85% (=51/60) of students were successful in answering questions pertaining to SLO#3 and reached the goal. Of the respondents, 100% of the "Upper 27%", and 79.90% of the "Lower 27%" answered the question correctly. The distracter questions were distributed very evenly: (a) 51/60 for the correct answer, and distracters with (b) 3/60, (c) 2/60, (d) 2/60, (e) 2/60.
ASTR G100	cSLO 3	Spring 2017	SLO 3:89.13% (=41/46) of students were successful in answering questions pertaining to SLO#3 and reached the goal. Of the respondents, 100% of the Upper 27%, and 66.67% of the Lower 27% answered the question correctly.
ASTR G100	cSLO 4	Spring 2017	There are 70 students that got a better score between the in-class quiz and the final exam questions. These questions are directed towards understanding the concepts of astronomical properties more than memorizing textbook information. This number corresponds to 73.7% of the students' surveyed and 64% of total students enrolled in the classroom. As a result, about 15% of the students did not necessary take the class academically seriously as many students had random guesses. In my view 73.3% of the students did above satisfactory work illustrated by this data and am pleased with that result.
ASTR G100	cSLO 4	Spring 2018	Out of twelve classification questions on: planetary, stellar and galactic properties: 12 students earned 90% or better. 32 Students earned 80% or better, but less than 90% 40 Students earned 70% or better, but less than 80% 4Students earned less than 70%

Course Name	cSLO	Semester Assessed	cSLO Data Evaluation
ASTR G100	cSLO 5	Fall 2017	Criterion for Individual Student Success: Five multiple choice questions were given on the subject. The following indicate the percentages: 1 70/92 (76.08) 2 73/92 (79.35) 3 75/92 (81.52) 4 77/92 (83.70) 5 78/92 (84.78) Total 373/460 (81.09) Overall, were student success rates were acceptable given the class earned an 81.09 %. I usually use 70% as my standard for an acceptable level of student success, but if I consider the assessment question(s) to be especially easy or difficult I will raise or lower my standard. The student success rates for the different sections were comparable. I was not surprised by the student success rates for I keep a close eye on student progress. The student performance on a particular question was not significantly better or worse than expected. The assessment tool allowed an for accurate assess the SLO? The questions I asked actually told me what I wanted to know. The next SLO will focus on a different set of questions, which will help in an overall understanding of student learning objectives
ASTR G100L	cSLO 1	Fall 2015	53% reached the goals completely in one class and (with a grade of A) while 33% reached the goals completely in another class (with a grade of A) 23% reached the goals competently in one class (with a grade of B) while 30% reached the goals competently in another class (with a grade of B). 13% reached the goals passably (with a grade of C) while 26% reached the goals passably (with a grade of C).
ASTR G100L	cSLO 1	Fall 2016	6/33 = 18% reached the goals completely in both sections with a grade of A, 19/33= 57.6% reached the goals competently in both sections with a grade of B, 4/33=12% reached the goals passably in both sections with a grade of C. 29/33=87.9% of students satisfactorily completed the assessment.
ASTR G100L	cSLO 1	Fall 2016	33% reached the goals completely in one class and (with a grade of A) while 47% reached the goals completely in another class (with a grade of A) 33% reached the goals competently in one class (with a grade of B) while % 21% reached the goals competently in another class (with a grade of B). 25% reached the goals passably (with a grade of C) in one class while 26% reached the goals passably (with a grade of C) in another class.
ASTR G100L	cSLO 1	Spring 2017	24/31=77.4% of students satisfactorily completed the assessment.
ASTR G100L	cSLO 2	Fall 2015	53% reached the goals completely in one class and (with a grade of A) while 33% reached the goals completely in another class (with a grade of A) 23% reached the goals competently in one class (with a grade of B) while 30% reached the goals competently in another class (with a grade of B). 13% reached the goals passably (with a grade of C) while 26% reached the goals passably (with a grade of C).
ASTR G100L	cSLO 2	Spring 2016	Incomplete SLO assessment - ORPIE
ASTR G100L	cSLO 3	Fall 2015	53% reached the goals completely in one class and (with a grade of A) while 33% reached the goals completely in another class (with a grade of A) 23% reached the goals competently in one class (with a grade of B) while 30% reached the goals competently in another class (with a grade of B). 13% reached the goals passably (with a grade of C) while 26% reached the goals passably (with a grade of C).
ASTR G100L	cSLO 3	Fall 2015	The students were given a graded tutorial on the Stellar Magnitude System. • As with the previous semester, the distribution was skewed to the right. Out of 32 students,6 performed worse when the same questions were asked again. • 6 students raised their percentage score. 63% of the students showed no improvement in satisfying the SLO by the end of the course. This isunacceptable. An important factor that negatively influenced

Course Name	cSLO	Semester Assessed	cSLO Data Evaluation
			the students' results was the lack ofmore discussion/supplementary problems to force the material.
ASTR G100L	cSLO 3	Spring 2016	Incomplete SLO assessment - ORPIE
ASTR G100L	cSLO 3	Spring 2017	97.8% of the enrolled students could successfully use the parallax, and parsec formulas to calculate distances of nearby astronomical bodies. In addition, the student comfortably manipulates Kepler's laws to solve for unknown quantities.This high success rate is also a consequence of the no-excuse absence, meaning if the student was not present in lab, he or she could not make-up the lab. As a result, 97.8% of students can perfectly use mathematical tools to solve problems in astronomy.
ASTR G100L	cSLO 3	Fall 2017	The average for the multiple choice final results was 72.5%. The final exam was 30% of the course grade. 14 out of 15 students (14/15 = 93.3%) received a passing grade of A, B, or C. One student who did not take the final exam received a failing grade of F (1/15 = 6.7%).The grade breakdown for the course was as follows 7/15=46.7% received A, 6/15+40% received B, 1/15=6.7% received C, and 1/15=6.7% received a letter grade of F.
ASTR G100L	cSLO 3	Spring 2018	The assessment lab consisted of a several visual simulations that allowed students to work with the Celestial Sphere and the paths of the stars, together with Bands in the Sky, through a Rotating Sky Explorer.
ASTR G100L	cSLO 4	Fall 2015	53% reached the goals completely in one class and (with a grade of A) while 33% reached the goals completely in another class (with a grade of A) 23% reached the goals competently in one class (with a grade of B) while 30% reached the goals competently in another class (with a grade of B). 13% reached the goals passably (with a grade of C) while 26% reached the goals passably (with a grade of C).
ASTR G100L	cSLO 4	Fall 2017	Nineteen students were given a laboratory assignment to evaluate and interpret data associated with the Motions of the Of the nineteen students tested in this Sun motion lab, all either earned a B or an A. These grades indicate each student passed the assignment with more than a satisfactory result.

DATA PLANNING

Table 5. cSLOs assessed and corresponding Data Planning.
*Denotes historical cSLOs.

Course Name	cSLO	Semester Assessed	cSLO Data Planning
ASTR G100	cSLO 1	Fall 2015	The historical aspects of astronomy have been an interesting part of the course and can be made even more interesting to students by including more historical events and figures in lectures. The historical aspects of astronomy can also widen to include more cultural diversity in the presentation. Students should be encouraged to write papers and research on this part of the course. The instruments used in modern astronomy can have more educational value by teaching their practical applications in the laboratory as well as in space missions. More concrete examples of the data collecting process and analysis can be included in lectures and in homework.
ASTR G100	cSLO 1	Fall 2015	Based upon these results, there was an improvement on baseline scores of a few percent from the previous semester for exams 1 and 2, implying that practice questions based on previous students' deficiencies are helpful for the present students Further "most missed" exam--like practice questions based on this last semester as well Spring 2015 term will be implemented the next time I teach this class.

Course Name	cSLO	Semester Assessed	cSLO Data Planning
ASTR G100	cSLO 1	Spring 2016	The historical aspects of astronomy have been an interesting part of the course and can be made even more interesting to students by including more historical events and figures in lectures. The historical aspects of astronomy can also widen to include more cultural diversity in the presentation. Students should be encouraged to write papers and research on this part of the course. Using this approach, the improvement over last year was 2%. The instruments used in modern astronomy can have more educational value by teaching their practical applications in the laboratory as well as in space missions. More concrete examples of the data collecting process and analysis can be included in lectures and in homework. Improvement over last year was 2%.
ASTR G100	cSLO 1	Spring 2016	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100	cSLO 1	Fall 2016	Students were interested in stories about discoveries in astronomy from ancient times to modern era. They could understand the importance of these discoveries as contribution to human advancement in science and culture. The instruments used in modern astronomy can have more educational value by teaching their practical applications in the laboratory as well as in space missions. More concrete examples of the data collecting process and analysis can be included in lectures and in homework. The change from last semester's percentage was about the same within a deviation of 5%
ASTR G100	cSLO 2	Fall 2015	The historical aspects of astronomy have been an interesting part of the course and can be made even more interesting to students by including more historical events and figures in lectures. The historical aspects of astronomy can also widen to include more cultural diversity in the presentation. Students should be encouraged to write papers and research on this part of the course. The instruments used in modern astronomy can have more educational value by teaching their practical applications in the laboratory as well as in space missions. More concrete examples of the data collecting process and analysis can be included in lectures and in homework.
ASTR G100	cSLO 2	Spring 2016	The historical aspects of astronomy have been an interesting part of the course and can be made even more interesting to students by including more historical events and figures in lectures. The historical aspects of astronomy can also widen to include more cultural diversity in the presentation. Students should be encouraged to write papers and research on this part of the course. Using this approach, the improvement over last year was 2%. The instruments used in modern astronomy can have more educational value by teaching their practical applications in the laboratory as well as in space missions. More concrete examples of the data collecting process and analysis can be included in lectures and in homework. Improvement over last year was 2%.
ASTR G100	cSLO 2	Spring 2016	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with

Course Name	cSLO	Semester Assessed	cSLO Data Planning
			conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100	cSLO 3	Fall 2016	Overall performance was satisfactory, however a better performance would be expected if model telescopes and other astronomical instruments are involved in lecture demonstrations, and outside observation. With the approval of new astronomy equipment, including telescopes, students' understanding of the tools of astronomy and how observations are made and data collected can drastically be improved. As soon as our equipment arrives, I intend to use them for my astronomy classes.
ASTR G100	cSLO 3	Spring 2017	Overall performance was satisfactory. A better performance may be expected when we involve model telescopes and other astronomical instruments in lecture demonstrations, and outside observation. With the arrival of new astronomy equipment, including telescopes, students' understanding of the tools of astronomy and how observations are made and data collected can drastically be improved. As soon as our equipment arrives, I intend to use them for my astronomy classes.
ASTR G100	cSLO 4	Spring 2017	I will use the same SLO and measure the outcome differently. The main difference in outcome should be the distribution of points. Many students have a difficulty to plan their studies accordingly. For example, giving one assignment due every week instead of two assignments due every two weeks. This should decrease the number of students that guess the solutions to all quizzes and tests.
ASTR G100	cSLO 4	Spring 2018	What planning and changes will or have occurred, as a result of assessment and analysis of data, to improve student learning? Spend more time on planetary, stellar and galactic properties by providing physical examples, such as showing metals and rocks and explaining where they ultimately originate from in regards to planetary, stellar and galactic processes. Overall, were student success rates were successful; all (but four student success rates) were 70% or better. I was not surprised by the success rates for they match experiences teaching Astronomy. The SLO questions reflected what I wished to understand concerning student learning.
ASTR G100	cSLO 5	Fall 2017	The student success rates for the different sections were comparable. I was not surprised by the student success rates for I keep a close eye on student progress. The student performance on a particular question was not significantly better or worse than expected. The assessment tool allowed an for accurate assess the SLO? The questions I asked actually told me what I wanted to know. The next SLO will focus on a different set of questions, which will help in an overall understanding of student learning objectives (01/08/2018)
ASTR G100L	cSLO 1	Fall 2015	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100L	cSLO 1	Fall 2016	1. More one-on-one help and tutoring can be help students with math deficiencies. 2. Use of modern astronomy equipment should be incorporated in ASTR G100L courses, to both introduce students to

Course Name	cSLO	Semester Assessed	cSLO Data Planning
			observational methods, and also to motivate them in their studies in astronomy. With arrival of new equipment, achieving some of this goal should be possible. 3. It may be a good idea to require MATH G10 or MATAH G30 as co-requisite or prerequisite for the laboratory course. 4. I will review some of the needed math in the beginning of each session.
ASTR G100L	cSLO 1	Fall 2016	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100L	cSLO 1	Spring 2017	1.With arrival of new equipment at the end of spring 2017, we should extensively incorporate them in ASTR G100L courses, starting fall 2017. This will introduce students to modern observational methods, and also should motivate them in their studies in astronomy. 2. It may be a good idea to require MATH G10 or MATAH G30 as co-requisite or prerequisite for the laboratory course.
ASTR G100L	cSLO 2	Fall 2015	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100L	cSLO 2	Spring 2016	Incomplete SLO assessment - ORPIE
ASTR G100L	cSLO 3	Fall 2015	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100L	cSLO 3	Fall 2015	Not every student taking the lab is concurrently taking the lecture. Thus, further reinforcement must take place in the lab setting. Based upon the above results, next semester's lab will include more extended discussion and supplementary problems than was done in the previous terms.
ASTR G100L	cSLO 3	Spring 2016	Incomplete SLO assessment - ORPIE
ASTR G100L	cSLO 3	Spring 2017	The students have successfully used various mathematical models to measure astronomical properties. Students have been introduced to the algebraic manipulation of measuring variables from the second lab session. This way the students where comfortable with the material by the final exam date.
ASTR G100L	cSLO 3	Fall 2017	The results were satisfactory for fall of 2017. Next semester I plan to include telescope observation skills and experience in the final exam.
ASTR G100L	cSLO 3	Spring 2018	Overall, student success rates were acceptable because all students earned grades of a 80% or greater for this laboratory SLO assignment. This constitutes an acceptable success rates. I will observe again to see if in the next lab session the rates are also acceptable; if not I will develop new strategies.
ASTR G100L	cSLO 4	Fall 2015	Students should be encouraged to complete all lab activities. Their work is checked each session and effort must be made to guide them to correct all

Course Name	cSLO	Semester Assessed	cSLO Data Planning
			their mistakes with explanations. Students should be encouraged and monitored to complete their formal lab reports and helped with conforming to the guidelines and format. Students should be encouraged to take the final exam with adequate preparation. More one-on-one help can be instrumental in helping students with math deficiencies.
ASTR G100L	cSLO 4	Fall 2017	Each student learned how to understand and visually interpret celestial motions of the Sun. Visualization techniques are key in scientific success. I plan finding was to improve on visualization but observing and interacting more closely this next semester with students--although I am happy with student results.