

## *Spring 2022 Core Curriculum Assessment Report*

<p><i>This report should be a collaborative effort involving the CCAC, the applicable subcommittee of the CCAC, the faculty teaching the applicable courses, and the UGSC.</i></p>	<p><b>Core Curriculum Requirement:</b> Natural Science, N</p>
	<p><b>Responsible Party:</b> Core Curriculum Assessment Committee (CCAC); N subcommittee of the CCAC: Kathryn Spink, Greg Pulliam, Bo Rodda, Kevin Cassel</p>
	<p><b>Delivered to:</b> Undergraduate Studies Committee (UGSC), UGAA, the Provost office.</p>

### 1. CORE CURRICULUM LEARNING GOALS/OUTCOMES EVALUATED IN THIS ASSESSMENT

**CYCLE:** List the core curriculum learning goals/outcomes that were evaluated in this assessment cycle.

Applicable Core Curriculum Learning Goals:

Think critically, viewing problems as opportunities for innovation, able to

- Appropriately employ multiple quantitative and qualitative methods of analysis and evaluation.

Communicate effectively, able to

- Speak and write in a manner that does not require significant work by the audience to fill in needed information or to ignore linguistic distractions

Natural Science Learning Outcomes:

1. Students will demonstrate an empirical and/or theoretical understanding of the natural world that is based upon observation and the scientific method
2. Students will be able to think critically about the natural world, to offer meaningful explanations of natural phenomena, and develop and test hypotheses about natural phenomena
3. Students will be able to communicate concepts of and contemporary issues in the natural sciences to the general population (i.e., not those educated in the natural sciences) in a way that is accessible to them.

**2. ASSESSMENT METHODOLOGY:** Use the table below to describe your assessment methodology. Do not simply reference the assessment plan for this program. *Copy the table for each learning goal assessed in the last academic year.*

<b>First Learning Goal</b>		
Learning Goal Assessed	All learning outcomes assessed with the same methodology	
Sample size	Random subset of students enrolled in courses designated as meeting N criteria with initial sample size of 87. This was determined by the population size of 918 students taking N classes this semester, and a confidence interval of 10%, 95% of the time.	
Semester(s) in which artifacts were collected	Spring 2022	
Name of rubric used to evaluate student artifacts	<p>Assessing student artifacts matching each learning outcome on a (0, 1, 2) point scale. Based on conversations and rubrics provided by the instructor and reviewed by the committee,</p> <ul style="list-style-type: none"> <li>• 0=does not meet expectations,</li> <li>• 1=meet expectations,</li> <li>• 2= exceeds expectations.</li> </ul> <p>The threshold for meeting expectations was the equivalent of 2.0/4. scale, (i.e. a C grade), as students are required to maintain a 2.0 overall GPA for graduation requirements. Exceeding expectations is the equivalent of 4.0/4.0 scale (i.e. an “A” grade).</p> <p>As each instructor will have different scaling in accordance with their own disciplinary expertise and expectations, the committee collaborated with course instructors in determinations of whether students met the learning objective expectations.</p>	
Artifact source	<p>Course(s) and Instructor(s):</p> <p>All N classes being offered this semester that students can take to satisfy their N requirement</p> <p>ARCH230 Ivonov            BIOL114 Krikorian            BIOL115 Bekyarova            BIOL117 Lin            CHEM124 Proszek-Gorninski            CHEM125 Zion            FDSN Roehl            MS201 Saghaian            PHYS123 Laurent-Muehleisen, Morrison, Gidalevitz, and Springer            PHYS221 Mishra and Khatiwada</p>	<p>Assignment(s):</p> <p>Assignments varied for each class. However, assignments were generally examinations given towards or at the end of the semester and for some classes laboratory reports were also assessed towards the end of the semester.</p>

	Other (specify):
Semester of Assessment/Evaluation	Spring 2022
Names & Titles of the evaluators	Kathryn Spink-Senior Lecturer, Greg Pulliam-Senior Lecturer, Bo Rodda-Professor of Practice, Kevin Cassel-Associate Dean

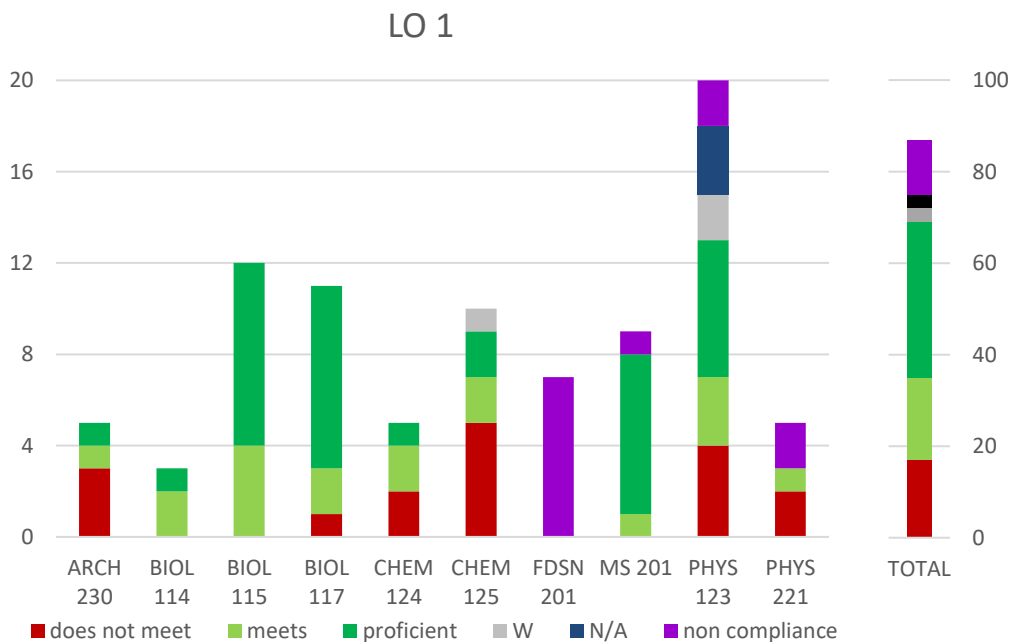
**3. ASSESSMENT RESULTS:** Insert a table or graph summarizing the results. Results should be presented by a performance indicator for each learning goal. If the data were collected in Blackboard Outcomes, the IIT Assessment Office will provide the information to insert into this section of the report (see samples below).

See data charts in the discussion section

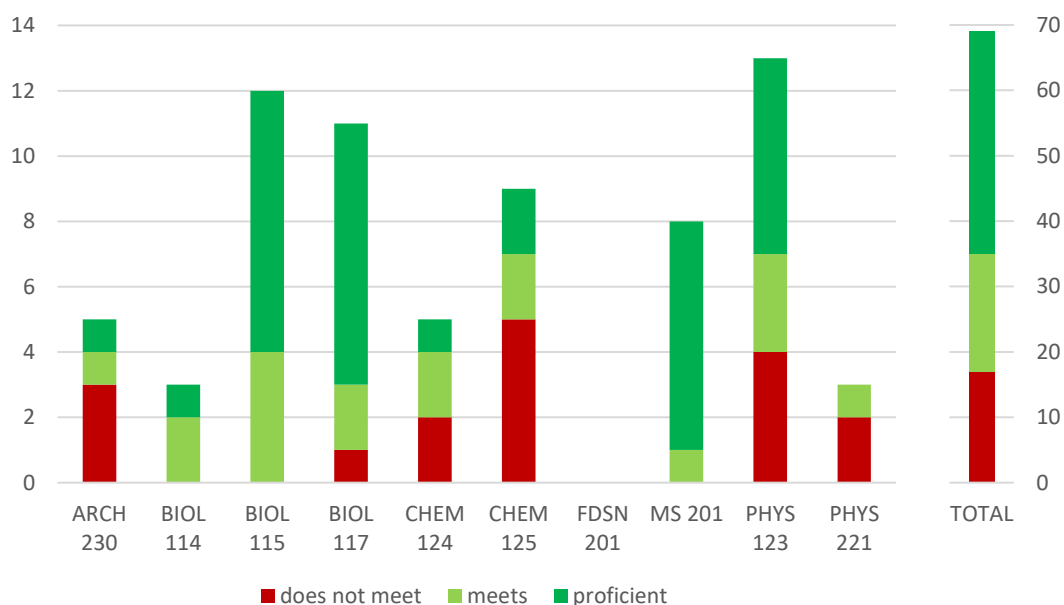
**4. DISCUSSION OF RESULTS:** Use this section to describe the key findings and program performance issues revealed in the interpretation of the data. *The evaluators should provide input into this section of the report.*

### LO1

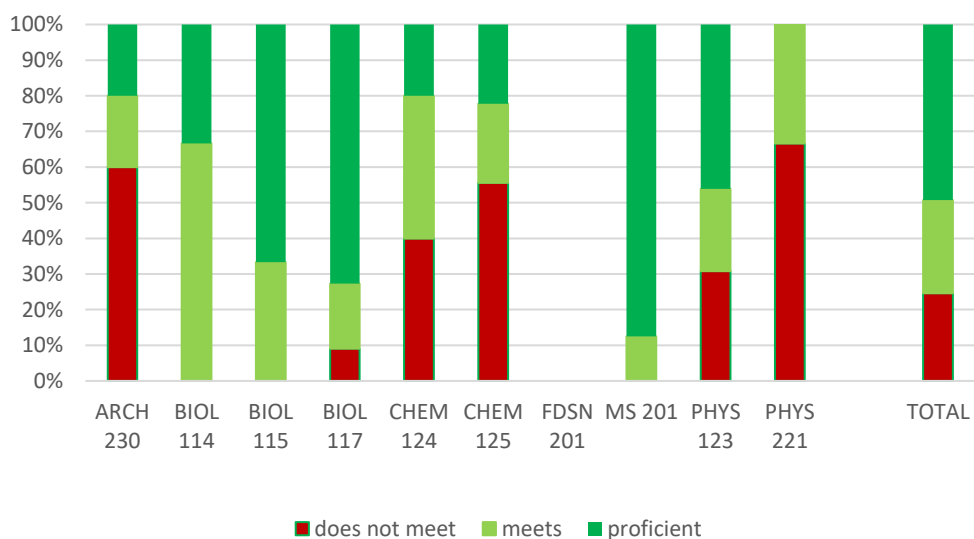
*Learning Objective 1: Students will demonstrate an empirical and/or theoretical understanding of the natural world that is based upon observation and the scientific method.*



### LO 1 of those assessed



### LO 1

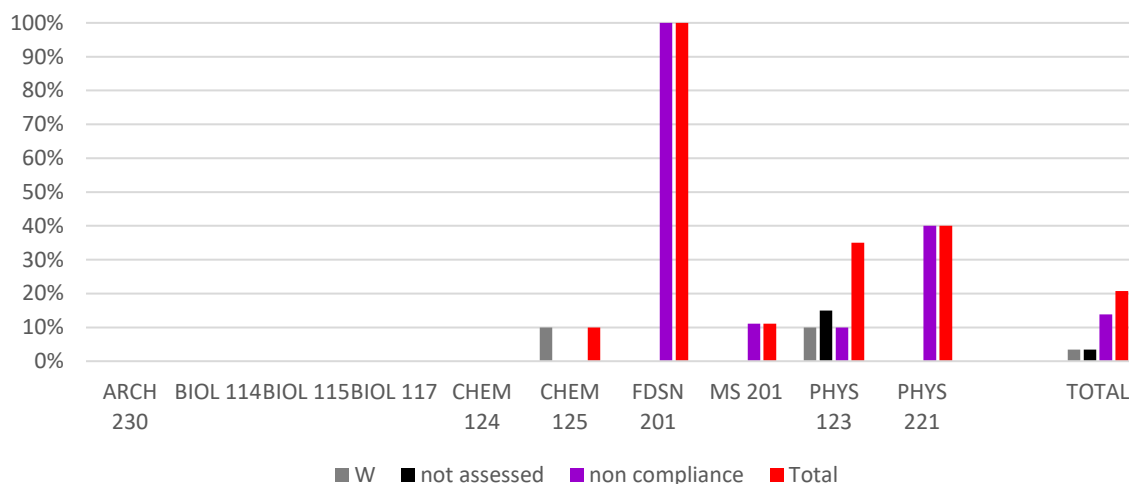


Student data by class is shown above, for the original sample of 87 students. Due to instructor non-participation, student withdrawal (W) and student failure to submit the assignment but not withdraw from the course, the actual sample size was 69. The average score of those students was 1.25 with 25% of students who were assessed not meeting the learning objective but 75% meeting or exceeding expectations of this learning objective. The fact that 75% of the students assessed met or exceeded expectations suggests that IIT students are in large part meeting this learning outcome.

We also noted significant heterogeneity in achievement of this LO between classes. This assessment was not designed to assess individual classes, and so there is no statistical significance for any class-specific results. Rather this assessment was carried out to examine the IIT student body as a whole, in achieving core N LOs. Students are not required to take any specific N classes to satisfy the core, however in many majors, especially STEM majors which are very common, certain preferences are observed, and even recommended by program advisors. The data we do have is suggestive of heterogeneity, which although not confirmed, cannot be ruled out. If desired future assessment could examine the issue of class heterogeneity.

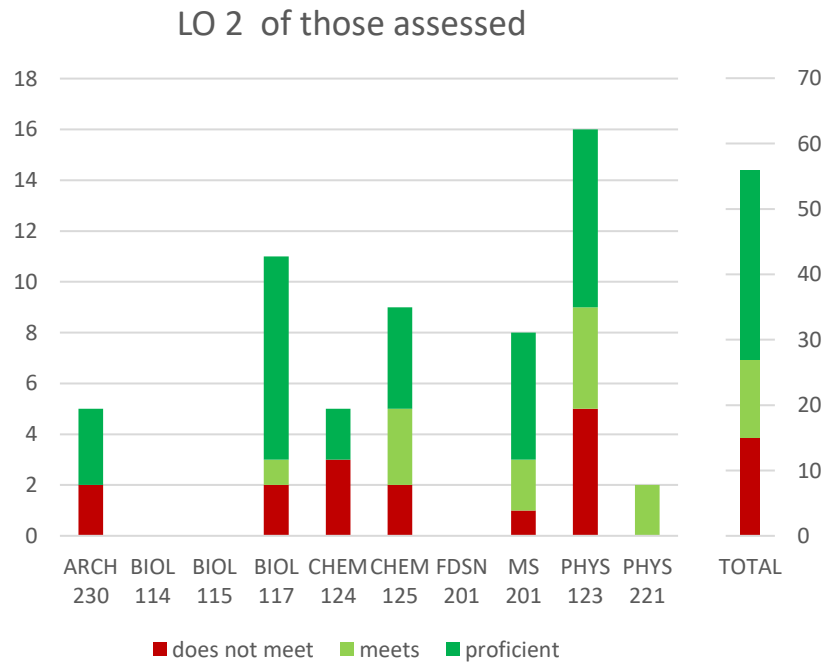
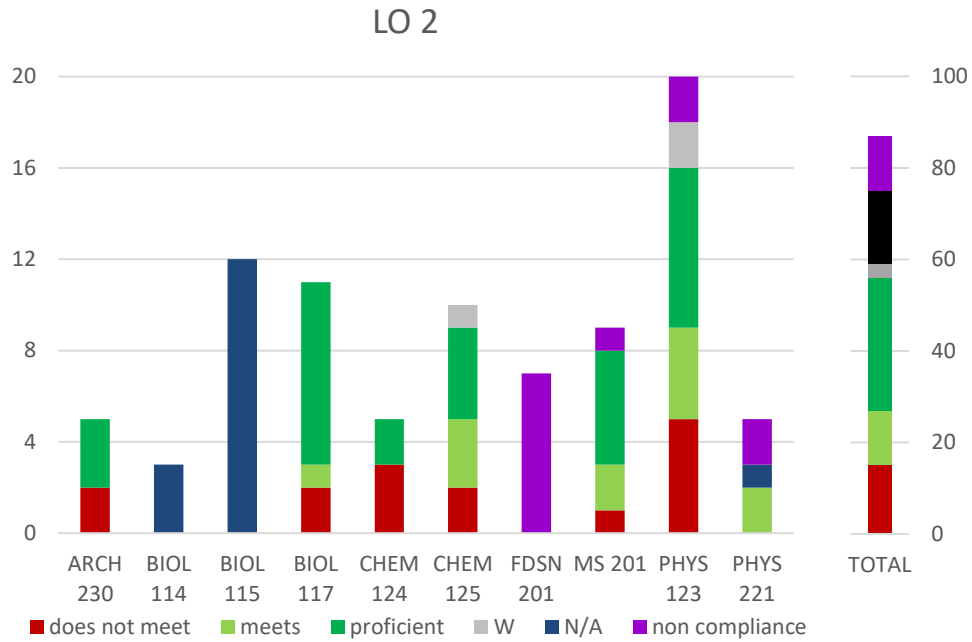
In addition, several classes and/or sections of certain classes did not participate, which makes it difficult to be confident that all students are meeting these LOs. In total, 20% of students were missed, with the largest issue being non-compliance. This committee will need to coordinate with UGSC, college deans, and faculty to ensure that this learning objective is assessed in all courses with the N designation and that all faculty participate in the process in order to acquire better data to support this conclusion.

### Missing data LO1

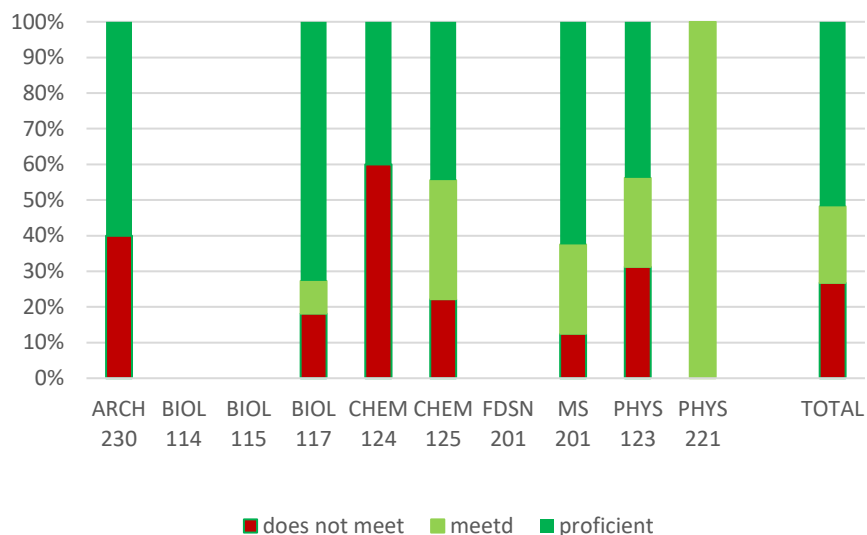


## LO2

*Learning Objective 2: Students will be able to think critically about the natural world, to offer meaningful explanations of natural phenomena, and develop and test hypotheses about natural phenomena*



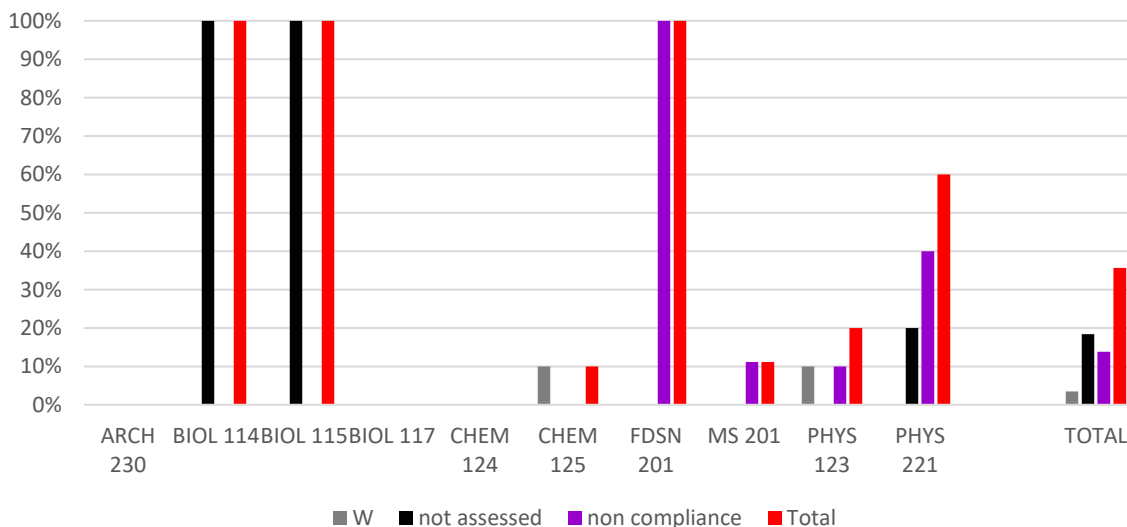
## LO 2



Data by class is represented in the charts above. Due to instructor non-participation, student withdrawal, student failure to submit the assignment but not withdraw from the course, and in some cases the objective not being assessed in the course, the actual sample size was 56. The average score of those students was 1.25 with 27% of students not meeting the learning objective but 73% meeting or exceeding expectations of this learning objective, where taught and assessed. This is very similar to LO#1 and suggest students are largely meeting this LO.

Once again, significant heterogeneity is seen between classes, but this assessment was not designed to assess classes, so no statistically valid conclusion can be drawn there. Rather the N pool of classes as a whole was assessed.

## Missing data LO2



In terms of data collection, in total 35% of students were not assessed for this LO. There were of course a few Ws, but once again, as with LO1, non-participation was a significant issue in some classes and sections. Therefore, it is necessary for the CCAC to work with UGSC, college deans, and faculty to participate in the assessment process in order to obtain a clearer picture on whether this learning objective is being met or not.

However for LO#2, an added problem was that in some classes, this LO was simply not delivered as part of the course. This data suggests an area in need of improvement, and it will be necessary for the CCAC to work with UGSC, college deans, and faculty to ensure that this learning objective is delivered and assessed in all courses with the N designation. Alternatively this LO could be removed as a N LO; however that is beyond the scope of this committee, and a matter for UGSC to examine and decide on

### **LO3**

*Learning Objective 3: Students will be able to communicate concepts of and contemporary issues in the natural sciences to the general population (i.e., not those educated in the natural sciences) in a way that is accessible to them.*

This learning objective was largely not assessed in the N classes in S22. We did interact with instructors to examine student artifacts that might potentially demonstrate this LO, but in the end came to the conclusion that either none were available, or that none exhibited evidence of achieving this objective. We thus are not presenting any data on its achievement, although artifacts were examined and archived to support this conclusion.

Many of the classes utilized for the N core learning objective are also what we would consider ‘majors’ courses. As such, communication, written and/or oral, is largely technical in nature. We believe this is a reflection that N instructors may not be familiar with the specific learning objective of communicating science to the general population. Therefore, it is necessary for the CCAC to work with UGSC, college deans, and faculty to ensure that this learning objective is assessed in all courses with the N designation.

Other options include revising the N and core LOs to remove or modify this LO. This is beyond the scope of this committee, and this matter is referred to UGSC for consideration. However we provide the following possible continuous improvement options as a recommendation:

1. Reaffirm that this is a desired LO, and to work with UGSC, college deans, and faculty to ensure that this learning objective is delivered and then assessed in all courses with the N designation.
2. Decide that this is not a desired part of the core curriculum, and remove it as an LO.
3. We might also consider that the N classes may not be the best place to assess this learning objective. These courses are largely taken by students in their first few years at IIT, and these students may not be mature enough to communicate science effectively to the general population at this stage in their academic career. However there is no core requirement beyond these introductory classes, and by definition core requirements are something that all IIT students should be exposed to and achieve. As such a revision of the core requirements might be required if is option is chosen.



**5. IMPROVEMENT PLANS:** Use this section to provide specific information about what elements of the curriculum may need to be modified in order to improve the program's performance. *This section should be completed and signed by the UGAA Chair.*

Specific modification	Entities responsible for implementing the changes.	Date by which changes will be in place.	Intended result
Examine LO#3, (communication of science to the general population) and decide if it is to be kept, modified, or discarded. If kept, effort must be made to work with AUs and instructors to ensure it is delivered.	UGSC, Department Chairs, Course Instructors	Next N Assessment Cycle	Concordance of material delivered in N classes with N LOs
Increase delivery and assessment of LO#2	UGSC, Department Chairs, Course Instructors	Next N Assessment Cycle	Improvement in the percentage of students both <ul style="list-style-type: none"> <li>● being delivered content relevant to the LO,</li> <li>● and meeting this LO.</li> </ul>

**6. ASSESSMENT PROCESS RECOMMENDATIONS:** Use this section to provide feedback on the assessment process itself.

- We are suggesting the following recommendations for improving the assessment process:
1. Communicate to instructors early about expectations and stay in contact throughout the semester to ensure participation, understanding of required artifacts, clear development of rubrics, and timely artifact collection
  2. Increase sample size by at least 20% so that enough artifacts are collected to ensure statistical value to data analysis
  3. Consider whether data should be collected at a class level, to achieve assessment of LO achievement in individual classes, rather than for the student body as a whole. This needs to be balanced by workload and sustainability of the assessment process, and also by the strategic aims of the faculty with regard to assessment.
  4. Communicate with department chairs, and when necessary, college deans, to ensure faculty participation in the process. This is particularly important for adjunct faculty who may not be familiar with the process.