




ASSESSMENT HANDBOOK FOR FACULTY AND STAFF

THE PURPOSE OF ACADEMIC ASSESSMENT AT DREXEL UNIVERSITY IS TO IMPROVE THE OVERALL EDUCATIONAL EXPERIENCE OF OUR STUDENTS. THIS IS ACHIEVED THROUGH ASSESSMENT ACTIVITIES BASED ON INSTITUTIONAL VALUES THAT AIM TO PRODUCE RELEVANT AND FUNCTIONAL DATA FOR ALIGNING CURRICULAR DESIGN, COURSE CONTENT, AND PEDAGOGICAL APPROACHES WITH DREXEL'S MISSION AND VALUES. IN ALL ASSESSMENT, THE FACULTY AND STAFF OF THE UNIVERSITY ENDEAVOR TO TAKE FULL CONSIDERATION OF THE DIFFERENT EDUCATIONAL AND CULTURAL BACKGROUNDS OF OUR INCREASINGLY DIVERSE STUDENT POPULATION. THE PRIMARY OBJECTIVE OF OUR ASSESSMENT PROGRAM IS TO ESTABLISH A PRACTICE OF ACTION RESEARCH THAT INFORMS PLANNING AND RESULTS IN TANGIBLE IMPROVEMENTS FOR OUR STUDENTS.



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BACKGROUND

The purpose of academic assessment at Drexel University is to improve the overall educational experience of our students. This is achieved through assessment activities based on institutional values that aim to produce relevant and functional data for aligning curricular design, course content, and pedagogical approaches with Drexel’s mission and values. In all assessment activities the faculty and staff of the University endeavor to take full consideration of the different educational and cultural backgrounds of our increasingly diverse student population. The primary objective of our assessment program is to establish a practice of action research that informs planning and results in tangible improvements for our students.

STATEMENT OF COMPLIANCE

As a Middle States accredited institution, Drexel University is committed to diligence in its efforts to capture assessment data and to create new opportunities to assess curricular processes and products concurrent with a strong emphasis on academic trends and issues. It is expected that the final product will be verifiable evidence of student achievement in knowledge attainment, skills, and critical thinking. Results of assessment will be used to inform instruction, improve the quality of programs, provide validation to internal and external constituencies, and aid in the achievement of the University’s mission and its core and experiential learning goals, defined at Drexel as The Drexel Student Learning Priorities (DSLPs).

UNIVERSITY VISION STATEMENT

Drexel will be the Philadelphia region’s leading university excelling in high-quality experiential education, online learning, translational research, technology transfer and business incubation, and urban revitalization. Drexel will use and leverage all of its assets—outstanding faculty; highly motivated students; 130,000 alumni; a pragmatic and entrepreneurial culture; co-operative education; Drexel eLearning; and our superior location at a major transportation hub—to create an accessible, relevant, and market-leading educational and research platform that benefits our diverse community of students, advances our scholarly work, and champions economic development in our region. Drexel will join the ranks of the most impactful and competitive universities in the United States at a time when the nation is clamoring for educational value, jobs, and new ideas for bolstering our economy.

UNIVERSITY MISSION

Drexel University fulfills our founder’s vision of preparing each new generation of students for productive professional and civic lives while also focusing our collective expertise on solving society’s greatest problems. Drexel is an academically comprehensive and globally engaged urban research university, dedicated to advancing knowledge and society and to providing every student with a valuable, rigorous, experiential, technology-infused education, enriched by the nation’s premier co-operative education program.

GOALS

- Create a sustainable university climate for assessing student learning outcomes
- Support and encourage flexible approaches to assessment that are useful, cost-effective, accurate, truthful, planned, organized, and sustained
- Provide training on the process to faculty
- Use assessment results to improve teaching and learning

OBJECTIVES

Each College, School and Division of Drexel University will:

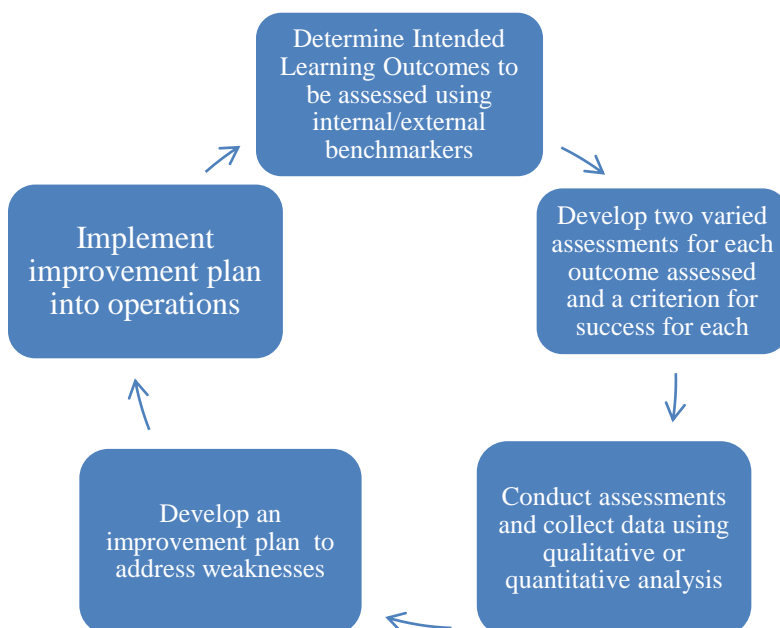
- Provide the human, financial and physical resources needed to implement and sustain the outcomes assessment process
- Embed assessment of student learning outcomes into the curriculum or program development processes
- Provide ongoing professional development opportunities for faculty and staff in the area of student outcomes assessment

DEFINITION OF STUDENT OUTCOMES ASSESSMENT

The Office of Institutional Research, Assessment, and Effectiveness defines student outcomes assessment as an on-going process aimed at understanding and improving student learning. By making our expectations for learning explicit, clearly articulating course and program outcomes, and providing purposeful opportunities for students to achieve, we create opportunities to gather, analyze and interpret assessments of student learning. The results of those assessments are used to make informed decisions about the improvement of learning, teaching, planning and resource allocation.

ASSESSMENT CYCLE LOOP

The figure below depicts the steps in developing and implementing an assessment plan. The process is intentionally circular in order to illustrate the ideal of continual improvement.





RELEVANT CHARACTERISTICS OF EXCELLENCE TO OUTCOMES AND ASSESSMENT

STANDARD 7: INSTITUTIONAL ASSESSMENT

The institution has developed and implemented an assessment process that evaluates its overall effectiveness in achieving its mission and goals and its compliance with accreditation standards.

STANDARD 14: ASSESSMENT OF STUDENT LEARNING

Assessment of student learning demonstrates that, at graduation, or other appropriate points, the institution's students have knowledge, skills, and competencies consistent with institutional and appropriate higher education goals

BACKGROUND

In *A Test of Leadership: Charting the Future of U.S. Higher Education. A Report of the Commission Appointed by Secretary of Education Margaret Spellings (2006)*, four key areas of higher education were examined: access, affordability, quality, and accountability. Six strong recommendations for reform were directed at colleges and universities, accrediting agencies, governing boards, policy makers, elementary and secondary schools, the business community, parents and students (USDOE, 2006). The most significant reform called for was accountability, or the measurement of institutional effectiveness. The commission found that this was a critical issue for higher education and stated "there is inadequate transparency and accountability for measuring institutional performance, which is more and more necessary to maintaining public trust in higher education" (USDOE, 2006, p. 14).

In this atmosphere of increased attention to student learning outcomes, accreditation agencies have been very active in responding to the call for accountability and the Middle States Commission on Higher Education is no exception. Each agency is committed to ensuring that every institution of higher learning is developing and applying evidence of student learning outcomes as part of the ongoing evaluation and improvement of the specific college or university. The types of documented evidence of student learning outcomes sought included comprehensive or capstone examinations, external or licensure examinations, performances or demonstrations, student portfolios, or samples of student work.

DREXEL STUDENT LEARNING PRIORITIES

Students graduating from Drexel University achieve competency in a field of study evidenced by achievement of a set of program-specific learning outcomes. In addition to demonstrating competency in their fields of study, students graduating from Drexel University also will demonstrate meaningful progress in six core intellectual and practical skill areas (Communication, Creative and Critical Thinking, Ethics, Information Literacy, Self-Directed Learning and Technology Use) and five experiential and applied learning areas (Global

Competence, Leadership, Professional Practice, Research, Scholarship and Creative Expression and finally Responsible Citizenship), achieving levels of competency in each core area appropriate to their field of study, their individual interests and their abilities. Learning in these core areas supports, and is integrated with, learning in the disciplines and provides the foundation for a broad education across disciplines.

Once the program level outcomes have been set and the individual course outcomes determined, the next step in the process will be to link or align the outcomes both at the program level and at the course level to the DSLPs (for your convenience they are presented on the pages 7 and 8). Of course, in some cases, an expected outcome will map very neatly onto a learning priority; in other cases, the connection may be more tenuous or there may be no connection at all with some of the priorities.

To illustrate, a program or course goal for a student may be to, “Demonstrate their ability to present information clearly, logically, and critically, both orally and in writing.” On the face of the statement of expected learning there would appear to be an alignment with Drexel University’s DSLP Core Intellectual Goal 1 – Communication, and Goal 4 – Information Literacy. The linkage, however, must be to specific experiences, projects, assignments, contained within the course/program experience that would underscore the legitimacy of that linkage.

Similarly, many program/course outcomes currently existing would align with Drexel University’s Experiential and Applied Learning Goals 1 - Global Competence, and 5 - Responsible Citizenship. Why? As we are increasingly connected and integrated on a global scale, students must be able to understand the nature of difference and the power that surrounds their own lives and in their encounters with other people. In that context, they can be viewed as citizens on a local, national or global scale. Therefore, it is essential that our students effectively communicate and work with others across cultural and geopolitical boundaries. The same question however must then be asked regarding the experiential goals as before; namely, “To what specific experiences, projects, assignments, etc. contained within the program/course experience can that alignment be made?”

Going forward the DSLP’s will be numbered (see following pages) so as to make the task of mapping and reference easier and more effective when completing various reporting documents. This is a model typically used by colleges and universities when reviewing the institutional strategic plans. For example, Mapping Strategy 1.1, or Strategic Initiative 2.2, etc. makes for an easy and quick reference point for faculty and staff and other constituent groups to use, not in a hierarchical sense, but rather as a source of convenience and clarity.

CORE INTELLECTUAL AND PRACTICAL SKILLS

Upon graduation, students will demonstrate an improved ability to...

DSLP 1 - COMMUNICATION

Employ an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media

DSLP 2 - CREATIVE AND CRITICAL THINKING

Use divergent (e.g., generation of novel ideas, thinking out of the box, brainstorming) and convergent thinking (e.g., critical thinking, evaluation of ideas, quantitative/qualitative analysis, scientific reasoning) to generate novel and relevant ideas, strategies, approaches, or products

DSLP 3 - ETHICAL REASONING

Assess their own ethical values and the social context of ethical problems, recognize ethical issues in a variety of settings, think about how different ethical perspectives might be applied to an ethical problem, and consider the consequences of alternative actions

DSLP 4 - INFORMATION LITERACY

Possess the skills and knowledge to access, evaluate and use information effectively, competently, and creatively

DSLP 5 - SELF---DIRECTED LEARNING

Establish goals and monitor progress toward them by developing an awareness of the personal, environmental and task-specific factors that affect attainment of the goals

DSLP 6 - TECHNOLOGY USE

Make appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning

EXPERIENTIAL AND APPLIED LEARNING

Upon graduation, students will demonstrate an improved ability to...

DSLP 7 - GLOBAL COMPETENCE

Engage in, reflect upon, and demonstrate open mindedness toward all issues of diversity at the local, national and international level

DSLP 8 - LEADERSHIP

Develop a vision, translate that vision into shared goals, and effectively work with others to achieve these goals

DSLP 9 - PROFESSIONAL PRACTICE

Apply knowledge and skills gained from a program of study to the achievement of goals in a work, clinical, or other professional setting

DSLP 10 - RESEARCH, SCHOLARSHIP, AND CREATIVE EXPRESSION

Make meaningful contributions in their chosen field, participating in use-inspired research, scholarship or creative activity as an individual or in a collaborative effort

DSLP 11 – RESPONSIBLE CITIZENSHIP

Create and sustain a healthy, engaged, public life



Developing Program Learning Outcomes

The first step in an assessment cycle is to identify the program-specific learning outcomes that each student in the program should achieve by the time they complete the degree requirements of that program. A well-formulated set of Program Learning Outcomes (PLOs) will describe what the faculty hopes to successfully accomplish in offering their particular degree to prospective students or what specific skills, competencies, and knowledge the faculty believes graduates of the program will have attained by degree completion. The learning outcomes must be concise descriptions of the impact the program will have on its students.

Ask yourself the following questions when developing learning outcomes:

What do we want students in our program to know?

What do we want students to be able to do?

When do we want them to be able to do it?

Are the outcomes observable and measurable and can they be performed by students?

The Program Learning Outcomes need to link to the University's [core and experiential goals](#).

INSTITUTIONAL GOALS OR DREXEL UNIVERSITY STUDENT LEARNING PRIORITIES

Learning Outcome is very broad in scope.
(Student achieves outcome as he/she completes degree)



PROGRAM LEARNING OUTCOME

Learning Outcome is broad in scope
(Student achieves outcome as he/she completes program)



COURSE LEARNING OUTCOMES

Learning Outcome is narrow in scope
(Student achieves outcome as he/she completes course)



When creating **Program Learning Outcomes** please remember that the outcomes should clearly state what students will do *or* produce to determine and/or demonstrate their learning. Use the following learning outcomes formula:

Graduates of this program will be able to + behavior + Resulting Evidence

Listed on the next page are a few examples from the College of Wooster of potential learning outcomes in Physics on the program level:

Upon completion of the undergraduate degree program in physics at Drexel University, students will be able to:

1. Demonstrate a proficiency in the fundamental concepts in each of the major areas of physics.
2. Demonstrate their ability to read, understand, and critically analyze the physical ideas presented in published textbooks and journal articles.
3. Demonstrate their ability to present information clearly, logically, and critically, both orally and in writing.
4. Demonstrate both an understanding and the practical application of the ethical standards implicit in science, such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data and conclusions.
5. Students will be fully prepared for graduate study in physics and/or careers in scientifically oriented jobs in the public or private sector.

Listed below are examples of potential learning outcomes in Physics on the course level:

Upon the completion of Physics 101 students will be able to:

1. State Newton's laws of motion and the law of universal gravitation
2. Use vectors to describe physical observations.
3. Define the scientific meaning of work, energy and power

DREXEL'S UNDERGRADUATE PROGRAM OUTCOMES ARE LISTED HERE:

<http://drexel.edu/provost/assessment/outcomes/undergrad-program/>

DREXEL'S GRADUATE PROGRAM OUTCOMES ARE LISTED HERE:

<http://drexel.edu/provost/assessment/outcomes/grad-program/>

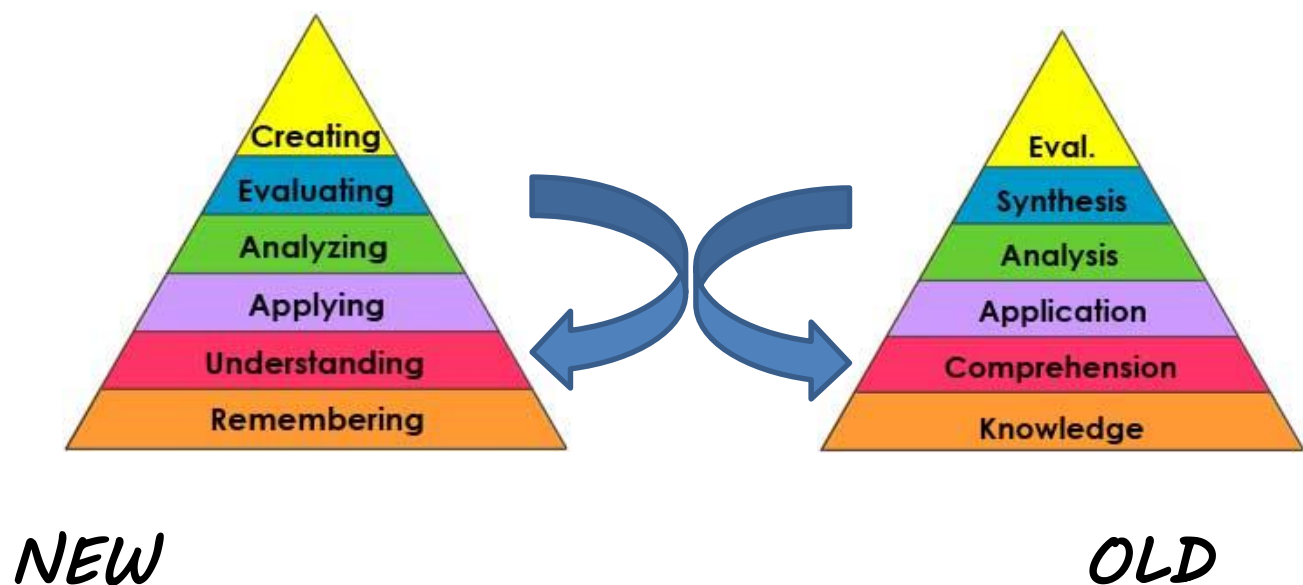
Correct word usage plays an important role in the development of learning outcomes. As stated above, all learning outcomes must be **specific and measurable**. Learning outcomes that state, “should understand...”, “will be able to appreciate...”, and “will know how to...” are not directly measurable and lead to different interpretations of what the student’s behavior will be. We need to know specific outcomes that will demonstrate how students will “understand”, “appreciate” or “know”. Specific verbs such as “explain”, “appraise”, or “apply” are better, more measurable choices. The final part of the outcome is the resulting evidence, which refers to the work that students produce—such as papers, exams, presentations, performances, portfolios, and lab results—to demonstrate their learning.

Examples of solid and effective action words taken from Bloom’s earlier taxonomy that you will want to include in expected learning outcome statements are:

- | | | |
|---------------|-----------------|-------------|
| ✚ Appraise | ✚ Illustrate | ✚ Integrate |
| ✚ Demonstrate | ✚ Classify | ✚ Construct |
| ✚ Evaluate | ✚ Assess | ✚ Perform |
| ✚ Design | ✚ Diagnose | ✚ Rate |
| ✚ Formulate | ✚ Distinguish | ✚ Predict |
| ✚ Calculate | ✚ Differentiate | ✚ Determine |

At Drexel, we need to know specific outcomes that will demonstrate how students will “understand”, “appreciate” or “know”. Consider referring to the following chart, which illustrates the revised Bloom’s Taxonomy of Educational Objectives. In 1956, Benjamin Bloom headed a group of educational psychologists who developed a classification of levels of intellectual behavior important in learning. During the late 1990’s a new group of cognitive psychologists, led by Lorin Anderson (a former student of Bloom’s), updated the taxonomy to reflect relevance to 21st century work. The two graphics show the revised and original Taxonomies. Note the change from nouns to verbs associated with each level.

Bloom’s Taxonomy of Educational Objectives



Remembering: can the student recall or remember the information?	define, duplicate, list, memorize, recall, repeat, reproduce state
Understanding: can the student explain ideas or concepts?	classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase
Applying: can the student use the information in a new way?	choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write.
Analyzing: can the student distinguish between the different parts?	appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.
Evaluating: can the student justify a stand or decision?	appraise, argue, defend, judge, select, support, value, evaluate
Creating: can the student create a new product or point of view?	assemble, construct, create, design, develop, formulate, and write.

Definitions of the different levels of thinking skills in Bloom's taxonomy

1. **Remembering** – recalling relevant terminology, specific facts, or different procedures related to information and/or course topics. At this level, a student can remember something, but may not really understand it.
2. **Understanding** – the ability to grasp the meaning of information (facts, definitions, concepts, etc.) that has been presented.
3. **Applying** – being able to use previously learned information in different situations or in problem solving.
4. **Analyzing** – the ability to break information down into its component parts. Analysis also refers to the process of examining information in order to make conclusions regarding cause and effect, interpreting motives, making inferences, or finding evidence to support statements/arguments.
5. **Evaluating** – being able to judge the value of information and/or sources of information based on personal values or opinions.
6. **Creating** – the ability to creatively or uniquely apply prior knowledge and/or skills to produce new and original thoughts, ideas, processes, etc. At this level, students are involved in creating their own thoughts and ideas. ¹

¹ (Adapted from information from Ball State University accessed at <http://web.bsu.edu/IRAA/AA/WB/chapter2.htm>)¹

REMEMBER	UNDERSTAND	APPLY	ANALYZE	EVALUATE	CREATE
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Count	Associate	Add	Analyze	Appraise	Categorize
Define	Compute	Apply	Arrange	Assess	Combine
Describe	Convert	Calculate	Breakdown	Compare	Compile
Draw	Defend	Change	Combine	Conclude	Compose
Identify	Discuss	Classify	Design	Contrast	Create
Label	Distinguish	Complete	Detect	Criticize	Drive
List	Estimate	Compute	Develop	Critique	Design
Match	Explain	Demonstrate	Diagram	Determine	Devise
Name	Extend	Discover	Differentiate	Grade	Explain
Outline	Extrapolate	Divide	Discriminate	Interpret	Generate
Point	Generalize	Examine	Illustrate	Judge	Group
Quote	Give examples	Graph	Infer	Justify	Integrate
Read	Infer	Interpolate	Outline	Measure	Modify
Recall	Paraphrase	Manipulate	Point out	Rank	Order
Recite	Predict	Modify	Relate	Rate	Organize
Recognize	Rewrite	Operate	Select	Support	Plan
Record	Summarize	Prepare	Separate	Test	Prescribe
Repeat		Produce	Subdivide		Propose
Reproduce		Show	Utilize		Rearrange
Select		Solve			Reconstruct
State		Subtract			Related
Write		Translate			Reorganize
		Use			Revise
					Rewrite
					Summarize
					Transform
					Specify

There are some verbs that describe actions that are either vague, unobservable, or unmeasurable (*e.g. know, appreciate, understand*). As such, it is best to avoid using these words when you are creating a learning outcome statement. For example, examine the following learning outcomes:

- *The students will understand basic human development theory.*
- *The students will appreciate music from other cultures.*

Both of these learning outcomes are stated in a manner that will make them difficult to assess. Consider the following:

How do you observe someone “understanding” a theory or “appreciating” other cultures?

How easy will it be to measure “understanding” or “appreciation”?

These expected learning outcomes are more effectively stated in the following way:

- *The students will be able to identify and describe the major theories of human development.*

- *The students will be able to critique music from other cultures within the context of the world's musical and cultural landscapes.*

PROGRAM LEVEL ASSESSMENT

It is recommended that every program assess their Program Learning Outcomes on a continuous cycle, focusing on different courses within a program each year. For each outcome assessed, you will need to develop an assessment tool (i.e. test questions, project, essay, etc.). The first step in the process is to create an assessment plan using a PROGRAM-LEVEL OUTCOMES ASSESSMENT PROFILE or *PLO Form*. The following is a draft version of such a form:

<p>DREXEL UNIVERSITY PROGRAM LEVEL OUTCOMES ASSESSMENT PROFILE</p> <p>Academic Program/Major _____ Assessment Period _____</p> <p>Drexel University DSLP supported:</p> <p><i>Step 1: To employ.....</i></p> <p>Program Outcome:</p> <p><i>Step 2: Graduates of this major will be able to.....</i></p> <p>Assessment Conducted:</p> <p><i>Step 3: Means of Assessment & Criteria for Success</i></p> <ul style="list-style-type: none"> • <i>Means of Assessment [if a test, state the name]</i> • <i>How will the assessment be scored?</i> • <i>To whom?</i> • <i>By whom?</i> • <i>When?</i> • <i>Criteria for Success?</i> <p>Data</p> <p><i>Step 4: Summary of Assessment Data Collected</i></p> <ol style="list-style-type: none"> 1. <i>Data Results</i> 2. _____ out of _____ students or _____ % of participating students <p>Use of Results to Inform Instruction</p> <p><i>Step 5: Criteria for Success: Met? Not Met?</i></p> <ol style="list-style-type: none"> 1. <i>Changes in Academic Program</i> 2. <i>Improvement Plan</i>

STEP 1: DREXEL UNIVERSITY DSLP SUPPORTED

Please see pages 7 and 8 of this document for a list of the DSLPs

STEP 2: MAJOR/PROGRAM OUTCOME

Graduates of this program will be able to:

Graduates of this program will be able to.... + Behavior + Resulting evidence

“Resulting evidence” refers to the work that students produce—such as papers, exams, presentations, performances, portfolios, works of art, musical compositions, lab results—to demonstrate their learning. An important distinction should be considered when writing learning outcomes regarding whether the evidence of student achievement will be absolute or value added. For instance, a learning outcome could be written in this way: “Students will apply the scientific method” (absolute); or in this way: “Students will improve their application of the scientific method” (value added). Value added outcomes may be useful in specialized programs that are not driven by disciplinary requirements, but degree-granting programs will typically make use of absolute outcomes. The distinction is important to keep in mind when writing outcomes in order to use language that clearly states the expectations of the program.

Sample outcomes (see also Appendix A):

1. Students graduating with a chemistry degree will be able to comprehend and summarize scholarly scientific journal articles.
2. Students graduating with a chemistry degree will be able to practice chemical safety and evaluate the environmental impact of chemicals.
3. Students graduating with a degree in sociology will be able to demonstrate a working knowledge of the core concepts of sociology (social structure; culture; social stratification and inequality; race, ethnicity, and gender; and globalization).
4. Students graduating with a degree in biology will be able to demonstrate a working knowledge of newer and/or specialty areas of biology (e.g., bioinformatics, genomics, proteomics, etc.) and/or deeper knowledge of the traditional core areas of biology of particular interest to them.
5. Students graduating with a degree in history will be able to understand the historical context of ideas and events and evaluate differing scholarly interpretations of the past

NOTE: If the program’s outcome was not met in the previous cycle, you will need to reassess that precise outcome in the current cycle.

STEP 3: THE PLAN – MEANS OF ASSESSMENT & CRITERIA FOR SUCCESS

A. Means of assessment

- Multiple-choice questions embedded in:
 - mid-term or final exam test
 - short answer test
- National Standardized Exam
- Licensure examination
- Essay questions (grading rubric required)
- Computer Projects (grading rubric required)
- Laboratory Projects (grading rubric required)
- Portfolio/Project (grading rubric required)
 - topic and/or theme of project/presentation
- Presentation (grading rubric required)
 - topic of presentation
- Performance rating (grading rubric required)

B. To whom:

- All instructors from Sociology 101
- Department or Program Head
- Adjunct faculty
- Random sample of sections of English 101
- All sections of Philosophy 105

C. By whom:

- All instructors from Sociology 101
- Department or Program Head
- Adjunct faculty
- Random sample of sections of English 101
- All sections of Philosophy 105

D. When:

- Specific date
- Near the middle of the term
- During the second half of the term
- Near the end of the term
- At the end of the term

E. Criteria for Success:

- A minimum of (70%) of the students will correctly answer (80%) of the questions
- A minimum of (80%) of the students will correctly answer (85%) of the questions
- A minimum of (85%) of the students will correctly answer at least (7) of (10) multiple-choice questions embedded on the final exam.

- A minimum of (85%) of the students will score of at least (40) out of (50) points according to the grading rubric and/or score at least (7) out of (10) points in each of the four categories on the rubric.

STEP 4: SUMMARY OF ASSESSMENT DATA COLLECTED

Data Results: _____ of _____ students
 [How many students achieved expected result?] [How many students actually participated in the assessment?]
 or ____% of participating students scored or were able to: [Go back and look at Step 3.-F. Criteria for Success]

STEP 5: USE OF RESULTS TO ENHANCE/IMPROVE INSTRUCTIONAL PROGRAM

Changes to Academic Program:

- Criterion for success was met. No action is required at this time.
- Criterion for success was not met. (Discuss with the Dean/Associate Dean changes that need to be made). Create an “Improvement Plan” that includes tangible benchmarks for progress.

ADJUSTING PROGRAM LEVEL OUTCOMES

Learning outcomes should be continually reviewed and revised. The Office of Institutional Research, Assessment and Effectiveness (IRAE) collects and publishes all undergraduate program level outcomes each year. Programs are able to revise their PLOs in the first 30 days of each Fall Quarter. IRAE will always be available to offer guidance in developing the learning outcomes prior to submission to the Faculty Senate. The current undergraduate PLOs are listed here: <http://drexel.edu/provost/assessment/outcomes/undergrad-program/>



Developing Course Learning Outcomes

COURSE LEVEL LEARNING OUTCOMES

After the Program Outcomes have been established, the next step and in many ways, the first step in the actual assessment cycle is to identify the learning outcomes that should occur for each course. A well-formulated set of Course Learning Outcomes (CLOs) will describe what a faculty member hopes to successfully accomplish in offering their particular course(s) to students, or what specific skills, competencies, and knowledge the faculty member believes students will have attained once the course has been successfully completed. The learning outcomes need to be concise descriptions of what learning is expected to take place by the point when the course is completed.

When crafting course outcomes, consider the following guidelines as you develop them either individually or as part of a multi-section group:

- ✚ Limit the course-level expected learning outcomes to 4 – 10 statements for the entire course. More detailed outcomes can be developed for individual units, assignments, chapters, etc. if so desired by the instructor(s).
- ✚ Focus on overarching knowledge and/or skills rather than small or trivial details.
- ✚ Focus on knowledge and skills that are central to the course topic and/or discipline.
- ✚ Create statements that have a student focus rather than an instructor-centric approach (e.g. “upon completion of this course students will be able to list the names of the 50 states” versus “one objective of this course is to teach the names of the 50 states”).
- ✚ Focus on the learning that *results* from the course rather than describing activities or lessons that are in the course.
- ✚ Incorporate and/or reflect aspects of Drexel’s and the Program’s missions and outcomes.
- ✚ Include various ways for students to show success (outlining, describing, modeling, depicting, etc.) rather than using a single statement such as “at the end of the course, students will know _____” as the stem for each expected outcome statement.
- ✚ When developing learning outcomes, here are the core questions to ask yourself:
 - *What do we want students in the course to learn?*
 - *What do we want the students to be able to do?*
 - *Are the outcomes observable, measurable and are they able to be performed by the students?*

DEFINITION

A **Course Level Outcome (CLO)** is a formal statement of what students are expected to learn in a course. Course learning outcome statements refer to specific knowledge, practical skills, areas of professional development, attitudes, higher-order thinking skills, etc. that faculty members expect students to develop, learn, or master during a course (Suskie, 2004)². Course learning outcomes are often referred to as “learning outcomes”, “student learning outcomes”, or “learning outcome statements”.

Learning outcome statements at the course level describe:

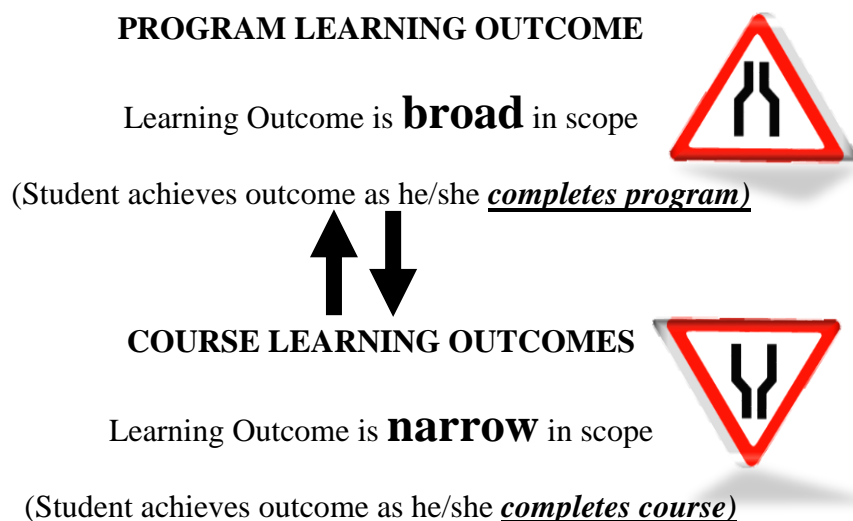
1. What faculty members want students to *know* at the end of the course *AND*
2. What faculty members want students *to be able to do* at the end of the course

Learning outcomes have three major characteristics

1. They specify an action by the students/learners that is *observable*
2. They specify an action by the students/learners that is *measurable*
3. They specify an action that is done by the *students/learners* rather than the faculty members

Effectively developed expected learning outcome statements possess all three of the above characteristics. When this is done, the expected learning outcomes for a course are designed so that they can be assessed (Suskie, 2004)³.

The Course Learning Outcomes need to link to the Program Learning Outcomes.



² Assessing Student Learning: A Common Sense Guide, Linda Suskie, Anker Publishing, 2004

³ Assessing Student Learning: A Common Sense Guide, Linda Suskie, Anker Publishing, 2004

When creating Course Learning Outcomes, remember that the outcomes should clearly state what students will do or produce to determine and/or demonstrate their learning. Use the following learning outcomes formula:

STUDENTS WILL BE ABLE TO + BEHAVIOR + RESULTING EVIDENCE

For example, you can use the following template to help you write an appropriate course level learning outcome:

“Upon completion of this course, students will be able to *(knowledge, concept, rule or skill you expect them to acquire)* by *(how will they apply the knowledge or skill/how will you assess the learning).*”

Examples of Effective Course Learning Objectives:

At the end of this course students will be able to:

- Critically review the methodology of a research study published in a scholarly sociology journal.
- Design a Web site using HTML and JavaScript.
- Describe and present the contributions of women to American history.
- Recognize the works of major Renaissance artists.
- Facilitate a group to achieve agreed-upon goals.
- Determine and apply the appropriate statistical procedures to analyze the results of simple experiments.
- Develop an individual learning plan for a child with a learning disability.
- Produce a strategic plan for a small manufacturing business.
- Analyze a character’s motivation and portray that character before an audience.
- Differentiate among five major approaches to literary analysis
- List the major ethical issues one must consider when planning a human-subjects study.
- Locate and critically evaluate information on current political issues on the Web.
- List and describe the functions of the major components of the human nervous system.
- Correctly classify rock samples found in
- Conduct a systems analysis of a group interaction.
- Demonstrate active listening skills when interviewing clients.
- Apply social psychological principles to suggest solutions to contemporary social problems.

A more detailed model for stating learning objectives requires that objectives have three parts: a condition, an observable behavior, and a standard. The table below provides three examples.

Condition	Observable Behavior	Standard
1. Given a list of drugs	the student will be able to classify each item as amphetamine or barbiturate	with at least 70% accuracy.
2. Immediately following a fifteen-minute discussion on a topic	the student will be able to summarize in writing the major issues being discussed	mentioning at least three of the five major topics.
3. Given an algebraic equation with one unknown	the student will be able to correctly solve a simple linear equation	within a period of five minutes.

The following example describes a CLO that is not measurable as written, gives an explanation for why the CLO is not considered measurable, and provides a suggested edit that improves the CLO.

Original CLO:

Explore in depth the literature on an aspect of teaching strategies.

Evaluation of language used in this CLO:

Exploration is not a measurable activity but the quality of the product of exploration would be measurable with a suitable rubric.

Improved CLO:

Upon completion of this course, students will be able to write a paper that illustrates an in-depth exploration of the literature on an aspect of teaching strategies.

SAMPLE FROM ANYWHERE UNIVERSITY

HIST 101 History of Civilization Cultural Traditions

This course is intended to survey the development of civilization from ancient times to 1000 AD. Cultures studied include Mesopotamia, Egypt, India, China, Greece, Rome, and ending with the fall of Rome and the rise of Christianity.

Learning outcomes:

After completing this course, students should be able to:

- Analyze relevant causes and effects through the media of written essays and oral analysis.
- Describe and explain the major accomplishments of the early bronze age civilizations – such as their political structures; economic and commercial systems; social stratification; gender relations; religious and philosophical beliefs; scientific and technological innovations; military and diplomatic systems; plastic and literary artistic achievements
- Identify the major causes leading to the decline or collapse of early bronze age civilizations
- Compare the historical conditions and experiences of different human communities during the ear of the Bronze Age.
- Describe and explain the global historical developments at the time of the transition from the Bronze Age to the Iron Age.
- Describe and explain the rise and development of the world’s classical civilizations – such as Greek, Hellenistic, Roman, Chinese, and Indian.

In addition to discipline-specific objectives, some learning objectives are taught, practiced, and reinforced throughout much of the curriculum. When planning your course, consider adding one or more of these important objectives⁴:

- Communication skills, including oral (speaking and listening) and written (writing and reading) skills.
- Interpersonal skills, including the ability to lead and to work cooperatively with others.
- Computational skills, including applications of statistics.
- Problem-solving skills in a variety of contexts.
- Critical thinking skills in a variety of contexts.
- Information competency skills: the ability to find, evaluate, use, and communicate information in all its various formats. Information competency, broadly defined, includes computer literacy, library literacy, media literacy, technological literacy, ethics, critical thinking, and communication skills. Students should be aware of issues like access and privacy, intellectual property, copyright and fair use, and the power and influence of information, including information provided in non-print media. They should be able to create information and communicate it effectively⁵
- Multicultural awareness, including respect for people unlike yourself and the ability to take perspectives of and to interact positively with groups other than your own.

⁴Upcraft, M. L. Gardner, J. N. & Associates. *The freshman year experience: Helping students survive and succeed in college*. San Francisco: Jossey-Bass Publishers,

⁵ A Report Submitted to Commission on Learning Resources and Instructional Technology Work Group on Information Competence CLRIT Task 6.1; Susan C. Curzon, Chair, December 1995

- Intellectual flexibility, an openness to new ideas and an ability to adapt to a changing environment.
- Understanding of scientific methods, including distinguishing between empirical evidence and unsubstantiated claims.
- Ethics, including an awareness of personal and others' values and how they relate to ethical decision-making.
- “Conscientiousness, personal responsibility, and dependability”⁶

What are we trying to accomplish?

Research tells us that an organization can greatly increase its productivity by being very specific about the goals it is trying to achieve. For a variety of reasons, we as higher education professionals today are being asked to substantially improve our productivity to improve the quality of our results and our students' level of development.

One of the most helpful ways we can improve our students' learning is to clarify our intentions as faculty and staff. Currently, many departments and faculty members do not clearly specify their intended outcomes be they at the program or course level. We aim at whatever we think will be most useful to the students we serve, but in reality we may be pulling our students in different directions. Lacking clear guidance, students may have to guess at what they should learn.

An Introspection - Examine Your Own Course Learning Outcomes [CLO]

1. If you have written statements of broad course goals, take a look at them. If you do not have a written list of course goals, reflect on your course and list the four to six most important student outcomes you want your course to produce.
2. Look over your list and check the one most important student outcome. If you could only achieve one outcome, which one would it be?
3. Look for your outcome on the list of key competencies or outcomes society is asking us to produce (see below). Is it there? If not, is the reason a compelling one?
4. Check each of your other "most important" outcomes against the list of outcomes. How many are on the list of key competencies?
5. Take stock. What can you learn from this exercise about what you are trying to accomplish as a teacher? How clear and how important are your statements of outcomes for your use and for your students'? Are they very specifically worded to avoid misunderstanding? Are they supporting important needs on the part of the students?

⁶ Tools and Resources to Increase Student Learning; Lion F. Gardiner, Department of Biological Sciences, Rutgers University, February 1997; Vol.6 No.2

Society's Key Competencies⁷

Leaders in business, government, and education have been urging us to focus on producing a number of specific student-development outcomes they believe are essential for the democratic and economic future of our society. Hence it is no surprise to see those elements embedded within most of the Drexel Student Learning Priorities [DSLPS].

Here is a list of those key outcomes taken from *Redesigning Higher Education*

- Conscientiousness, personal responsibility, and dependability [DSLPS 11]
- The ability to act in a principled, ethical fashion [DSLPS 3]
- Skill in oral and written communication [DSLPS 1]
- Interpersonal and team skills [DSLPS 8]
- Skill in critical thinking and in solving complex problems [DSLPS 2]
- Respect for people different from oneself [DSLPS 7]
- The ability to adapt to change
- The ability and desire for life-long learning

Conditions Necessary for Development of the Key Competencies⁸

These are the conditions in a college or university which research has shown foster the development of these abilities.

1. High-level of intellectual challenge
2. A supportive environment
3. Active involvement
4. High expectations
5. Clearly defined outcomes and frequent assessment with prompt feedback

How do you determine what you're asking your students to do intellectually?

The most common formal method used by teachers to set the level of intellectual responses required by their students on questions asked in class, on assessments, and in assignments is the Taxonomy of Education Objectives mentioned on pages 3-5 of this booklet. Here is an exercise that you can do with the material presented on those pages.

- Take a sample of the tests you've given to your students recently and perform a simple item analysis on them. Rate each item as to its level in the Taxonomy.
- Determine the percentage of all items in the sample or on one test that are at each level.
- Reflect on the level of intellectual challenge presented on your tests. Expectations for assessment affect how students study. How does the level of challenge posed by your tests affect your students' quality of learning effort outside the classroom? Is it consistent with society's key competencies mentioned on page 10 and our institutional and national effort to significantly raise our standards for college students?

⁷ Redesigning Higher Education, p.7; The George Washington University, sponsored by The New Jersey Institute for Collegiate Teaching and Learning

⁸ Redesigning Higher Education, p.23; The George Washington University, sponsored by The New Jersey Institute for Collegiate Teaching and Learning

Write Your Course Outcomes!

One of the first steps you take in identifying the expected learning outcomes for your course is identifying the purpose of teaching the course. By clarifying and specifying the purpose of the course, you will be able to discover the main topics or themes related to students' learning. Once discovered, these themes will help you to outline the expected learning outcomes for the course. Ask yourself:

1. What role does this course play within the major?
2. How is the course unique or different from other courses?
3. Why should/do students take this course? What essential knowledge or skills should they gain from this experience?
4. What knowledge or skills from this course will students need to have mastered to perform well in future classes or jobs?
5. Why is this course important for students to take?

Once your outcomes have been written (see samples and background presented on pages 5-9 of this booklet, you must then decide how to assess them. COAS will assess "Course Learning Outcomes" or CLO on a continuous cycle with every other year focusing on specific courses within a program/major. You will need to develop the means of assessment for the "Course Learning Outcome" you are assigned to assess.

The first step in the process is to create an assessment plan using the COURSE-LEVEL OUTCOMES ASSESSMENT REPORT or *CLO Form*. See sample on next page.

COURSE LEVEL REPORT FORM
[TO BE USED TO REPORT ASSESSMENT ACTIVITY]

It is a good practice to assess Course Learning Outcomes on a continuous cycle in conjunction with a larger, Program Level Outcome assessment (page 14). For each outcome assessed, you will need to develop an assessment tool (i.e. test questions, project, essay, etc.). The first step in the process is to create an assessment plan using the COURSE-LEVEL OUTCOMES ASSESSMENT REPORT or *CLO Form*. The following is a draft version of such a form that could be developed into a template:

PROGRAM LEVEL OUTCOMES ASSESSMENT PROFILE

Course: _____ **Assessment Period** _____

Drexel University DSLP supported:

Step 1: To employ.....

Course Outcome:

Step 2: Graduates of this course will be able to.....

Assessment Conducted:

Step 3: Means of Assessment & Criteria for Success

1. *Means of Assessment [if a test, state the name]*
2. *How will the assessment be scored?*
3. *To whom?*
4. *By whom?*
5. *When?*
6. *Criteria for Success?*

Data

Step 4: Summary of Assessment Data Collected

3. *Data Results*
4. _____ out of _____ students or _____ % of participating students

Use of Results to Inform Instruction

Step 5: Criteria for Success: Met? Not Met?

3. *Changes in Academic Program*
4. *Improvement Plan*

SECTION BY SECTION GUIDELINES ON COMPLETING THE FORM

STEP 1: DREXEL UNIVERSITY DSLP SUPPORTED

Please see pages 7 and 8 of this document for the DSLPs.

STEP 2: COURSE LEVEL OUTCOME

Graduates of this course will be able to:

Graduates of this course will be able to... + Behavior + Resulting Evidence

“Resulting evidence” refers to the work that students produce—such as papers, exams, presentations, performances, portfolios, works of art, musical compositions, lab results—to demonstrate their learning. An important distinction should be considered when writing learning outcomes regarding whether the evidence of student achievement will be absolute or value added. For instance, a learning outcome could be written in this way: “Students will apply the scientific method” (absolute); or in this way: “Students will improve their application of the scientific method” (value added). Value added outcomes may be useful in specialized programs that are not driven by disciplinary requirements, but degree-granting programs will typically make use of absolute outcomes. The distinction is important to keep in mind when writing outcomes in order to use language that clearly states the expectations of the program.

Sample Course Level Outcomes (See also pages 27 and 28 in this booklet)

Graduates of this course will be able to:

United States History 101

Upon completion of this course, the students will be able to:

- Describe the relationship between the past and the present
- Write an essay defining a pluralistic society and its relationship to our democratic principles
- Outline the structure of the Constitution of the U.S.
- Identify and define the social, political, and economic institutions that impact contemporary American society
- Describe the major events and individuals associated with the history of the United States.

Business 101

At the end of the course, students should be able to:

- Identify and describe current domestic and international business trends
- Explain how proper business management benefits consumers and employees
- Define the basic rules related to human resources management
- Compare and contrast the different types of business ownership
- Evaluate and classify various marketing strategies
- Summarize how technology can help a business to manage information

Music History 101

After completing this course, students will be able to:

- Identify the basic elements of Western music
- List the instruments associated with Western music
- Describe the distinct style periods of Western music
- Recognize selected examples of Western music aurally
- Discriminate among different Western musical styles
- Explain music's place in relation to other art forms

Intro to Psychology 101

Students who complete this course should be able to:

- Identify and define basic terms and concepts which are needed for advanced courses in psychology
- Outline the scientific method as it is used by psychologists
- Apply the principles of psychology to practical problems

- Compare and contrast the multiple determinants of behavior (environmental, biological, and genetic)
- Analyze current research findings in the areas of physiological psychology, perception, learning, abnormal, and social psychology
- Distinguish between healthy and unhealthy physical, mental, and emotional patterns

NOTE: If the course's outcome was not met in the previous cycle, you will need to reassess that precise outcome in the current cycle.

STEP 3: THE PLAN – MEANS OF ASSESSMENT & CRITERIA FOR SUCCESS

A. Means of assessment [ILLUSTRATIVE]

- Multiple-choice questions embedded on:
 - mid-term or final exam test
 - short answer test
- National Standardized Exam
- Licensure examination
- Essay questions (grading rubric required)
- Computer Projects (grading rubric required)
- Laboratory Projects (grading rubric required)
- Portfolio/Project (grading rubric required)
 - topic and/or theme of project/presentation
- Presentation (grading rubric required)
 - topic of presentation
- Performance rating (grading rubric required)

B. To whom:

- All instructors from Sociology 101
- Department or Program Head
- Adjunct faculty
- Random sample of sections of English 101
- All sections of Philosophy 105

C. By whom:

- All instructors from Sociology 101
- Department or Program Head
- Adjunct faculty
- Random sample of sections of English 101
- All sections of Philosophy 105

D. When:

- Specific date
- Near the middle of the term
- During the second half of the term
- Near the end of the term
- At the end of the term

E. Criteria for Success:

- A minimum of (70%) of the students will correctly answer (100%) of the questions
- A minimum of (80%) of the students will correctly answer (10) of the questions
- A minimum of (85%) of the students will correctly answer at least (7) of (10) multiple-choice questions embedded on the final exam.
- A minimum of (85%) of the students will score of at least (40) out of (50) points according to the grading rubric and/or score at least (7) out of (10) points in each of the four categories on the rubric.

	Actions	Products	Learning Activities
<p>Creating</p> <p>(Putting together ideas or elements to develop an original idea or engage in creative thinking).</p>	Designing Constructing Planning Producing Inventing Devising Making	Film Story Project Plan New game Song Media product Advertisement Painting	
<p>Evaluating</p> <p>(Judging the value of ideas, materials and methods by developing and applying standards and criteria).</p>	Checking Hypothesising Critiquing Experimenting Judging Testing Detecting Monitoring	Debate Panel Report Evaluation Investigation Verdict Conclusion Persuasive speech	
<p>Analysing</p> <p>(Breaking information down into its component elements).</p>	Comparing Organising Deconstructing Attributing Outlining Structuring Integrating	Survey Database Mobile Abstract Report Graph Spreadsheet Checklist Chart Outline	
<p>Applying</p> <p>(Using strategies, concepts, principles and theories in new situations).</p>	Implementing Carrying out Using Executing	Illustration Simulation Sculpture Demonstration Presentation Interview Performance Diary Journal	
<p>Understanding</p> <p>(Understanding of given information).</p>	Interpreting Exemplifying Summarising Inferring Paraphrasing Classifying Comparing Explaining	Recitation Summary Collection Explanation Show and tell Example Quiz List Label Outline	
<p>Remembering</p> <p>(Recall or recognition of specific information).</p>	Recognising Listing Describing Identifying Retrieving Naming Locating Finding	Quiz Definition Fact Worksheet Test Label List Workbook Reproduction	

STEP 4: SUMMARY OF ASSESSMENT DATA COLLECTED

Data Results: _____ of _____ students
[How many students achieved expected result?] [How many students actually participated in the assessment?]
or ____% of participating students scored or were able to: [Go back and look at Step 3.-F. Criteria for Success]

STEP 5: USE OF RESULTS TO ENHANCE/IMPROVE INSTRUCTION

Changes to Course:

- Criterion for success (was) met. No action is required at this time.
- Criterion for success (was not) met. (Discuss with the Department/Program Head changes that need to be made). You must create an “Improvement Plan” that includes tangible benchmarks for progress.

IMPLEMENT CHANGES BASED UPON CLO ASSESSMENT RESULTS

IMPROVEMENT PLANS

Effective assessments are used to inform important decisions, not only to improve curriculum and pedagogy, but also to impact Drexel’s planning and budgeting processes. Effective outcomes assessment produces data that guide *improvement* on a continuing basis. If a Program or Course Learning Outcome criterion is not met, then there is a compelling need to create an Improvement Plan. The results need to be interpreted and discussed and their implications for improving educational practice understood.

BASIC EXAMPLES:

NUR 100

Plan for Improvement

- a. More emphasis will be placed in the curriculum on the cultural aspects of patient care.
- b. A new text will be adopted that employs a focus on the “Cultural Aspects of Care” as well as integrated cultural material.
- c. Additional resource material will be acquired and integrated into the curriculum that highlights the issue of cultural sensitivity in contemporary patient care, for example a new DVD entitled, “Cultural Awareness: Understanding the Need”

Plan for Improvement

- a. A new set of mid-term and final examinations questions will be developed to not only vary the examinations but also to provide assessment data on course and program level objectives.
- b. Develop and refine communications between Department Head and course-specific adjunct faculty on administering assessment exams and rubric integration.

ASSESSMENT INSTRUMENTS AND METHODS
AVAILABLE TO ASSESS STUDENT LEARNING IN THE
MAJOR

	Direct Measures	Indirect Measures
Course	<ul style="list-style-type: none"> -Course and homework assignments -Examinations and quizzes -Standardized tests -Term papers and reports -Observations of field work, internship performance, service learning, or clinical experiences -Research projects -Class discussion participation -Case study analysis -Rubric (a criterion-based rating scale) scores for writing, oral presentations, and performances -Artistic performances and products -Grades that are based on explicit criteria related to clear learning goals 	<ul style="list-style-type: none"> -Course evaluations -Test blueprints (outlines of the concepts and skills covered on tests) -Percent of class time spent in active learning -Number of student hours spent on service learning -Number of student hours spent on homework -Number of student hours spent at intellectual or cultural activities related to the course -Grades that are not based on explicit criteria related to clear learning goals
Program	<ul style="list-style-type: none"> -Capstone projects, senior theses, exhibits, or performances -Pass rates or scores on licensure, certification, or subject area tests -Student publications or conference presentations -Employer, Co-op and internship supervisor ratings of students' performance 	<ul style="list-style-type: none"> -Focus group interviews with students, faculty members, or employers -Registration or course enrollment information -Department or program review data -Co-op supervisor surveys -Job placement -Employer or alumni surveys -Student perception surveys -Graduate school placement rates
Institutional	<ul style="list-style-type: none"> -Performance on tests of writing, critical thinking, or general knowledge -Explicit self-reflections on what students have learned related to institutional programs such as the co-op experience 	<ul style="list-style-type: none"> Locally-developed, commercial, or national surveys of student perceptions or self-report of activities (e.g., National Survey of Student Engagement) -Transcript studies that examine patterns and trends of course selection and grading -Annual reports including institutional benchmarks, such as graduation and retention rates, grade point averages of graduates, etc.

ASSESSMENT INSTRUMENTS AND METHODS

Assessment of student learning can be conducted using a variety of available instruments and methods. Many experts believe that a combination of assessment approaches can be the most effective way to measure student learning. Fortunately, many departments on campus and at other institutions have acquired some experience with many of the more commonly used instruments. Faculty in a variety of academic programs at large and small research universities have tested and used a wide range of assessment methods to determine whether students were attaining desired educational goals. In this section, many of these assessment approaches will be presented, providing handbook users with information that can simplify the development of assessment strategies.⁹

A. Direct Indicators of Learning

1. Capstone Course Evaluation

Capstone courses integrate knowledge, concepts, and skills associated with an entire sequence of study in a program. This method of assessment is unique because the courses themselves become the instruments for assessing student teaching and learning. Evaluation of students' work in these courses is used as a means of assessing student outcomes. For academic units where a single capstone course is not feasible or desirable, a department may designate a small group of courses where competencies of completing majors will be measured.

Capstone courses provide students with a forum to combine various aspects of their programmatic experiences. For departments and faculty, the courses provide a forum to assess student achievement in a variety of knowledge- and skills-based areas by integrating their educational experiences. Also, these courses can provide a final common experience for student in the discipline.

Many research universities are currently using capstone courses in a variety of academic disciplines. Departments at other research institutions using this method to gather information about student learning in the major include many general education programs, chemistry, political science, physics, music, religious studies, theatre, history, and foreign languages.¹⁰

2. Course-Embedded Assessment

Assessment practices embedded in academic courses generate information about what and how students are learning within the program and classroom environment. Course-embedded assessment takes advantage of already existing curricular offerings by using standardized data that instructors already collect or by introducing new assessment measures into courses. The embedded methods most commonly used involve the development and gathering of student data based on questions placed in course assignments. These questions, intended to assess student outcomes, are incorporated or embedded into exams, research reports, and term papers in courses. The student responses are then evaluated to determine whether or not the students are achieving the prescribed educational outcomes and objectives of the course

⁹ University of Wisconsin, Office of the Provost

¹⁰ Julian, Faye D. "The Capstone Course as an Outcomes Tests for Majors." *Assessment in Practice*. Banta, Trudy W., Lund, Jon P., Black, Karen E., & Oblander, Frances W., (Eds). San Francisco: Jossey-Bass Publishers, 1996. pp. 79-81.

and program. This assessment is a separate process from that used by the course instructor to grade the exam, report, or term paper.

There are a number of advantages to using course-embedded assessment.

- Student information gathered from embedded assessment draw on accumulated educational experiences and familiarity with specific areas or disciplines.
- Embedded assessment often does not require additional time for data collection, since instruments used to produce student learning information can be derived from course assignments already planned as part of the requirements.
- The presentation of feedback to faculty and students can occur very quickly, creating a conducive environment for ongoing programmatic improvement.
- Course-embedded assessment is part of the curricular structure and students have a tendency to respond seriously to this method.

3. Tests and Examinations

In most cases, a test will be one part of a fully developed assessment plan. Tests are commonly used in association with cognitive goals in order to review student achievement with respect to a common body of knowledge associated with a discipline or program. Departments have traditionally used tests in assessment programming to measure whether students have acquired a certain process- and content-related knowledge.

Using this approach, there are two primary testing alternatives; first, locally developed/ faculty generated tests and examinations, and (2) commercially produced standardized tests and examinations. Locally developed testing and examinations are probably the most widely used method for evaluating student progress. For assessing the validity of an academic program, using examinations designed by the instructors who set the educational goals and teach the courses is often the best approach. Cost benefits, interpretation advantages, and quick turnaround time all make using locally designed tests an attractive method for assessing student learning.

Tests designed for a specific curriculum can often prove more valuable when assessing student achievement than commercial instruments. These tests focus on the missions, goals, and objectives of the departments and permit useful projections of student behavior and learning. A well-constructed and carefully administered test that is graded for the specific purpose of determining program strengths and weaknesses remains one of the most popular instruments for assessing most majors. Departments at other research institutions using locally designed tests and examinations include mathematics, physical education, psychology, and English.

Commercially generated tests and examinations are used to measure student competencies under controlled conditions. Tests are developed and are normed nationally to determine the level of learning that students have acquired in specific fields. For example, nationally standardized multiple-choice tests are widely used and assist departments in determining programmatic strengths and weaknesses when compared to other programs and national data. Compilations of data on the performance of students who voluntarily take national examinations such as GRE and MCAT enable faculty to discover useful data that often leads to programmatic improvements.

When using commercially generated tests, national standards are used as comparative tools in areas such as rates of acceptance into graduate or professional school, rates of job placement, and overall achievement of students when compared to other institutions. In most cases, standardized testing is useful in demonstrating external validity.

There are a number of advantages for using commercial/standardized tests and examinations to measure student achievement:

- Institutional comparisons of student learning are possible.
- Very little professional time is needed beyond faculty efforts to analyze examination results and develop appropriate curricular changes based on the findings.
- In most cases, nationally developed tests are devised by experts in the discipline.
- Tests are traditionally given to students in large numbers and usually do not require faculty involvement.

As part of their assessment efforts, many institutions and programs already use a multitude of commercially generated examination. Some of the more commonly used national examinations include:

- *ACT - COMP (College Outcome Measures Program)*: This is an assessment instrument that measures knowledge and skills acquired by students in general education courses. Administered by ACT, Iowa City, IA.
- *GRE (Graduate Record Examinations)*: The GRE is widely used by colleges, universities, departments, and graduate schools to assess verbal and quantitative student achievement. Many discipline-specific examinations are offered to undergraduate students in areas such as Biology, Chemistry, Education, Geology, History, Literature, Political Science, Psychology, and Sociology. The GRE is published and administered by Educational Testing Services, Princeton, New Jersey.
- *Major Field Achievements Tests*: Major field examinations are administered in a variety of disciplines. They often are given to students upon or near completion of their major field of study. These tests assess the ability of students to analyze and solve problems, understand relationships, and interpret material. Major field exams are published by Educational Testing Services, Princeton, New Jersey.

4. Portfolio Evaluation

In assessment as in other areas, a picture can be worth a thousand words. As an evaluation tool, portfolio assessment has become widely used in higher education as a way to examine and measure progress, by documenting the process of learning or change as it occurs. Portfolios extend beyond test scores to include substantive descriptions or examples of what the student is doing and experiencing. Fundamental to "performance assessment" in educational theory is the principle that students should demonstrate rather than just say (show rather than tell), what they know and can do. Contents of portfolios (sometimes called "artifacts" or "evidence") can include drawings, photos, video or audio tapes, writing or other work samples, computer files, and copies of standardized or program-specific tests. Data sources can include a variety of personnel who know the participant or program, as well as the self-reflections of participants themselves. Portfolio assessment provides a practical strategy for systematically collecting and organizing such data. Portfolios used for assessment purposes are most commonly characterized by collections of student work that exhibit to the faculty the student's progress and achievement in given areas.

Information about the students' skills, knowledge, development, quality of writing, and critical thinking can be acquired through a comprehensive collection of work samples. A student portfolio can be assembled within a course or in a sequence of courses in the major. The faculty determine what information or students' products should be collected and how these products will be used to evaluate or assess student learning. These decisions are based on the program's learning outcomes.

PORTFOLIO ASSESSMENT IS MOST USEFUL FOR:

- Evaluating programs that have flexible or individualized goals or outcomes because each student's portfolio assessment can be geared to his or her individual needs and goals.
- Providing information that gives meaningful insight into behavior and related change. Because portfolio assessment emphasizes the process of change or growth, at multiple points in time, it may help faculty or administrators identify patterns.
- Providing a tool that can ensure communication and accountability to a range of audiences who may not have much sophistication in interpreting statistical data but can appreciate more visual or experiential evidence of learning.
- Allowing for the possibility of assessing some of the more complex and important aspects of many constructs (rather than just the ones that are easiest to measure).¹¹

PORTFOLIO ASSESSMENT IS NOT AS USEFUL FOR:

- Evaluating programs that have very concrete, uniform goals or purposes.
- Allowing for the ranking of participants or programs in a quantitative or standardized way.
- Comparing participants or programs to standardized norms. While portfolios can (and often do) include some standardized test scores along with other kinds of evidence of learning, this is not the main purpose of the portfolio.¹²

5. Pre-test/Post-test Evaluation

Pre-test/post-test assessment is a method used by academic units where locally developed tests and examinations are administered at the beginning and at the end of courses or academic programs. These test results enable faculty to monitor student progression and learning through prescribed periods of time. The results are often useful for determining where skills and knowledge deficiencies exist and whether knowledge and skills develop over time.

6. Video and Audio Evaluation

Video and audio devices have been used by faculty as a kind of pre-test/post-test assessment of student skills and knowledge. Disciplines such as theatre, music, art, and communication, might consider this assessment tool.

7. Rubrics

A scoring rubric is a method of classifying and categorizing identified criteria for successfully completing an assignment or task and to establish levels for meeting these criteria. Rubrics should be used to assess essay questions, projects, portfolios and presentations. They should be given to all faculty who are conducting and scoring the assignment. A well designed rubric will describe the definitions of each characteristic being assessed and descriptions of the best, worst and unacceptable characteristics of the identified criteria.

A rubric is an authentic assessment tool used to measure students' work. It is a scoring guide that can be used to evaluate a student's performance based on the sum of a full range of criteria rather than a

¹¹ The Use of Portfolio Assessment in Evaluation, Sewell, Marczak & Horn

¹² The Use of Portfolio Assessment in Evaluation, Sewell, Marczak & Horn

single numerical score. A rubric is a working guide for students and teachers, usually distributed before the assignment begins, in order to get students to think about the criteria on which their work will be judged. Rubrics can be analytic or holistic, and they can be created for any content area including math, science, history, writing, foreign languages, drama, art, music, etc.

The rubric is one authentic assessment tool that is designed to simulate real life activity where students are engaged in solving real-life problems. It is a formative type of assessment because it becomes an ongoing part of the whole teaching and learning process. Students themselves can be involved in the assessment process through both peer and self-assessment. As students become familiar with rubrics, they can even assist in the rubric design process. This involvement empowers the students and, as a result, their learning becomes more focused and self-directed.

THREE COMMON FEATURES

Rubrics can be created in a variety of forms and levels of complexity; however, they all contain three common features:

- A focus on measuring a stated objective (performance, behavior, or quality)
- The use of a range to rate performance
- Specific performance characteristics arranged in levels indicating the degree to which a standard has been met

ADVANTAGES OF RUBRICS

Many experts believe that rubrics improve students' end products and therefore increase learning. When teachers evaluate papers or projects, they know implicitly what makes a good final product and why. When students receive rubrics before starting an assignment, they understand how they will be evaluated and can prepare accordingly. Developing a grid and making it available to students provides the scaffolding necessary to improve the quality of their work and increase their knowledge.

Rubrics offer several advantages:

- Rubrics improve student performance by clearly showing the student how their work will be evaluated and what is expected.
- Rubrics help students become better judges of the quality of their own work.
- Rubrics allow assessment to be more objective and consistent.
- Rubrics force the teacher to clarify his/her criteria in specific terms.
- Rubrics reduce the amount of time teachers spend evaluating student work.
- Rubrics promote student awareness about the criteria to use in assessing peer performance.
- Rubrics provide useful feedback to the teacher regarding the effectiveness of the instruction.
- Rubrics provide students with more informative feedback about their strengths and weaknesses.
- Rubrics accommodate heterogeneous classes by offering a range of quality levels.
- Rubrics are easy to use and easy to explain.¹³

¹³ Heidi Goodrich Andrade. "Understanding Rubrics." [Online] 22 October 2001. <<http://www.middleweb.com/rubricsHG.html>>.

Teachervision.com. The Advantages of Rubrics: Part One in a Five-Part Series. [Online] 22 October 2001. <<http://www.teachervision.com/lesson-plans/lesson-4522.html>>.

BASIC RUBRIC TEMPLATE

	Beginning 1	Developing 2	Accomplished 3	Exemplary 4	Score
Stated Objective or Performance	Description of identifiable performance characteristics reflecting a beginning level of performance.	Description of identifiable performance characteristics reflecting development and movement toward mastery of performance.	Description of identifiable performance characteristics reflecting mastery of performance.	Description of identifiable performance characteristics reflecting the highest level of performance.	
Stated Objective or Performance					
Stated Objective or Performance					

SAMPLE UNDERGRADUATE RESEARCH PRESENTATION RUBRIC

Undergraduate research is becoming more important in higher education as evidence is accumulating that clear, inquiry-based learning, scholarship, and creative accomplishments can and do foster effective, high levels of student learning. This curricular innovation includes identifying a concrete investigative problem, carrying out the project, and sharing findings with peers. The following standards describe effective presentations.

Standards	5 - 4 Exemplary	3 - 2 Satisfactory	1-0 Unacceptable	Score	Weight	Total Score
Organization	Has a clear opening statement that catches audience's interest; maintains focus throughout; summarizes main points	Has opening statement relevant to topic and gives outline of speech; is mostly organized; provides adequate "road map" for the listener	Has no opening statement or has an irrelevant statement; gives listener no focus or outline of the presentation		X 2	
Content	Demonstrates substance and depth; is comprehensive; shows mastery of material	Covers topic; uses appropriate sources; is objective	Does not give adequate coverage of topic; lacks sources		X 2	

Nancy Pickett and Bernie Dodge. "Rubrics for Web Lessons." [Online] 22 October 2001.
<<http://edweb.sdsu.edu/webquest/rubrics/weblessons.htm>>.

Quality of conclusion	Delivers a conclusion that is well documented and persuasive	Summarizes presentation's main points; draws conclusions based upon these points	Has missing or poor conclusion; is not tied to analysis; does not summarize points that support the conclusion		X 2	
Delivery	Has natural delivery; modulates voice; is articulate; projects enthusiasm, interest, and confidence; uses body language effectively	Has appropriate pace; has no distracting mannerisms; is easily understood;	Is often hard to understand; has voice that is too soft or too loud; has a pace that is too quick or too slow; demonstrates one or more distracting mannerisms		X 1.5	
Use of media	Uses slides effortlessly to enhance presentation; has an effective presentation without media	Looks at slides to keep on track; uses an appropriate number of slides	Relies heavily on slides and notes; makes little eye contact; uses slides with too much text		X 1.5	
Response to Questions	Demonstrates full knowledge of topic; explains and elaborates on all questions	Shows ease in answering questions but does not elaborate	Demonstrates little grasp of information; has undeveloped or unclear answers to questions		X 1	

Resources for Rubric Creation

Please see Appendix B for resources with which to create a rubric

B. **Indirect Indicators of Learning**

1. External Reviewers

Peer review of academic programs is a widely accepted method for assessing curricular sequences as well as course development and delivery. Using external reviewers is a useful way of analyzing whether student achievement correlates appropriately with departmental goals and objectives. In numerous instances, recommendations initiated by skilled external reviewers have been instrumental in identifying program strengths and weaknesses leading to substantial curricular and structural changes and improvements. Drexel's Program Alignment and Review (PAR) is one example of such a process.

2. Student Surveying and Exit Interviewing

Student surveying and exit interviews have become increasingly important tools for understanding the educational needs of students. When combined with other assessment instruments, many departments have successfully used surveys to produce important changes. During this process, students are asked to reflect on what they have learned as majors in order to generate information for program improvement. Through using this method, we can gain insight into how students experience courses, what they like and do not like about various instructional delivery approaches, what is important about the classroom environment that facilitates or hinders learning, and the nature of assignments that foster student learning.

3. Alumni Surveying

Surveying of alumni is a useful assessment tool for generating data about student preparation for professional work, program satisfaction, and the relevancy of curriculum. As an assessment supplement, alumni surveys provide departments and faculty with a variety of information that can highlight program areas that need to be expanded or enhanced. In most cases, alumni surveys are an inexpensive way to gather data and for reestablishing relationships with individuals who can help the program continually improve.

4. Employer and Co-Op Surveying

Employer/Co-Op surveys can provide information about the curriculum, programs, and students that other forms of assessment cannot produce. Through surveys, colleges and departments within a university can review employer satisfaction levels with the abilities and skills of both recent graduates as well as co-op students. The advantages in using employer surveys (as well as using student surveys of their Co-Op experiences) include the ability to obtain both internal (Drexel undergraduate students) and external (Employers) data that cannot be produced on campus. The responses often help students discern the relevance of their educational experiences.

5. Curriculum and Syllabus Analysis

Once a department/program has defined its outcomes, all phases of the curriculum and each individual course would almost automatically cover most of the bases needed to provide each student with the opportunity to learn the essential components of those outcomes. That said, it must also be stated that not every course needs to or should attempt to cover *all* the outcomes of the major. The curriculum map or analysis provides a means to just which courses will cover which objectives and a what level. The chart then provides assurance to the department that, assuming certain sequences are taken by the student candidates for that major, they will in fact have the opportunity to learn those objectives.

Syllabus analysis is an especially useful technique when multiple sections of a department course are offered by a variety of instructors. It provides assurance that each section will cover essential points without prescribing the specific teaching methods to be used in helping the students learn those common objectives.

CURRICULUM MAPS

Once the program learning outcomes and course level outcomes are created, faculty and staff can engage in curriculum mapping to determine where the program learning outcomes along with the Drexel Student Learning Priorities (DSLPS) are embedded in the current course offerings. A curriculum mapping template appears below.

PROGRAM: [Replace this text with the name of the program]		Program of Study Learning Goals								DREXEL STUDENT LEARNING PRIORITIES											
Courses	Outcomes									COMMUNICATION	CREATIVE AND CRITICAL THINKING	ETHICAL REASONING	INFORMATION LITERACY	SELF-DIRECTED LEARNING	TECHNOLOGY USE	GLOBAL COMPETENCE	LEADERSHIP	PROFESSIONAL PRACTICE	RESEARCH, SCHOLARSHIP, AND CREATIVE	RESPONSIBLE CITIZENSHIP	
CORE																					

A curriculum map is a way to show how program learning outcomes are developed across curriculum. Faculty and staff examine each outcome in the context of each course to determine what outcome(s) and which DSLP(s) the course addresses in a meaningful way.

There are three ways a course might be related to an outcome:

- *Introduce (I)*: Students first learn about key ideas, concepts or skills related to the outcome.
- *Develop (D)*: Students gain additional information related to the outcome. They may start to synthesize key ideas or skills and are expected to demonstrate their knowledge or ability at increasingly proficient levels.
- *Master (M)*: Students are expected to be able to demonstrate their ability to perform the outcome with a reasonably high level of independence and sophistication.

In building a map with the above template, faculty would place an I, D, or M in the table cell for each course that meaningfully addresses an outcome or a DSLP.

Once the map is complete, it is possible to assess the overall alignment of the curriculum with the course and program learning outcomes. A “healthy” map means:

- Each learning outcome is introduced, developed and mastered, in a logical sequence, at least once across multiple course. However, if each cell in the column is filled, it suggests redundancy and overlap related to that outcome in the curriculum. If few cells are completed or are missing an “I,” “D,” or “M,” it is likely the curriculum is not covering that outcome as completely as faculty and/or the department/program might like.
- Each course supports at least one and ideally more than one learning outcome and DSLP. Meaningfully addressing all learning outcomes in a single course is difficult. But if a required course does not seem related to any program learning outcomes, it provides the opportunity to ask whether the course should be required or whether an important learning outcome is missing from the Program Learning Outcomes.

Curriculum maps provide a quick reference view of how individual courses are related to both the program learning outcomes and the DSLPs. They can also show the curricular emphasis given to each outcome and DSLP. Additionally, curriculum maps help facilitate faculty discussion about the extent to which the program currently addresses the existing learning outcomes and their alignment with the DSLPs. The sample map to follow is but one example of a university’s chemistry department map. Please note that this is purely illustrative and there are as many examples of curriculum map formatting as there are universities.



Matrix	course	outcome 1	outcome 2	outcome 3	outcome 4	outcome 5	outcome 6	outcome 7	outcome 8	outcome 9	outcome 10
CHEM	100										
	104										
	w/Lab 110	i	i	i				i	i	i	i
	w/Lab 111		i	i				i	i	i	i
	150										
	w/Lab 201	i	i	i				i	i	i	i
	w/Lab 220		i	i				i	i	i	i
	w/Lab 221		i	i				i	i	i	i
	w/Lab 135		i	i				i	i	i	i
	w/Lab 145		i	i				i	i	i	i
	w/Lab 235		i	i				i	i	i	i
	w/Lab 245		i	i				i	i	i	i
	300				i	d	d				
	300 L	d	d	d		d	d	d	d	d	
	305					d	d				
	305L	d	d	d		d	d	d	d	d	d
	350					d	d				
	350 L	d	d	d	d	d	d	d	d	d	m
	332	d				d	d				
	332 L	d	d	d		d	d	d	d	d	
	370	d				d	d				
	360	d				d	d				
	380	d				d	d				
	Researc 195	i	i	i	i	i	i	i	i	i	i
	Researc 295	d	d	d	d	d	d	d	d	d	d
	Researc 395	d	m	d	d	d	d	m	d	d	d
	Ind/ Inte 396		d	d		d			d		
	Ind. Stui 397	d				d	d		d		
	Comps 490	m	m	m	m	m	m	m	m	m	m
	Honors 499	m	m	m	m	m	m	m	m	m	m

GLOSSARY OF ASSESSMENT TERMS

Assessment: The systematic collection, review, and use of information about educational programs and courses undertaken for the purpose of both improving student learning and instructional delivery.

Bloom's Taxonomy of Cognitive Objectives: Six levels arranged in order of increasing complexity. (See pages 11 – 13)

Course Embedded Assessment: The process of reviewing materials generated in the classroom. In addition to providing a basis for grading students, such materials allow faculty to evaluate approaches to instruction and course design.

Curriculum Maps: Tools that can be used at any stage in the curriculum cycle—whether developing, reviewing or revising curriculum. They provide a picture, a graphical description or a synopsis of curriculum components that can be used to encourage dialogue and help faculty ensure that learning experiences are aligned and lead to the achievement of program learning outcomes.

Direct Measures of Learning: Students display knowledge and skills as they respond directly to the instrument itself. Examples might include: objective tests, essays, presentations, and classroom assignments.

External Assessment: Use of criteria (rubric) or an instrument developed by an individual or organization external to the one being assessed. This kind of assessment is usually summative, quantitative, and often high-stakes, such as the SAT or GRE exams.

Formative evaluation: Improvement-oriented assessment. The use of a broad range of instruments and procedures during a course of instruction or during a period of organizational operations in order to facilitate mid-course adjustments.

Goals for Learning: Goals are used to express intended results in general terms. The term goals are used to describe broad learning concepts, for example: clear communication, problem solving, and ethical awareness.

Indirect Measures of Learning: Students are asked to reflect on their learning rather than to demonstrate it. Examples include: exit surveys, student interviews, and alumni surveys.

Institutional Effectiveness: The measure of what an institution actually achieves.

Institution Level Assessment: Institution level assessment is aimed at understanding and improving student learning across the institution

Learning Outcomes: Observable behaviors or actions on the part of students that demonstrate that the intended learning objective has occurred. Learning outcomes occur on both the program and course levels.

Measurements: Design of strategies, techniques and instruments for collecting feedback data that evidence the extent to which students demonstrate the desired behaviors.

Methods of Assessment: Techniques or instruments used in assessment.

Mission Statement: A mission statement explains why your organization exists and what it hopes to achieve in the future. It articulates the organization's essential nature, its values and its work.

Modifications/Improvement Plans: Recommended actions or changes for improving student learning, service delivery, etc. that respond to the respective findings of measurement evaluations.

Objectives for Learning: Objectives are used to express intended results in precise terms. Further, objectives are specific as to what needs to be assessed and thus are an accurate guide when selecting appropriate assessment tools. Example: Graduates in Speech Communication will be able to interpret non-verbal behavior and to support arguments with credible evidence.

Performance Assessment: The process of using student activities or products, as opposed to tests or surveys, to evaluate students' knowledge, skills, and development. Methods include: essays, oral presentations, exhibitions, performances, and demonstrations. Examples include: reflective journals (daily/weekly); capstone experiences; demonstrations of student work (e.g. acting in a theatrical production, playing an instrument, observing a student teaching a lesson); products of student work (e.g. Art students produce paintings/drawings, Journalism students write newspaper articles, Geography students create maps, Computer Science students generate computer programs, etc.).

Portfolio: An accumulation of evidence about individual proficiencies, especially in relation to learning standards. Examples include but are not limited to: samples of student work, including projects, journals, exams, papers, presentations, videos of speeches and performances.

Program Assessment: Uses the department or program as the level of analysis. Can be quantitative or qualitative, formative or summative, standards-based or value added, and used for improvement or for accountability. Ideally, program goals and objectives would serve as a basis for the assessment. Example: How well can senior Engineering students apply engineering concepts and skills to solve an engineering problem? This might be assessed through a capstone project, by combining performance data from multiple senior level courses, collecting ratings from internship employers, etc.

Quantitative Methods of Assessment: Methods that rely on numerical scores or ratings. Examples include surveys, inventories, institutional/departmental data, departmental/course-level exams (locally constructed, standardized, etc.).

Qualitative Methods of Assessment: Methods that rely on descriptions rather than numbers. Examples include ethnographic field studies, logs, journals, participant observation, and open-ended questions on interviews and surveys.

Reliability: Reliable measures are measures that produce consistent responses over time.

Reflective Essays: generally brief (five to ten minute) essays on topics related to identified learning outcomes, although they may be longer when assigned as homework. Students are asked to reflect on a selected issue. Content analysis is used to analyze results.

Rubrics: Written and shared for judging performance, rubrics indicate the qualities by which levels of performance can be differentiated, and anchor judgments about the degree of achievement.

Student Outcomes Assessment: The act of assembling, analyzing and using both quantitative and qualitative evidence of teaching and learning outcomes in order to examine their alignment with stated purposes and educational objectives and to provide meaningful feedback that will stimulate self-renewal.

Summative evaluation: Accountability-oriented assessment. The use of data assembled at the end of a particular sequence of activities, to provide a macro view of teaching, learning, and institutional effectiveness.

Teaching-Improvement Loop: Teaching, learning, outcomes assessment, and improvement may be defined as elements of a feedback loop in which teaching influences learning, and the assessment of learning outcomes is used to improve teaching and learning.

Validity: As applied to a test, validity refers to a judgment concerning how well a test does in fact measure what it purports to measure

References:

Adapted from Assessment Glossary compiled by American Public University System, 2005
<http://www.apus.edu/Learning-Outcomes-Assessment/Resources/Glossary/Assessment-Glossary>

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APPENDIX A

Examples of Program Level Outcomes by Discipline

Sample Program Learning Outcomes for Mathematics Majors

Graduates of our program will be able to:

- Understand and apply the role of axioms and assumptions in the formulation of mathematical definitions and theorems.
- Understand the basic rules of logic and demonstrate their ability to follow the logical flow of proofs.
- Distinguish a coherent mathematical argument from a fallacious one.
- Understand the core concepts of analysis and algebra, or key techniques of applied mathematics and demonstrate the ability to analyze mathematical models.
- Recognize which real-world problems are subject to mathematical reasoning.
- Make vague ideas precise by representing them in mathematical notation, when appropriate.
- Use a variety of techniques for solving problems expressed in mathematical notation.
- Formulate a mathematical statement precisely.
- Develop and write a coherent proof using proper sentence structure and grammar.
- Present a mathematical argument verbally.
- Understand and explain mathematical arguments derived from a variety of sources including textbooks, research papers, and research presentations.
- Demonstrate sufficient experience in mathematical language and foundational material to be well-prepared to extend ones mathematical knowledge further through independent reading.
- Demonstrate and present evidence of successful experience in solving mathematical problems presenting substantial intellectual challenge
- Use problem-solving skills in a broad range of significant mathematics.
- Understand what constitutes mathematical thinking, including the ability to produce and judge the validity of rigorous mathematical arguments.
- Communicate mathematical ideas and arguments.
- Be prepared to use mathematics in their future endeavors, not only in the discipline of mathematics, but also in other disciplines as well.
-

Sample Program Learning Outcomes for Physics Majors

Graduates of our program will be able to:

- Demonstrate a proficiency in the fundamental concepts in each of the major areas of physics.
- Understand a broad range of experimental and data-analysis techniques and demonstrate their ability to use these techniques in both designing and conducting scientific experiments and observations.
- Demonstrate their ability to read, understand, and critically analyze the physical ideas presented in published textbooks and journal articles.
- Demonstrate their ability to present information clearly, logically, and critically, both orally and in writing.
- Demonstrate both an understanding and the practical application of the ethical standards implicit in science, such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data and conclusions.
- Be fully prepared for graduate study in physics and/or careers in scientifically oriented jobs in the public or private sector.

Sample Program Learning Outcomes for Chemistry Majors

Graduates of our program will be able to:

- Understand the traditional core of chemistry (organic, inorganic, analytical and physical chemistry) and demonstrate the ability to apply this knowledge at an advanced level.
- Demonstrate a working knowledge of at least one or two new or specialty areas of chemistry (for example, biochemistry, environmental chemistry, organometallic chemistry, polymers) and/or a deeper knowledge of the traditional core areas and/or proficiency in research.
- Apply quantitative or qualitative theories of molecular behavior to a broad variety of chemical problems.
- Competently perform a broad variety of analytical and synthetic procedures and critically evaluate the results.
- Skillfully utilize the chemical literature.
- Communicate scientific information orally and in writing.
- Develop high levels of the knowledge and skills for admittance to and success in graduate programs in chemistry, biochemistry and related fields.
- Develop high levels of the knowledge and skills to secure employment and achieve success in chemistry, biochemistry or related fields directly upon graduation.
-

Sample Program Learning Outcomes for Sociology Majors

Graduates of our program will be able to:

- Demonstrate a working knowledge of the core concepts of sociology (social structure; culture; social stratification and inequality; race, ethnicity, and gender; and globalization).
- Demonstrate a working knowledge of the nature, methods, and critical thinking skills in qualitative and quantitative research methodologies in the field.
- Apply their understanding of sociology to their professional, personal and civic lives.
- Develop an appreciation for the rich diversity within and between societies and cultures
- Demonstrate an understanding of the discipline's major theories
- Be able to understand and critique the content of scholarly articles employing a range of disciplinary methods and perspectives.
- Be able to develop, organize, and complete a research project and present it systematically in a paper that includes a critical review of past research on the subject, an effective application of theories to the issue, appropriate collection of data, clear and accurate presentation of results, and discussion of the disciplinary and practical implications of the research findings.

Sample Program Learning Outcomes for Anthropology Majors

Graduates of our program will be able to:

- Demonstrate a basic understanding of the field of cultural anthropology.
- Demonstrate awareness of the sub-fields within anthropology (biological anthropology, archaeology, linguistic anthropology, cultural anthropology) and of applied anthropology.
- Demonstrate a basic understanding of ethnography and how it differs from other types of qualitative and quantitative research methods in the social sciences.
- Demonstrate an awareness of the variety, variability and relativity of social categories and systems of meaning around the world.
- Demonstrate a familiarity with different cultures in at least one ethnographic region of the world.
- Demonstrate knowledge of the history of anthropology and the development of the major theoretical perspectives of the discipline.

- Demonstrate an understanding of complex research problems, and apply appropriate methods and theories to the study of these problems.
- Design and carry out an anthropology research project, understand both qualitative and quantitative research methods, and identify the underlying assumptions in theoretical orientations and methodological approaches.
- Demonstrate anthropological skills applicable to solutions to present day concerns, both locally and globally.
- Effectively communicate anthropological knowledge through writing and oral presentation in various formats for diverse audiences

Sample Program Learning Outcomes for Psychology Majors

Graduates of our program will be able to:

- Develop a knowledge base of psychology
- Develop expertise in using research methods of psychology
- Develop critical thinking skills for the consumption and interpretation of academic and nonacademic knowledge
- Learn how to apply psychology to real world problems
- Demonstrate informational and technological literacy
- Communicate effectively in writing and speaking
- Show an understanding of the significance of psychological research
- Develop an understanding of the sociocultural context of psychology
- Show mastery of the subject matter of core content areas of research in psychology.
- Demonstrate the ability to design and report original research conducted in psychology.
- Communicate empirical findings and critical analysis of research findings effectively in oral and written presentations.
- Demonstrate the application of ethical principles of research in psychology.

Sample Program Learning Outcomes for History Majors

Graduates of our program will be able to:

- Demonstrate a base of knowledge about important periods, events, and ideas in various regions of the world.
- Understand the historical context of ideas and events and evaluate differing scholarly interpretations of the past.
- Critically evaluate and analyze historical evidence, when appropriate, in the form of primary documents.
- Write articulately and persuasively based on critical understanding and logical, rigorous, and creative thinking.
- Speak articulately and persuasively, based on critical understanding and logical, rigorous, and creative thinking.
- Demonstrate basic research skills and understanding of historical methods, including and ability to use the library and read intelligently and with purpose.
- Demonstrate a synthesis of all of the above in an encompassing historical literacy

- Promote critical thinking skills: encourage students to acquire the ability to synthesize and analyze disparate forms of information.
- Provide students with basic and advanced research skills, including fluency with relevant print and virtual bibliographic and research guides.
- Recognize the diversity of human experience over time
- Discuss the processes and dynamics of historical change.
- Evaluate historical scholarship
- Assess evidence used by historians
- Pursue independent historical research
- Construct a historical interpretation
- Write clear and persuasive historical prose

Sample Program Learning Outcomes for Political Science Majors

Graduates of our program will be able to:

- Demonstrate an understanding of fundamental political processes, institutions, actors, behavior, and ideas; and familiarity with major theories, methods, and concepts in Political Science and its major sub-fields.
- Demonstrate proficiency in thinking systematically about political interactions in national, global, and international contexts.
- Demonstrate proficiency in thinking systematically about the ethical dimensions of politics.
- Write effectively, engage in intellectually grounded oral debate and form and express cogent arguments.
- Synthesize, analyze, and critically evaluate major arguments in the discipline.
- Assess original and secondary sources of argumentation and evidence, and apply scholarly findings to new situations.
- Demonstrate continuing engagement in public affairs on local, national, and/or international levels.
- Possess the intellectual skills for graduate work and employment.
- Identify and apply concepts and theoretical approaches that pertain to a relevant political science research question or puzzle in the student's field of study.
- Use appropriate methods to critically examine relevant texts or phenomena, or to test hypotheses informed by theoretical arguments or propositions.
- Use sound reasoning and marshal evidence in a rigorous manner to make critical arguments and derive related implications.
- Demonstrate a respectable understanding of the politics of at least one country/region outside the United States

Sample Program Learning Outcomes for Philosophy Majors

Graduates of our program will be able to:

- Be able to formulate rationally grounded views on issues of central importance to human experience, including questions about the nature of the world, our place within it, and how we ought to act.
- Be able to offer a balanced and fair evaluation of the views of others, both in readings and in discussions.
- Be familiar with the history of philosophical thought, and with the general metaphysical, epistemological and ethical issues that guide the discipline today.
- Be able to interpret and extract an author's arguments from a text, and to offer novel, substantive commentary on philosophical positions.

- Be able to write clear and cogent arguments in defense of their positions.
- Be able to discuss in an articulate manner issues that arise in class and in their own work.
- Be prepared to excel in the best graduate programs in Philosophy, should they decide to continue their education
- Demonstrate a general comprehension of several major periods and authors in the history of Western philosophy.
- Demonstrate skill in constructing and evaluating argumentation.
- Demonstrate skill in developing and evaluating interpretations of philosophical texts.
- Appreciate the fundamental ambiguities and complexities involved in the human attempt to answer questions about knowing, valuing, and living.

Sample Program Learning Outcomes for Communications Majors

Graduates of our program will be able to:

- Develop, organize, support, express, and defend ideas in a precise, clear, effective, and systematic manner in oral presentations.
- Develop, organize, support, express, and defend ideas in a precise, clear, effective, and systematic manner in writing.
- Demonstrate the skills necessary to:
 - a. utilize a variety of research methods
 - b. review literature
 - c. critique published literature
 - d. critique arguments
 - e. conduct original research
- Possess an ethical and critical framework within the field of communication and media studies that fosters the development of critical thinking skills, a social consciousness and global awareness.
- Demonstrate their mastery of critical thinking skills, creative and imaginative uses of form and technology, and career preparedness.

Sample Program Learning Outcomes for Biology Majors

Graduates of our program will be able to:

- Demonstrate their biological literacy
- Demonstrate a working knowledge of the traditional core of biology (molecular, cellular, genetics, organismal, ecological).
- Demonstrate a substantive knowledge of other fields of science and how they relate to biology.
- Demonstrate a working knowledge of newer and/or specialty areas of biology and/or deeper knowledge of the traditional core areas of biology of particular interest to them.
- Apply their understanding of biology to their professional, personal and civic lives.
- Demonstrate their knowledge of fundamental biological principles and their implications.
- Utilize scientific methods of inquiry and the philosophy of science, including methodologies for distilling biological information.
- Design and conduct an independent scientific investigation.
- Use scientific information to make reasoned decisions.
- Communicate scientific information effectively.

- Demonstrate their understanding of the role of creativity in science.
- Develop well-reasoned experimental hypotheses and design experiments and define experimental predictions by which to test them
- Understand the importance of a statistical sample, the meaning of statistical significance, and how to apply appropriate statistical treatments to different data sets
- Students will be able to communicate clearly and explicitly, both orally and in writing, following conventional scientific formats.
- Students will show proficiency in reading, understanding and critically evaluating scientific literature across major areas of the curriculum
- Students will demonstrate an ability to collaborate effectively in cooperative laboratory and field-based experimental projects
- Students will demonstrate proficiency in independent research, understanding a research topic and the associated methods to a level that allows them to problem-solve and take ownership of a project

Sample Program Learning Outcomes for English Majors

Graduates of our program will be able to:

- Analyze a variety of texts and respond to their aesthetic and cultural value.
- Respond to a wide range of literary and filmic texts and understand their historical and cultural contexts.
- Articulate ideas effectively in discussion and in oral presentations.
- Write coherently, imaginatively, and persuasively, with proper attention to effective organization and with clarity and purpose, using the conventions of the discipline.
- Interpret literary texts and other cultural forms, using close reading and other interpretive strategies.
- Demonstrate the ability to develop, organize, and articulate a critical analysis. Students will demonstrate familiarity with major historical periods and genres.
- Understand the connections among language, literature and culture.
- Identify and employ research methods and critical practices used to investigate and interpret diverse literary texts and other cultural forms.
- Read literary works closely, with focused attention to the nuances of language, content and form.
- Compose thesis-driven, textually supported literary analyses based upon their readings of literary works.
- Demonstrate a knowledge of literary terms, genres, devices, figures of speech, and poetic, dramatic, and narrative forms.
- Develop an understanding of literary analysis as a discipline, which will involve acquiring familiarity with the goals, terminology and methods of literary criticism as it has been practiced in the past several decades.
- Demonstrate a familiarity with major periods and authors of the English/American literary tradition.
- Explain how language and literary works shape their perceptions of themselves and their world

Sample Program Learning Outcomes for Environmental Studies Majors

Graduates of our program will be able to:

- Recognize environmental problems as existing across the margins of scientific, political, and humanistic discourse, amenable best to interdisciplinary comprehension.

- Demonstrate competence in understanding the geological factors affecting the management of the environment.
- Demonstrate competence in understanding the structure and function of biological ecosystems and ecology.
- Demonstrate an understanding of the geological factors affecting the management of the environment.
- Demonstrate an understanding of the structure and function of biological ecosystems and ecology.
- Demonstrate an understanding of quantitative and qualitative research methods as applied to questions related to the natural environment.
- Demonstrate effective oral and written communication necessary to construct, evaluate, and present solutions to environmental problems.
- Demonstrate the knowledge, skills and qualifications necessary for acceptance and success in graduate programs in Environmental Studies and Environmental Science.
- Understand the challenges and expectations of environmental careers in planning, business, non-profits, law administration, and education.

Sample Program Learning Outcomes for IAS Majors

Graduates of our program will be able to:

- Possess an interdisciplinary approach to international studies that provides political, economic, and historical perspectives on global issues.
- Undertake focused methodological exploration and research in order to provide detailed knowledge in one core area of international study.
- Demonstrate cross-cultural communication skills which will allow them to move beyond their native experiences and build an understanding of different cultures.
- Demonstrate comprehensive knowledge of a region of the world by successfully completing at least three courses from a variety of disciplines that concentrate on a single region
- Demonstrate their understanding of the contemporary world by successfully developing an interdisciplinary capstone project which signifies their understanding of the major contemporary issues facing the world
- Possess the leadership skills needed to meet the challenges of a rapidly changing world

Sample GENERIC Program Learning Objectives for ALL Majors

Graduates of our program will be able to [action verb]:

- "an ability to apply knowledge of"
- "an ability to design and conduct..... as well as to analyze and interpret data"
- "an ability to design ato meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety"
-: "an ability to function on multi-disciplinary teams"
- "an ability to identify, formulate, and solve problems"
- "an understanding of professional and ethical responsibility"
- "an ability to communicate effectively"

- "the broad education necessary to understand the impact of..... solutions in a global, economic, environmental, and societal context"
- "a recognition of the need for, and an ability to engage in life-long learning"
- "a knowledge of contemporary issues"
- "an ability to use the techniques, skills and tools necessary for....."

APPENDIX B

Resources for Rubric Creation

Association of American Colleges and Universities VALUE Project

The major achievement of the Valid Assessment of Learning in Undergraduate Education Project, completed in fall of 2009, was preparation of institutional-level rubrics for fifteen of the AAC&U Essential Learning Outcomes (e.g., oral communication, critical thinking). All of the VALUE rubrics are available for download in PDF format at the VALUE web site; those most closely related to the IUPUI PULs are linked directly in the Assessing IUPUI PULs section of this website. In addition, the Winter 2009 issue of the AAC&U *Peer Review* journal focuses entirely on the VALUE project. Though the entire journal must be purchased (IUPUI is a member, so reduced costs apply), several of the articles are available online for general readership. In addition, the Project published in January 2010 **Assessing Outcomes and Improving Achievement: Tips and Tools for Using Rubrics** (Terrel L. Rhodes, ed.), which can be ordered online at the reduced member rates.

IUPUI University Library

Information about information literacy in general as well as IUPUI standards for competency in each year of study.

University of West Florida, Center for University Teaching, Learning, and Assessment

Links to several web sites about rubric development.

University of Hawaii at Manoa, Assessment Center How-to Creating and Using Rubrics

Useful tips and how-to's for deciding whether and how to use rubrics, how to develop them, how to use them effectively in classes, and how to orient and calibrate group ratings for reliability.

St. John's University, Online Resources for Higher Education Assessment

Extended list of links to various organizations in the assessment and portfolios fields, plus glossaries, explanations, and papers.

North Central College (Illinois), Authentic Assessment Toolbox

Maintained by Professor Jon Mueller, the Toolbox section on Rubrics includes a helpful overview of the kinds and uses of rubrics as well as advice on creating them.

Community College of Philadelphia, Viewpoints: a journal of developmental and collegiate teaching, learning and assessment, "Building a Better Mousetrap: The Rubric Debate," Madeline Marcotte

Journal article provides an extended introduction--both philosophical and practical--to rubrics in higher education.

California State University Fresno, Institutional Research, Assessment and Planning, “Using Scoring Rubrics”

Provides a helpful summary of what rubrics are and how to develop them, along with suggestions for using them for both grading and program assessment.

“Creating a Rubric for a Given Task”

Though situated on a web site about WebQuests, this information can easily be generalized to other kinds of assignments at different educational levels.

