

# Mapping the Curriculum: A Low-tech Model for Synthesizing Assessments and Improving Learning at Multiple Levels

By Jennifer M. Harrison & Vickie Williams

## **Introduction**

Survey results published in the Winter 2017 issue of *Intersection* suggest that curriculum mapping is of great interest to faculty and staff working in assessment, regardless of their level of expertise (Gulliford, O'Brien, Curtis, & Peagler, 2017, p. 33). Fortunately, curriculum mapping is strategic process that is easy to achieve through low-tech means—in our case, using Excel. Our systematic model—which we presented on at the 2016 conference for the Association for Assessment of Learning in Higher Education—enables institutions to synthesize authentic assessment measures and use them to improve learning at multiple levels.

Provosts across the country identify classroom-level direct measures as valued assessment approaches, yet connecting and applying the resulting data can be challenging. Moreover, universities struggle to align student learning outcomes at each level—only 27% of doctoral universities report successful program-to-institutional outcomes alignment, and across all institutional classifications, only 42% of programs have aligned their outcomes to institutional outcomes (Kuh, et al, 2014, p. 8).

However, curriculum mapping with vertical alignment across levels empowers divisions, programs, and faculty to connect learning opportunities and results to build an institution-wide view of student learning. At the University of Maryland, Baltimore County (UMBC), a research university, vertically aligned curriculum mapping has become a vital process that engages faculty in learning assessment, creates connections across learning experiences, and makes it easier to use evidence of student learning at each level.

In this essay, we share what we've learned about curriculum mapping at UMBC. First we define the basic elements of curriculum mapping, then we explore vertical alignment, which empowers curriculum mapping to delineate clear connections from the institutional mission to a specific assignment. Finally, we examine how curriculum maps can help faculty close the loop, using direct-measure evidence to analyze results at each level.

## **What is Curriculum Mapping?**

A curriculum map diagrams relationships between learning outcomes and learning opportunities to show how the curriculum components work together to help learners achieve the outcomes. Curriculum mapping helps institutions and programs identify common ground, so faculty can share student learning successes, challenges, and ways to collaborate on interventions. Maps are flexible enough to be developed for an entire institution, college, or division; for degree and general education programs; or for courses.

Curriculum maps typically have three components:

1. Student Learning Outcomes
2. Student Learning Opportunities
3. A key to define intersections between outcomes and opportunities

Two additional elements make our curriculum map template more useful. Double boxes denote where key assessments will take place. To illustrate connections across institutional-, program-, and course-level outcomes, we added a fifth element to our curriculum maps: vertical alignment.

Figure 1 displays a curriculum map matrix that we created in Excel. Learning outcomes appear in the rows and learning opportunities in the columns. The rows are designed to present program-level outcomes, including explicit vertical alignment from program- to institutional-level outcomes. The columns denote core courses, electives, and co-curricular learning opportunities.

Figure 1. Curriculum map template

UMBC Curriculum Map Template for Programs

UMBC  
AN HONORS UNIVERSITY IN MARYLAND

Core Courses		Electives			Co-Curricular Learning			
100...								
Add your core course numbers above		Note electives or other requirements			Include internships, service learning, living learning communities, undergraduate research, etc.			

**Your Program's Curriculum Map**

Your Program's Student Learning Outcomes (SLOs)

1. Add your program student learning outcomes below. 2. Align and add your institutional-level learning outcomes. 3. Add courses and co-curricular learning opportunities to the columns.  
4. Use the key below to define the intersections between SLOs and learning opportunities.

Program-Level SLOs	Aligned Institutional-Level SLOs																
1																	
2																	
3																	
4																	
5																	

**Key:** In this course, students ...

Do not focus on this outcome	
Gain fundamental knowledge and skills in this outcome	1
Practice and build their learning in this outcome	2
Complicate and refine their learning in this outcome	3
Demonstrate mastery of this learning outcome	4
Double lines indicate formal assessments	

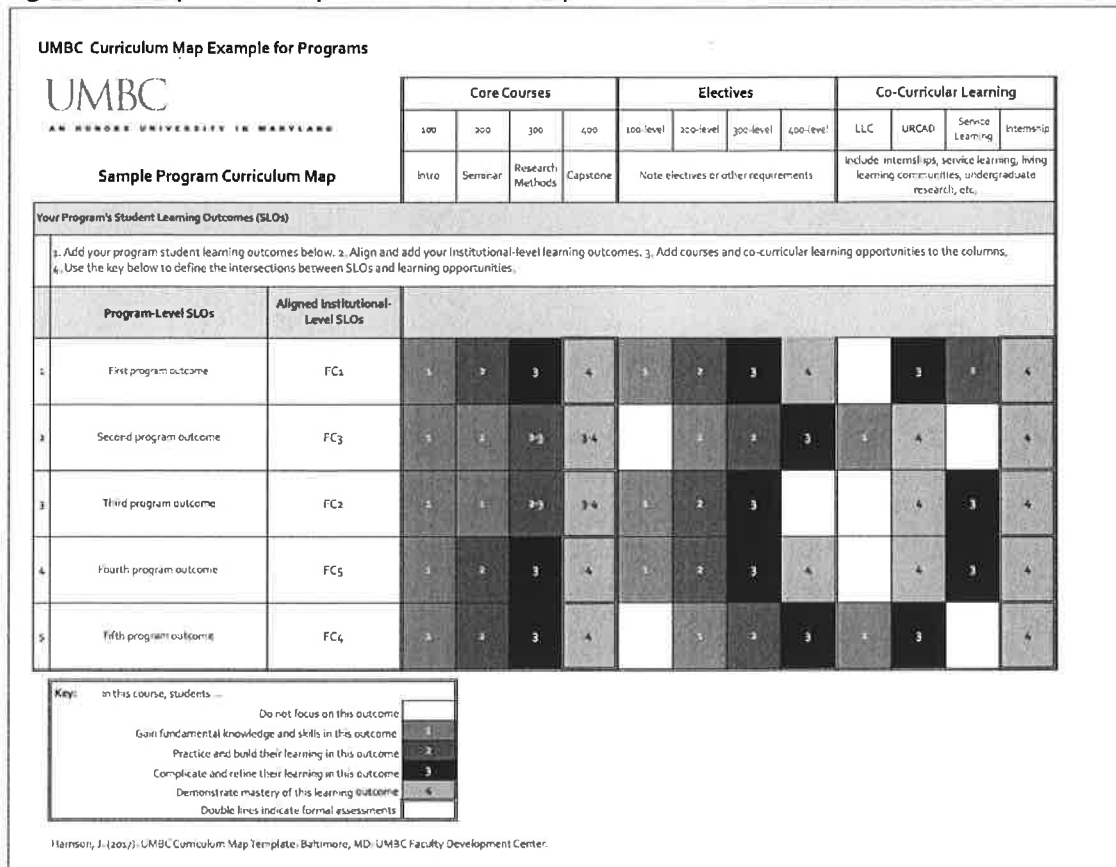
Harrison, J. (2022). UMBC Curriculum Map Template. Baltimore, MD: UMBC Faculty Development Center.

*The curriculum map template above helps faculty to illustrate how programs empower students to achieve learning outcomes across a range of learning opportunities.*

The matrix's key defines intersections between outcomes and opportunities, making visible how a program builds student learning from the point where students gain foundational ideas related to an outcome to the point where they demonstrate mastery of that outcome. The map captures the learning progression across a program, fostering clarity (or discussions to clarify) about where (and to what degree) students will develop each outcome. Thus, a curriculum map becomes a tool for discussing, analyzing, and improving a program. Additionally, the map can become a tool to guide students as they work to transfer skills from course to course and synthesize their learning. Advisors and mentors can use the map to show students what we want them to learn and be able to do at each stage of a program, contributing to their metacognitive development.

A typical program curriculum map (see figure 2) shows how faculty scaffold student learning across a series of courses—sometimes culminating in a portfolio, capstone, internship, service learning, or other experience. When faculty assess student learning at the upper levels and analyze the results, the map can help them to reflect on ways to close the loop. The visual simplicity makes it easy to find gaps in learning. For example, if capstone results suggest that students succeed in critical thinking but struggle with information literacy, faculty can collaboratively review the curriculum map to identify potential interventions to improve information literacy skills.

**Figure 2. Example of a completed curriculum map**



*This example curriculum map shows how faculty scaffold student learning, enabling students to achieve the learning outcomes through core courses, electives, and co-curricular learning opportunities.*

In contrast to a program curriculum map that scaffolds learning from the beginning to the end of a program, some programs require a different approach. General education programs, for example, connect student learning across disciplines, distribution, and outcomes. Undergraduate support programs, like UMBC’s Office of Undergraduate Education (OUE), also require a different approach, since they offer broad undergraduate support for new students just beginning their academic careers. The OUE map in figure 3 shows how the program supports students, particularly through high-impact practices, as they transition into their degree and study plans, preparing for disciplinary study. Students build their skills in the First-Year Seminars (FYS), the Introduction to an Honors University (IHU) courses, the Transfer Seminars (TRS), and/or the Collegiate Success Institute (CSI). Additionally, they learn through co-curricular programs like the New Student Book Experience (NSBE), and the Discovery Scholars Living Learning Community. Later in their studies, students can demonstrate higher-level outcomes through original research at the Undergraduate Research Creative Award Day (URCAD) and the Undergraduate Research Awards (URA).

**Figure 3.** Example of a curriculum map for the Office of Undergraduate Education

UMBC AN HONORS UNIVERSITY IN MARYLAND		Curricular Learning					Co-Curricular Learning			
		OUE courses					Other OUE Learning Opportunities			
Office of Undergraduate Education Curriculum Map										
Program-Level SLOs	Aligned Institutional-Level SLOs	FYS	IHU	TRS	CSI	Discovery	NSBE	URCAD	URA	
1 Written & Oral Communication	FC <sub>1</sub>	1-2	1-2	2-3	1-2	1-2	1-2	2-3	2-4	
2 Scientific & Quantitative Reasoning	FC <sub>2</sub>	1-2		2-3	1-2			2-3	2-4	
3 Critical Analysis & Reasoning	FC <sub>3</sub>	1-2	1-2	2	1-2	1-2	1-2	2-3	2-4	
4 Technological Competency	FC <sub>4</sub>	1-2	1-2	1-2	1-2	1-2		2-3	2-4	
5 Information Literacy	FC <sub>5</sub>	1-2	1-2	1-2			2-3	2-3	2-4	
6 Resilience: Assess and develop knowledge, skills, attitudes, and habits	NA	1-2	1-2	1-2	1-2	1-2		2-3	2-3	
7 Integrative learning; experience and reflect on future application of skills	All FCs+	1-2	1-2	1-2	1-2	1-2		2-3	2-3	

Key:	In this course, students ...
	Do not focus on this outcome
1	Gain fundamental knowledge and skills in this outcome
2	Practice and build their learning in this outcome
3	Complicate and refine their learning in this outcome
4	Demonstrate mastery of this learning outcome
	Double lines indicate formal assessments

The curriculum map above illustrates how the Office of Undergraduate Education builds students' skills in specific learning outcomes—particularly UMBC's institutional-level learning outcomes, the Functional Competencies (FCs)—and empowers them to apply these skills to their disciplines.

### **Why Is Vertical Alignment Central to Curriculum Mapping?**

Vertical alignment helps us to illustrate common ground across individual learning opportunities, since many audiences want to know how well students are learning at the institutional level. Student learning typically happens at the assignment level, so we need a way to gather the results at each level, and then synthesize, triangulate, and apply them to improving student learning. We make this possible by aligning each level of learning from institution to program to course to assignment, where we can measure directly. Moreover, the alignment process allows the assignment-level decision-making to reside in the course and remain a part of the academic freedom that most faculty value.

Like most universities, UMBC has an explicit mission statement that describes our goals—our central mission is to help students learn. To clarify exactly what we want our graduates to know and be able to do, we operationalize our mission through institutional-level learning outcomes (UMBC's Functional Competencies, or FCs). Each program contributes to helping students achieve these outcomes through discipline-focused program outcomes aligned to the institutional outcomes. Likewise, course outcomes align to program outcomes and assignment criteria align to course outcomes. As a result, assignment outcomes are embedded in the course outcomes, the course outcomes align to the program, the program aligns to the institutional goals, and every level contributes to the UMBC mission. Alignment clarifies relationships between direct measures and other data, so we can aggregate and close the loop at each level.

**How Can Curriculum Maps Contribute to Closing the Loop?**

Student learning develops at the assignment and course levels as students apply concepts and skills to specific challenges and demonstrate that they have achieved the outcomes. Direct measures, like rubrics and tests, help faculty analyze the results and determine whether students have learned effectively or whether interventions are needed. Mapping outcomes to the assignment level makes closing the loop easier, since data can be aggregated at the higher levels to gain a clearer view of how well students learned in the course, program, and institution.

We'll demonstrate how this works using a reflection essay assignment from a First-Year Seminar called FYS 102: Ethics, Diversity, and Social Justice in the Context of Schools. For this assignment, students reflect on their service learning placement experience in response to questions that echo course learning outcomes. To assess the essays, we use a descriptive rubric that delineates criteria for direct, measurable, student-oriented evidence in the rows with levels of achievement in the columns. Like the curriculum maps discussed above, the rubric maps the specific outcomes for this assignment horizontally. We aligned the assignment to the course outcomes explicitly in each rubric row and include them below to illustrate the multiple alignments.

**Figure 4.** First-Year Seminar Service-Learning Reflection Rubric

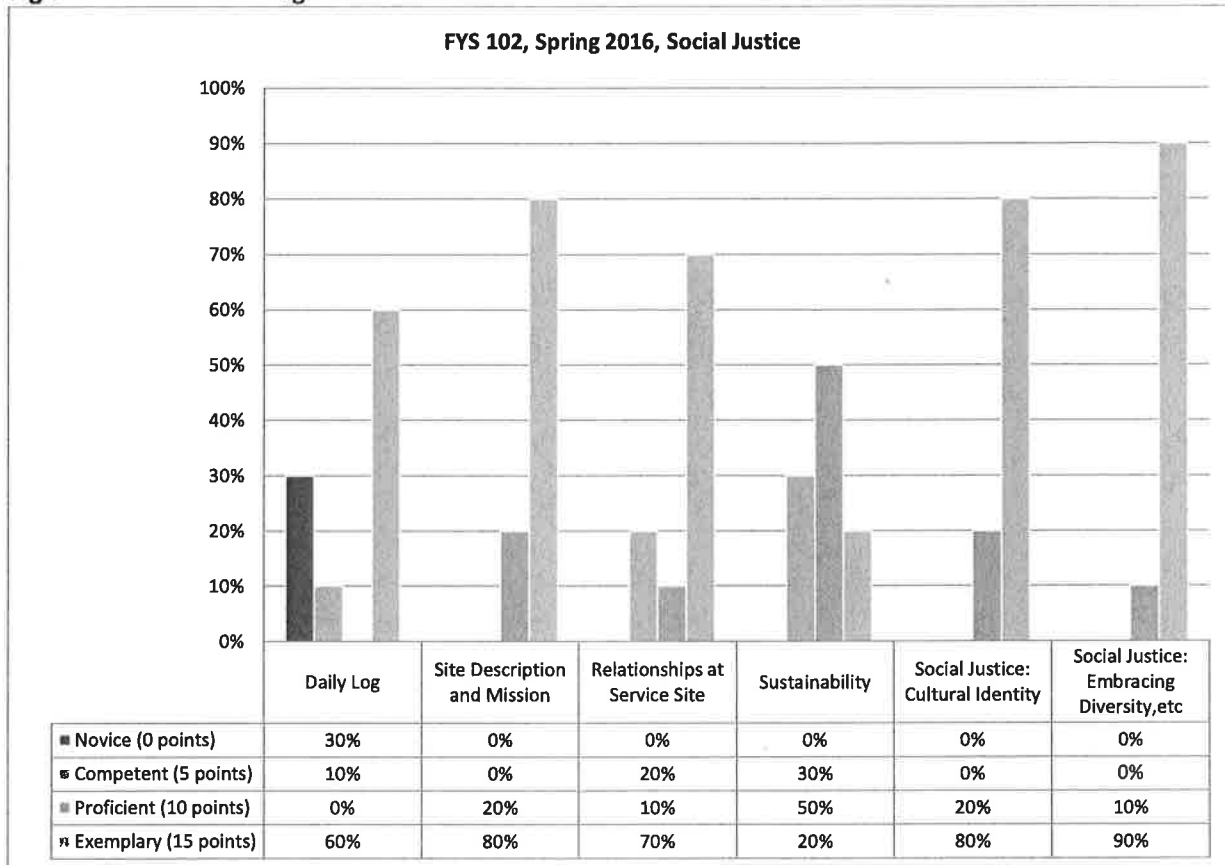
	Novice	Competent	Proficient	Exemplary
<b>Daily Log</b> FYS 102 Course SLO 1 FYS Program SLO 1 Institutional FC 1	0 Points Includes no daily logs	5 Points Includes less than 50% of logs for each visit	10 Points Includes all daily logs with meaningful entries that describe the experiences	15 Points Includes all daily logs with meaningful entries that fully describe the depth and breadth of experiences and relationships
<b>Site Description and Mission</b> FYS 102 Course SLO 1 FYS Program SLO 1 Institutional FC 1	0 Points Identifies location of service site but does not describe the operations or mission	5 Points Describes the location and operations of the site, but excludes the mission	10 Points Describes the location, operations, and mission of service site	15 Points Describes the location, operations, mission of service site with connections to social justice, & how your personal contribution serves the mission and provides advocacy
<b>Relationships at Service Site</b> FYS 102 Course SLO 2 FYS Program SLO 3 Institutional FC 3	0 Points Does not describe relationships built at service site	5 Points Describes relationships at service site superficially	10 Points Describes relationships at service site in depth and with breadth	15 Points Describes relationships at service site in depth and with breadth, and discusses how these relationships impacted you personally and how they impacted the site's mission
<b>Sustainability &amp; Other Challenging Issues</b> FYS 102 Course SLOs 3-5 FYS Program SLO 5 Institutional FC 5	0 Points Does not address sustainability or any challenges at the site	5 Points Addresses sustainability or other challenges, but does not propose any solutions	10 Points Addresses both sustainability & other challenges, and proposes possible solution(s)	15 Points Addresses both sustainability & other challenges, and proposes possible solution(s) directly linked to social justice

*A portion of the FYS 102 Service-Learning Reflection Rubric appears above. Each rubric row assesses student learning in the assignment. These criteria align to course student learning outcomes (SLO), program SLOs, institutional-level outcomes, and the UMBC Functional Competencies (FCs) as noted in red text above.*

As the rubric detail shows, students must demonstrate communication (FC1), critical reasoning (FC3), and information literacy (FC5) skills in this essay assignment. Since the rubric aligns the assignment to course outcomes, course to program outcomes, and program to institutional outcomes, we can use the assignment results at each level. Since the rubric builds common ground among FYS 102 and other classes, the data can be aggregated with results from other courses for views of program- and institutional-level learning. For example, we can analyze these results with data from FYS colleagues, identify shared learning challenges, and collaborate to improve student learning. At the program level, FYS leaders can aggregate learning data across the seminars to gain a program-level view of student learning and contribute to data aggregations at the institutional level.

To clarify, let's explore how this looks with a small sample of data. Figure 5 presents rubric results from one section of FYS 102 in Spring 2016. We'll look more closely at Sustainability, since we expected better results in this area. While 20% of students showed exemplary learning and 50% showed proficient learning, we're concerned about the 30% of students who demonstrated competent, or C-level, learning. We want our students to demonstrate proficiency in this area, since it measures information literacy skills, and students will face challenges in evaluating and synthesizing resources in future classes.

**Figure 5. Service-Learning Reflection Rubric results for one section of First-Year Seminar**



At the course level, we can use the results to triangulate these data with other direct and indirect measures, review student progress across a series of information-literacy-focused assignments, or compare to data from other sections.

To strengthen the analysis, we triangulated the service-learning reflection results with data from two other signature class assignments, case studies and problem-solving resolutions, also assessed by scoring rubrics. Like the service-learning reflection, these authentic assessments align to course objectives involving the evaluation of educational policies and practices and whether they narrow equity gaps and promote social justice in schools. Multiple assessment approaches are critical for goals aimed at instilling attitudes and values because direct evidence of these goals is often difficult to collect (Suskie, 2009). In all three performance assessments, students identify, evaluate, and interpret information resources informed by their experiences to propose social justice reforms.

Performance data from all three assignments (service-learning reflection, case study, and problem-solving resolutions) confirm that students successfully learn how to evaluate multiple sources of information to synthesize viable social justice solutions, but are less successful when evaluating how these resolutions are impacted by sustainability issues. Sustainability results on the scoring rubric helped us recognize this weakness in the information literacy FC.

Based on the above triangulation and comments in student self-evaluations on the same outcomes, we implemented interventions to raise students' scores on the sustainability indicator, including analyzing sustainability issues earlier in the course during problem-solving and case study discussions. Additionally, we attended two 16-hour workshops to learn how to teach this concept more effectively. We are considering other interventions for future semesters, such as a guest lecturer who is an expert in this area.

But the data can do more for us because of our curriculum map and vertical alignments. Are these students alone in their struggles with information literacy? When we compare direct measure evidence across First-Year Seminars, we find that many students struggle with this skill. So we have the opportunity to collaborate with colleagues on program-wide interventions to improve student learning in this area. Likewise, data can be rolled up to inform institutional-level assessment, where additional resources may be available to address common challenges.

At the institutional level, our data can be synthesized with hundreds of other measures across the institution. Without mapping alignments across the curriculum, we would lack this common ground, which enables faculty from any discipline to discuss shared learning successes and challenges and collaborate to create improvements. Our experiences with curriculum mapping at UMBC confirm the usefulness and flexibility of the curriculum map as a tool. More information about UMBC assessment is available on the UMBC Faculty Development Center's website at <http://fdc.umbc.edu/learning-assessment-at-umbc/>. Combined with vertical alignment, curriculum mapping helps us connect and apply authentic measures at multiple levels.

## **References**

- Gulliford, M., O'Brien, L., Curtis, M., & Peagler, C. (2017). How faculty experience with assessment relates to views, values, and practice. *Intersection*, 1(3), 33-37.
- Harrison, J. (2017). *UMBC Curriculum Map Template*. Baltimore, MD: UMBC Faculty Development Center.
- Harrison, J. (2015). *Sample UMBC curriculum map*. Baltimore, MD: UMBC Faculty Development Center.
- Harrison, J. M., & Williams, V. (2016, June 2). Creating direct measures for a diverse division. Presented at Lilly International 2016, Evidence-Based Teaching and Learning Conference, Bethesda, MD.
- Harrison, J. M., & Williams, V. (2016, Dec 9). Embedding assessment in everyday practices. Presented at Middle States Commission on Higher Education Annual Conference 2016, Philadelphia, PA.
- Harrison, J. M., & Williams, V. (2016, October 17). Mapping common ground: Connecting curricular and co-curricular learning. Presented at The 2016 Assessment Institute in Indianapolis, IN. October 16-18 <http://assessmentinstitute.iupui.edu/>
- Harrison, J. M., & Williams, V. (2016, June 7). Mapping direct measures across a diverse division: An interactive session. Presented at the Association for the Assessment of Learning in Higher Education 2016 Conference, Assessing What We Value: A Focus on Student Learning, Milwaukee, MI. <http://www.aalhe.org/events/conference-schedule-2/?>
- Kuh, G. D., Jankowski, N., Ikenberry, S. O., & Kinzie, J. (2014). *Knowing what students know and can do: The current state of student learning outcomes assessment in U.S. colleges and universities*. Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment (NILOA).
- Suskie, L. (2009). *Assessing student learning: A common sense guide*. 2d ed. San Francisco: Jossey Bass.
- Walvoord, Barbara E. (2004). *Assessment clear and simple: A practical guide for institutions, departments, and general education*. San Francisco: Jossey Bass, 2004.

*Jennifer M. Harrison, Ph.D. is UMBC's Associate Director for Assessment in the Faculty Development Center and can be reached at [jharrison@umbc.edu](mailto:jharrison@umbc.edu).*

*Vickie Williams, Ph.D. is the Director of Student Services for University System of Maryland, Baltimore County (UMBC) Department of Education and a faculty member in the First-Year Experience program. She can be reached at [vwilli5@umbc.edu](mailto:vwilli5@umbc.edu).*

## EXAMPLES OF EVIDENCE OF STUDENT LEARNING

*C = evidence suitable for course-level as well as program-level student learning*

### Direct (Clear and Compelling) Evidence of What Students Are Learning

- Ratings of student skills by field experience supervisors
- Scores and pass rates on appropriate licensure/ certification exams (e.g., Praxis, NLN) or other published tests (e.g., Major Field Tests) that assess key learning outcomes
- “Capstone” experiences such as research projects, presentations, theses, dissertations, oral defenses, exhibitions, or performances, scored using a rubric
- Other written work, performances, or presentations, scored using a rubric (C)
- Portfolios of student work (C)
- Scores on locally-designed multiple choice and/or essay tests such as final examinations in key courses, qualifying examinations, and comprehensive examinations, accompanied by test “blueprints” describing what the tests assess (C)
- Score gains between entry and exit on published or local tests or writing samples (C)
- Employer ratings of employee skills
- Observations of student behavior (e.g., presentations, group discussions), undertaken systematically and with notes recorded systematically
- Summaries/analyses of electronic discussion threads (C)
- “Think-alouds” (C)
- Classroom response systems (clickers) (C)
- Knowledge maps (C)
- Feedback from computer simulated tasks (e.g., information on patterns of actions, decisions, branches) (C)
- Student reflections on their values, attitudes and beliefs, if developing those are intended outcomes of the course or program (C)

### Indirect Evidence of Student Learning (Signs that Students Are Probably Learning, But Exactly What or How Much They Are Learning is Less Clear)

- Course grades (C)
- Assignment grades, if not accompanied by a rubric or scoring guide (C)
- For four-year programs, admission rates into graduate programs and graduation rates from those programs
- For two-year programs, admission rates into four-year institutions and graduation rates from those institutions
- Quality/reputation of graduate and four-year programs into which alumni are accepted
- Placement rates of graduates into appropriate career positions and starting salaries
- Alumni perceptions of their career responsibilities and satisfaction
- Student ratings of their knowledge and skills and reflections on what they have learned in the course or program (C)
- Questions on end-of-course student evaluation forms that ask about the course rather than the instructor (C)
- Student/alumni satisfaction with their learning, collected through surveys, exit interviews, or focus groups
- Voluntary gifts from alumni and employers
- Student participation rates in faculty research, publications and conference presentations
- Honors, awards, and scholarships earned by students and alumni

### Evidence of Learning Processes that Promote Student Learning (Insights into Why Students Are or Aren't Learning)

- Transcripts, catalog descriptions, and course syllabi, analyzed for evidence of course or program coherence, opportunities for active and collaborative learning, etc. (C)
- Logs maintained by students documenting time spent on course work, interactions with faculty and other students, nature and frequency of library use, etc. (C)
- Interviews and focus groups with students, asking why they achieve some learning goals well and others less well (C)
- Many of Angelo and Cross's *Classroom Assessment Techniques* (C)
- Counts of out-of-class interactions between faculty and students (C)
- Counts of programs that disseminate the program's major learning goals to all students in the program
- Counts of courses whose syllabi list the course's major learning goals
- Documentation of the match between course/program objectives and assessments (C)
- Counts of courses whose final grades are based at least in part on assessments of thinking skills as well as basic understanding
- Ratio of performance assessments to paper-and-pencil tests (C)
- Proportions of class time spent in active learning (C)
- Counts of courses with collaborative learning opportunities
- Counts of courses taught using culturally responsive teaching techniques
- Counts of courses with service learning opportunities, or counts of student hours spent in service learning activities
- Library activity in the program's discipline(s) (e.g., number of books checked out; number of online database searches conducted; number of online journal articles accessed)
- Counts of student majors participating in relevant co-curricular activities (e.g., the percent of Biology majors participating in the Biology Club)
- Voluntary student attendance at disciplinary seminars and conferences and other intellectual/cultural events relevant to a course or program (C)

Suskie, L. (2009). *Assessing student learning: A common sense guide* (2<sup>nd</sup> ed.). San Francisco: Jossey-Bass.



# UMBC Curriculum Map Template for Programs



AN HONORS UNIVERSITY IN MARYLAND

## Your Program's Curriculum Map

Core Courses			Electives			Co-Curricular Learning		
100...								
Add your core course numbers above			Note electives or other requirements			Include internships, service learning, living learning communities, undergraduate research, etc.		

### Your Program's Student Learning Outcomes (SLOs)

1. Add your program student learning outcomes below.
2. Align and add your institutional-level learning outcomes to the columns.
3. Add courses and co-curricular learning opportunities to the columns.
4. Use the key below to define the intersections between SLOs and learning opportunities.

Program-Level SLOs	Aligned Institutional-Level SLOs													
1														
2														
3														
4														
5														

**Key:** In this course, students ...

- Do not focus on this outcome
- Gain fundamental knowledge and skills in this outcome
- Practice and build their learning in this outcome
- Complicate and refine their learning in this outcome
- Demonstrate mastery of this learning outcome
- Double lines indicate formal assessments

1
2
3
4