Appendix A:

Student Learning Outcomes (SLOs)

HOUSTON COMMUNITY COLLEGE

Curriculum Map: Program Student Learning Outcomes
Program/Discipline: Mathematics

List program student learning outcomes (PSLO) across the top row and then individual courses down the first column.

A. For each course, indicate if the PSLO is not applicable, or taught at the basic, intermediate, or advanced level.
B. For each PSLO, check the core competencies substantially addressed.
C. Add additional sheets for additional courses and additional PSLO.

	Program SLO # 1: **Formulate algebraic and/or transcendental equations using variables to represent relations.**	Program SLO # 2: **Apply mathematics skills to solve application problems**	Program SLO # 3: **Construct, manipulate, and utilize mathematical functions**
1. Course Title, Rubric, and Number **College Algebra Math 1314**	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic Intermediate ☐Advanced
	*Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■R ■ W ☐S/L ■ CT ☐ C/IL
2.Course Title, Rubric, and Number: **Plane Trigonometry Math 1316**	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
3. Course Title, Rubric, and Number: **Finite Mathematics Math 1324**	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐ Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
4. Course Title, Rubric, and Number: **Elements of Calculus Math 1325**	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL

*Core Competencies: R = Reading W = Writing S/L = Speaking/Listening CT = Critical Thinking C/IL = Computer/Information Literacy

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5. Course Title, Rubric, and Number **Mathematics for Liberal Arts** **Math 1332**	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic Intermediate ☐Advanced
	*Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
6. Course Title, Rubric, and Number: **Statistics** **Math 1342**	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
7. Course Title, Rubric, and Number: **Mathematics for Elementary Teachers I** **Math 1350**	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐ Advanced	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
8. Course Title, Rubric, and Number: **Mathematics for Elementary Teachers I** **Math 1351**	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐Advanced	Taught at Level: ☐ N/A ■ Basic ☐ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL

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9. Course Title, Rubric, and Number **Discrete Mathematics Math 2305**	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■ Advanced	Taught at Level: ☐ N/A ☐ Basic ☐Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic Intermediate ■ Advanced
	*Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
10. Course Title, Rubric, and Number: **Linear Algebra Math 2318**	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■Advanced	Taught at Level: ☐ N/A ☐ Basic ☐Intermediate ■ Advanced	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
11. Course Title, Rubric, and Number: **Differential Equations Math 2320**	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■ Advanced	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ☐ Advanced	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
5. Course Title, Rubric, and Number: **Precalculus Math 2412**	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL

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12. Course Title, Rubric, and Number **Calculus I** **Math 2413**	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced
	*Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
13. Course Title, Rubric, and Number: **Calculus II** **Math 2414**	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■ Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐Advanced	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL
14. Course Title, Rubric, and Number: **Calculus III** **Math 2415**	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate ■Advanced	Taught at Level: ☐ N/A ☐ Basic ■ Intermediate ☐ Advanced	Taught at Level: ☐ N/A ☐ Basic ☐ Intermediate■ Advanced
	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL	Core Competencies: ■ R ■ W ☐S/L ■ CT ☐ C/IL

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Complete the following assessment report for the discipline/program student learning outcomes that were assessed this past year.
(See final page for assessment rubric that will be used to evaluate your report.)

Program OR Discipline Student Learning Outcome (SLO) assessed last year	**Description of Assessment- How did you assess the SLO?**	**Rubric or Method Used for Scoring of Assessment**	**Results-What were your findings?**	**Plan for Use of Results to improve Teaching and Learning –What changes were made or are planned to be made?**
Formulate algebraic and/or transcendental equations using variables to represent relations.	Selected a random sample of 15 courses in Math 1314 – College Algebra. Identified a question on the Departmental Final Exam that corresponded to the selected SLO, namely: ***Solve the following quadratic equation.*** Scantrons for each class were collected by the repective Math Department Chair and graded.	The selected question was graded in a boolean (i.e., correct/incorrect) manner on each Final Exam. The quadratic equation was $\mathbf{2x^2 = -12x - 7.}$ See question 4 below.	All Modes: **66.29%** N = **350** Traditional: **69.17%** N = **253** Online: **58.76%** N = **97**	Implement more engaging problem solving activities in class—aligned with the learning outcomes—and coordinate them throughout the Math 1314 classes. For the online courses, we will survey the online faculty, to determine the degree to which the PSLO was emphasized. This survey will be conducted in the Fall 2011. Once we have this information, we

				can implement a plan to improve student learning in the online environment. Potential solutions include a) writing the quadratic equation in standard form b) using a non-boolean rubric to assess student learning c) emphasizing real word problems in the context of quadratic equations d) creating a brief study guide for students in online courses that reviews solving linear and quadratic equations.

1. What changes were made as a result of this assessment? **A discussion of the changes made as a result of the assessment of at least one discipline/program SLO is required for every Annual Progress Report. The change might include curriculum revisions, faculty development, equipment/facility upgrades, etc. If these changes are detailed in a particular section below, please indicate.**

   This report offers an overview of the SLO assessment Houston Community College during the Fall 2009 – Spring 2010 academic Year in the discipline of college-level mathematics. The selected quadratic equation was not in standard form; i.e., the equation was of the form $ax^2 = bx + c$. We might have better results by selecting a quadratic equation that was in standard form, namely $ax^2 + bx + c = 0$. The results were not overly impressive in that the pass rate (overall) was 66.29%. We will raise the level of awareness of SLO assessment to all faculty, especially adjuncts. In particular, we will emphasize the notion that the Final Examination in Math 1314 will be used to assess one of the student learning outcomes for the course. In addition, it has been suggested that we, as a discipline, implement more engaging problem solving activities in class—aligned with the learning outcomes—and coordinate them throughout the Math 1314 classes.

   For the online courses, we will survey the online faculty, to determine the degree to which the PSLO was emphasized. This survey will be conducted in the Fall 2011. Once we have this information, we can implement a plan to improve student learning in the online environment. Potential solutions may include

   a) writing the quadratic equation in standard form
   b) using a non-boolean rubric to assess student learning
   c) emphasizing real word problems in the context of quadratic equations
   d) creating a brief study guide for students in online courses that reviews solving linear and quadratic equations.

2. If there was a rubric used district-wide to evaluate student achievement of the SLO when grading the test/paper/activity chosen as the district-wide assessment method for an SLO, attach it to this document.

   The multiple choice question was graded on a Boolean (i.e., correct/incorrect) basis. The selected question is given below:

$$\mathbf{2x^2 = -12x - 7.}$$

3. How were part-time faculty made aware of the assessment of the discipline/program student learning outcomes, and how were they included in the assessment activities?

Part-time Faculty were made aware of the assessment during semester staffing meetings held by each Department Chair. A greater emphasis will be placed on raising the awareness of SLO assessment for all faculty members next year.

4. Complete the first three columns of the assessment report for the discipline/program student learning outcomes ***that will be assessed next year***.

Program OR Discipline Student Learning Outcome (SLO) to be assessed	**Description of Assessment-How will you assess the SLO?**	**Rubric or Method Used for Scoring of Assessment-What methods will you use to score the assessment of SLO?**	**Results-*(To be submitted next year)*.**	**Plan for Use of Results to improve Teaching and Learning –*(To be submitted next year)*.**
Construct, manipulate, and utilize mathematical functions	***Selected a random sample of 20 courses in Math 1314 – College Algebra.*** ***Identified a question on the Departmental Final Exam that corresponded to the selected SLO, namely:*** ***Use the graph to determine the function's domain and range.*** ***Scantrons for each class were collected by the repective Math Department Chair and graded.***	***The selected question corresponding the the given SLO will be graded on each Final Exam.***	NA	NA