

ANNUAL SLOA SUMMARY: Mathematics and Science

Division: Math/Science

Academic Year: 2017

1. **Master Syllabi.** Please describe the progress made on master syllabi. (What is the percentage of master syllabi on file with the Academic Affairs Office for the courses in your division? What is the percentage of master syllabi that include outcomes and assessment procedures? Do all faculty, full and part-time, use the master syllabus to develop course guides?)

a. Total courses in the MSC Division

i. **Mathematics** 16

ii. **Engineering** 8

iii. **Science** 45

✓	Biology	17 (13 Gen Ed)
✓	Environmental	2
✓	Physics	7 (5 Gen Ed)
✓	Chemistry	7 (4 Gen Ed)
✓	Biotechnology	5 (1 Gen Ed)
✓	Physical Science	7 (7 Gen Ed)

b. Percent master syllabi that include outcomes and assessment procedures

i. **Mathematics** 15/16 = 93.7%

ii. **Engineering** 7/8 = 87.5%

iii. **Science** 44/45 = 97.7%

✓	Biology	17/17 = 100%
✓	Biotechnology	5/5 = 100%
✓	Environmental	1/2 = 50%
✓	Chemistry	7/7 = 100%
✓	Physical Science	7/7 = 100%
✓	Physics	7/7 = 100%

*BIO 203 and BIO 204 course numbers changed.

c. Do all faculty, full and part-time, use the master syllabus to develop course guides?

i. **Mathematics:** 94% of the courses (including those taught by adjuncts) have Course Guidelines for the students that are distributed on the first day of each semester. The Course Guidelines are an expanded version of the Master Syllabus for each course. MAT 209 was recently added and has only the Master Syllabus at this time but is running as a tutorial this FA17 semester.

ii. **Engineering** 100% of courses are taught by a single FT instructor and course guidelines are an expansion of the Master Syllabus.

iii. **Science**

✓	Biology
✓	Biotechnology
✓	Environmental
✓	Chemistry
✓	Physical Science
✓	Physics

95% of the Science courses provide course guidelines for the students which are an expansion of the Master Syllabus. Course Guidelines are not required to be posted on the website.

- 2. Course Outcome Guides (COGS).** Please describe the progress made on creating COGS. (What is the percentage of courses with COGs in your division? What courses need to have COGs developed? What are the obstacles to completing these COGs? What is your plan/timeline for completing this work?)
- a. What is the percentage of courses with COGS in your division?
 - i. **Mathematics:** 94% (15/16) courses have COGS on the Y drive and on the SLOA website. Any course with data older than SP 16 requires updating and the lead instructor is responsible for that.
 - ii. **Engineering:** 75% of the activated courses have COGS on the Y drive and on the SLOA website. Courses EGR 211 and EGR 206 do not have any data for COGs yet. All other courses have been updated through SP 16. Engineering will be added to the Einstein database in FY2018.
 - iii. **Science:** In order to complete this report, the “Einstein” database was finally able to print out a page of information for every Science Course. Some data came straight from Datatel: N=enrollment; %Success, %Withdrawal, Mean GPA. Instructors had to submit the remaining information that includes Walk-away Fs, Gen Ed Assessment results, and Common Final Exam results. Most of the actual assessment tools are on file in the Division Chair office. Instructors will be reminded of what is needed when 16FA data needs to be entered into Einstein.
 - iv. Some of the COGS do not have complete “Einstein” data and there is some item analysis and closing the loop. Faculty are probably doing one or the other (COG or “Einstein”). Einstein is not working correctly because when the instructors return the templates, the data is not consistent.
 - ✓ Overall COG situation (most are 17SP or 16SP but some are still in the process of being updated)
 - ✓ Fall 16
 - ASA section 1 adjunct (BIO 109), 1 FT (PHY 205)
 - # Essence Sections 23 (9 Science and 14 Math)
 - # adjuncts (all sections not including ESSENCE) 23 faculty teaching 52 sections (some teaching multiple)
 - #FT 19 faculty teaching (57 sections, 39 labs, 4 internships)
 - ✓ Spring 17
 - ASA section 1 FT (PHY 205, BIO 109 discontinued)
 - # Essence Sections 39 (26 Math and 13 Science)
 - # adjuncts (all sections not including ESSENCE) 27 faculty teaching 54 sections (some teaching multiple) – 1 RAD program
 - #FT 19 faculty teaching (71 sections, 36 labs, 4 internships)
 - ✓ Data sheets were sent from Einstein for FA16, SP17 and the data was collected and stored on the Y drive to be imported. Importing the data in to Einstein still has glitches due to data inconsistencies and the database is still a work in progress that needs courses updated.

- ✓ For AY18 faculty will link the course outcomes to the specific assessment item that will allow the computer to print out the content that needs more work. This has not been done yet.
- ✓ Biology 12/16 courses have COGS on the website. 12 out of 16 COGS are up-to-date (SP16, SP17, SU17, FA16). The remaining 4 COGs are not updated through the present as some reports from PIE were just received in September 2017. Two of the courses have changed course number BIO 103 to BIO 203 and BIO 104 to BIO 204 and the updates have not yet been made.
- ✓ Biotechnology 4/6 courses have COGS on the website. BTC 111 is a special topics course and has only been taught twice and has changed content for FA17; BTC 102 is usually taught as an internship on campus. The COGS that are posted need to be updated.
- ✓ Environmental COGS have not yet been created as the ENV 201 is being offered this FA17 semester.
- ✓ Chemistry: 6/7 out of courses have updated COGS through SP17. CHM 205, Intro to Biochemistry is a new course, did not run for 17SP and does not yet have a COG. These COGs include an analysis of the ACS data and the Gen Ed assessment.
- ✓ Physical Science: The only course without a COG is PHS 113 (which was updated in "Einstein"). This course is Oceanography which is a newer course from the AMS and is only taught in the spring semester. The PHS 105 COG should be updated this semester.
- ✓ Physics: All the physics courses have COGS and the data is updated to SP17 or FA16.

3. Assessment of Course Outcomes: Please describe how course outcomes are being assessed. (What assessment instruments are being used? What's the data showing? How is data being used to improve teaching and learning? Where/how is the data stored?)

a. **Mathematics:** What assessment instruments are being used?

All mathematics courses have a common assessment that is administered with the final exam. This is especially important for courses with more than one section and for off-campus courses (ex. The ESSENCE courses in area high schools). Assessment scores are entered into MATHY by the faculty with the COG data. All data is available on the website.

- i. The MAT 101 course has a 5 problem course assessment which is a supplement to the final exam. The problems are graded with a rubric by faculty (one instructor per problem to insure consistency). The maximum score on this exam is 35. The data for this assessment goes back over 10 years and has been consistent from year to year. The MAT 103 course uses this same 5 problem course assessment.
- ii. The MAT 109 course has a 19 point common assessment which has been in place for several years.
- iii. MAT 114 course has a 10 point common assessment.
- iv. Upper level mathematics courses have specific questions embedded in exams which are matched to Program Learning Outcomes. These questions are chosen from sources for which a national benchmark can be attained. These sources include retired Praxis, SAT Subject, GRE Subject, and AP test

questions. Each source has data available on the scoring of the questions on a national level that faculty can then use as a benchmark for HCC students. Some courses have no known source of benchmarked data (MAT 208, for example) so the instructors collaborated with Hood College on a set of questions that both institutions give to Linear Algebra students.

v. **What is the data showing?**

(sample of data available on the website and Table 1 of this summary)

Table 1. Benchmarked Assessment Data, 2015

CAAP Institutional Summary Report 10/25/15				
	HCC	National PB	HCC n	Natl n
Mathematics	58.6	56.1	27	21971
Science	61.8	59.1	34	15966

CAAP Mathematics	HCC	National PB	HCC n	Natl n
Basic Algebra	15.9	14.2	27	21971
College Algebra	15.5	14	27	21971

Expected Learning Outcome	HCC Average Score AY15	Benchmark Average Score AY15
Computational and Algebra Skills	48.6%	54.6%
Geometric Skills	49.8%	49.6%
Statistical Skills	58.3%	58.8%
Proof and Reasoning	56.1%	56.8%
Technological Skills	77.3%	NA
Communication Skills	66.0%	62.9%
Collaborative Skills	97.5%	None available

b. **Engineering.** There is a common course assessment for all engineering courses. Since there is only one section of most courses (Except for EGR 103), the assessments are being saved and comparisons are made for each year. Although the engineering courses are not 4 credit lab courses (except Systems and Circuits) the instructor has added hands-on projects to the courses in which students apply the theory from the lecture and engage in the material enthusiastically.

c. **Science.** All sections of a given Gen Ed courses have a common Gen Ed Assessment. The assessment tools are on file in the Division Office. The number of questions is provided on the Course SLOA Report. The % score on the Gen Ed assessment is entered into Einstein by every instructor. The questions on the Gen Ed Assessment need to be linked to the Course Outcome that is being measured. This is a goal for AY2018. All sections of a given course also have a common final exam and the results of that exam is also found on the Course Report attached.

4. Program Outcome Guides (POGS) Please describe the progress made on POGS. (What is the percentage of programs with POGs in your division? What programs need to have POGs developed? What are the obstacles to completing these POGs? What is your plan/timeline for completing this work?)

- a. What is the percentage of programs with POGs in your division?
100% of the Programs in the MSC Division have a POG. The POGS attempt to document how:
- ✓ each expected program outcome is being assessed,
 - ✓ the course outcomes for each program requirement relate to the Program Outcomes and the program outcomes contribute to satisfying the Institutional Learning Outcomes (ISLO). A draft of the new ISLOs was provided to the Division Director this September and the POGs will need to be updated.
- b. The POGS available on the website are listed below with the date when each was updated. All of them need some work to address the three expectations above.
- Mathematics (AS) (2015)
 - Engineering (AS) (2016)
 - Biology (AS) (2014)
 - Biotechnology (AAS) (2014)
 - Chemistry (AS) (2017)
 - Physics (AS) (2017)
 - Pre-Pharmacy (AS) (2015)

5. Program Outcome Assessment. Please describe how program outcomes are being assessed.

- a. Mathematics
- i. Have course matrices been developed for all programs? They have been developed but some of them need to be updated.
 - ii. What assessment instruments are being used? Most of the programs are being assessed at the course level. Matrices relate the Course Learning Outcomes to the Program Learning Outcomes.
 - iii. What's the data showing? Mathematics data show that students are achieving the learning outcomes. (See Table 1)
 - iv. How is data being used to improve teaching and learning? Closing the Loop documentation needs attention.
 - v. Where/how is the data stored? Data is being stored on the website. Can be accessed by SEARCH Mathematics POG
 - vi. What is missing on the POGs are the retention, graduation, and completion data for the mathematics program. This data is shown in the table below:

AA/AS Mathematics Program

	AY 2013	AY 2014	AY 2015	AY 2016	AY 2017
	AA/AS	AA/AS	AA/AS	AA/AS	AA/AS
	2011/2015 Catalogue	2015 Catalogue	2015 Catalogue	2016 Catalogue	2017 Catalogue
New Students	25	26	31	32	18
Retention Fall → Spring	68%	85%	81%	79%	69%

Retention Fall → Fall	45%	48%	46%	46%	46%
Students (Math Program)	27/32	8/60	0/68	74	65
Graduates AS Mathematics	9	12	10	17	13
AS Engineering	4	9	17	16	16

b. Engineering

- i. The Program::Course Matrix for Engineering has been developed and is on the Y drive and the website.
- ii. The Program Outcomes are assessed primarily at the course level and include problem-based assessments, projects involving application of course learning outcomes.
- iii. Internships are being encouraged.

c. Biotechnology

- i. The students are expected to master a set of technical skills which are documented at the course level
- ii. A laboratory notebook is maintained for every lab course in the program
- iii. The completion of a hands-on, skills-based internship is no longer required.

d. Biology

- i. The program is assessed mostly at the course level and a course: program matrix is available on the SLOA website.
- ii. A capstone research project (Stream Study) is completed in BIO 114 and one is being created for BIO 106.
- iii. A capstone project is also completed in CHM 203/204 (Organic Chemistry I/II). This is a laboratory exercise requiring the use of the Gas Chromatograph and other sophisticated chemistry equipment.

e. Chemistry

- i. The program is assessed mostly at the course level and a course program matrix is available on the SLOA website.
- ii. Every chemistry lab course requires the completion of written laboratory reports
- iii. Chemistry courses are assessed with standardized final exams from the American Chemical Society (ACS).
- iv. A capstone project has been incorporated into the final course of the program, Organic Chemistry II. The project involves the use of the gas chromatograph, a sophisticated instrument available since the opening of the new STEM facility.

f. Physics

- i. The program is assessed primarily at the course level and a course: program matrix is available on the SLOA website
- ii. A capstone course, PHY 205 is required in the semester when students complete PHY 204 (Principles of Physics II).
- iii. A portfolio of lab reports for every lab completed is required.

- g. Every Math/Science Program (100%) has a chart which matches the Institutional Learning Outcomes to their Program Learning Outcomes. These will updated and could use some polishing and expansion, but they are a great start and area available on the HCC website.
- h. Validation of learning outcomes is benchmarked with CAAP assessment on a regular basis for general education courses. See #7 below (approximately 100 students per year, 50 math/50 science).

6. General Education Assessment. Please describe the progress made on General Education Outcomes Assessment. This is summarized on the General Education SLOA Summary reports for Mathematics and Science.

- a. Do all the general education courses in your division have common outcomes listed by discipline area on the syllabus? 100%
- b. What courses need to have common outcomes developed? None
- c. What are the obstacles to completing these common outcomes? This is complete. Obstacles overcome include lack of communication and dedicated time for working together.
- d. What is your plan/timeline for completing this work? We will be updating all the General Education SLOA materials annually.
- e. Do all the general education courses in your division have a common assessment procedure? Yes. See the GEN ED SLOA Report

7. General Education Course Assessment. Please describe how general education course outcomes are being assessed.

- a. (What assessment instruments are being used? Faculty have developed course assessments, usually 5-10 questions. This data creates a semester to semester database to compare learning over time and changes in course learning strategies. This in-house assessment strategy is validated with external assessments which are nationally normed.
 - i. CAAP testing has been done at least every other year on two sections of a general education mathematics class (MAT 101 and 109) and two sections of science classes (most recently BIO 106 and BIO 113 but over the last 8-10 years all the science gen courses have been included in CAAP testing.
 - ii. Math: PRAXIS questions from released PRAXIS exams
 - iii. Chemistry: American Chemical Society (ACS) nationally normed exams are used for all courses except CHM 101. HCC students usually score at or above the norm on these assessments.
 - iv. Biology: A&P I is assessed with an in-house exam which has been correlated with a normed exam used for A&P II (Human Anatomy and Physiology Society (HAPS). Remaining Gen Ed BIO courses have common assessments developed by the faculty.
 - v. Biotechnology: Common final exam for BTC 101. Not normed.
 - vi. PHS: Gen Ed assessments developed by individual faculty teaching the courses. All the PHS courses were taught by adjunct faculty until FA16 when the new full-time PHS faculty member was hired. He will be overseeing the Gen Ed assessments from FA16 onward.

- vii. PHY: Assessments are problem-based and graded with a rubric. They have been developed by the lead instructor.
- b. What's the data showing?
 - i. HCC Science students are achieving the general education course outcomes.
- c. How is data being used to improve teaching and learning?
 - i. There is very little documentation of how data is being used to improve teaching and learning. The Closing the Loop (CTL) Report prepared for Unit Planning includes some of this information.
- d. Where/how is the data stored?)
 - i. Until recently, data was added to the COG for every course and COGS were posted on the SLOA website. Now the mathematics data is entered into the Mathy database and science data is entered into the Einstein database.
 - ii. See the 2017 Course Reports for Mathematics and for Science.

General Education Mathematics Data AY 2017

MAT 101, College Algebra

Semester	N = # of students	# successful Students	Success, %	Walk away F	Withdrawal	Mean GPA	Course Out of 35	Gen Ed Out of 8
16/SU	66	50	75.8%	14	2	2.22	26.12	4.75
16/FA	341	268	78.6%	52	21	2.47	26.71	5.36
17/SP	336	277	82.4%	42	16	2.41	25.07	5.42
Total	743	595	80.1%	108	39	2.37	25.97	5.18

MAT 103, Finite Math

Semester	N = # of students	# successful Students	Success, %	Walk away F	Withdrawal	Mean GPA	Course	Gen Ed Out of 8
16/SU	not offered							
16/FA	6	4	66.7%	0	2	2.25	18.75	5.5
17/SP	not offered							
Total	6	4	66.7%	0	2	2.25	18.75	5.5

MAT 109, Introduction to Statistics

Semester	N = # of students	# successful Students	Success, %	Walk away F	Withdrawal	Mean GPA	Course Out of 19	Gen Ed Out of 8
16/SU	94	78	83.0%	6	10	2.72	7.42	4.96
16/FA	267	206	77.2%	35	26	2.46	8.02	4.94

17/SP	236	181	76.7%	39	15	2.34	8.16	4.72
Total	597	465	77.9%	80	51	2.51	7.87	4.87

MAT 114, Applied Algebra

Semester	N = # of students	# successful Students	Success, %	Walk away F	Withdrawal	Mean GPA	Course Out of 10	Gen Ed Out of 8
16/SU								
16/FA	22	21	95.5%	1	0	3.27	5.15	5.3
17/SP								
Total	22	21	95.5%	1	0	3.27	5.15	5.3

General Education Science Data AY 2017

Gen Ed Course	Avg % on Gen Ed Skills	Avg % on Final Exam	Gen Ed Assessment	Avg GPA	16SU, 16/FA & 17/SP Active	16/SU, 16/FA & 17/SP Complete	16/SU, 16/FA & 17/SP Success	F/U	Withdrawal
BIO 101	discontinued								
BIO 102	discontinued								
BIO 103	69.16	74.1	5 Question BIO	2.63	210	185	173	15	10
BIO 104	73.94	58.23	HAPS	2.84	191	171	162	10	9
BIO 106	73.28	77.2	5 Question BIO	2.56	164	143	125	16	5
BIO 110	70.45	68.16	5 Question BIO	2.56	404	332	303	49	23
BIO 111	64.57	51.16	5 Question BIO	2.06	18	12	12	4	2
BIO 112	62.69	63.73	5 Question BIO	1.99	53	31	30	16	6
BIO 113	84.66	75.46	5 Question BIO	2.29	118	94	82	15	9
BIO 114	78.19	74.54	5 Question BIO	3.00	39	38	36	1	1
BIO 116	74.0%	67.5%	5 Question BIO	3.10	17	16	16	0	1
BIO 117	offered as Essence Only			3.67	3	3	3	0	0

BIO 203	begins SU17 replaces BIO 103		5 Question BIO						
BIO 204	begins SU17 replaces BIO 104		HAPS						
BIO 205	77.42	73.75	5 Question Micro	3.41	155	151	151	1	3
BTC 101	85.4	85.5	5 Question BTC	3.26	50	49	48	1	0
BTC 103	offered as Essence Only			3.71	7	7	7	0	0
CHEM 101	49.05	69.8	8 question CHM	2.61	312	250	224	42	20
CHEM 103	76.14	55.55	8 question CHM	2.04	129	93	75	21	15
CHEM 104	81.49	59.11	8 question CHM	2.10	59	50	38	5	4
CHM 107	61	58.95	8 question CHM	1.87	20	16	12	3	1
EGR 103		74.2	none	2.69	33	27	25	3	1
EGR 108		78.9	none	3.25	15	13	13	1	1
EGR 203		77.7	none	2.83	18	15	12	3	0
EGR 204		76	none	3.00	15	14	13	1	0
EGR 206	new course but did not run								
EGR 208		77.1	none	2.77	10	8	8	2	0
EGR 210	new course began FA17		none						
PHS 104	56.22	69.58	5 Question PHS	2.26	60	48	42	11	1
PHS 105	73.37	67.42	5 Question PHS	2.69	45	37	32	5	3
PHS 107	76.15	86.05	5 Question PHS	3.10	21	20	18	1	0
PHS 108	76.15	86.05	5 Question PHS	2.94	39	31	30	5	3
PHS 109	81.29	72.06	7 question PHS 109	3.33	93	86	85	2	5
PHS 111	73.75	76.81	5 Question PHS	2.94	16	16	16	0	0
PHS 113	80.5	96.4	5 Question PHS	2.29	14	10	10	4	0
PHY 112	83	91	4 Questions PHY	2.40	5	4	4	0	0

PHY 201	79.7	75.95	4 Questions PHY	2.91	47	40	38	0	7
PHY 202	78.92	78.15	4 Questions PHY	2.71	15	12	12	2	1
PHY 203	79.5	82.7	4 Questions PHY	2.47	37	32	26	5	0
PHY 204	78.4	71.95	4 Questions PHY	2.35	26	22	21	6	0
PHY 205	76.82	76.9	4 Questions PHY	2.82	13	12	11	0	1
Totals					2471	2088	1913	250	132