

Course Outcomes Guide (COG)

Course Title: MAT109 (3 Credits) INRO TO STATS
Date: 6/27/19
Course Team: Tom Crawford, Joseph Mason, Richard Campbell, Alicia Myers, Steve Lindsey

STUDENT LEARNING OUTCOMES:

General Education: Upon successful completion of this course, students will have demonstrated the capacity to effectively...

- G1 Apply mathematical methods involving arithmetic, algebra, geometry, and graphs to solve problems.
- G2 Represent mathematical information and communicate mathematical reasoning symbolically and verbally.
- G3 Interpret and analyze numerical data, mathematical concepts, and identify patterns to formulate and validate reasoning.

Course: Upon successful completion of this course, students will have demonstrated Statistical Literacy (SL) and Statistical Reasoning (SR).

SL - Statistical literacy involves understanding and using the basic language and tools of statistics: knowing what statistical terms mean, understanding the use of statistical symbols, and recognizing and being able to interpret representations of data.

SR - Statistical reasoning is the way people reason with statistical ideas and make sense of statistical information. Statistical reasoning may involve connecting one concept to another (e.g., center and spread) or may combine ideas about data and chance. Reasoning means understanding and being able to explain statistical processes, and being able to fully interpret statistical results.

These skills/abilities will be applied to the follow course concepts generating 26 distinct course outcomes: SL1, SR1, SL2, SR2, ..., SL13, SR13.

- 1 – Data Collection
- 2 – Summarizing Data Graphically
- 3 – Summarizing Data Numerically
- 4 – Regression
- 5 – Probability
- 6 – Discrete Distributions
- 7 – Normal Distributions
- 8 – Sampling Distributions
- 9 – Parameter Estimation
- 10 – One Sample Inference
- 11 – Two Sample Inference
- 12 – Chi-Square Tests
- 13 – ANOVA

Assessment:

1. Up until Fall 2017 a common assessment (CA) was delivered to all students across all sections and delivery modes. This common tool was first used at the conclusion of the Fall 2012 semester and remains in place for dual enrolled students in the HS AP classroom.
2. This CA consists of 19 MC questions selected from AP Stats and Praxis Exams.
3. Effective SP18, the new CA for on campus sections of this course is the course mid-term and final exam.

Validation:

1. Moving away from an externally validated CA tool and to an internally developed mid-term and final exam has diminished ability to validate results.
2. Weighting of the course mid-term and final exam make overall course grade distribution an appropriate tool for SLOA.

Results:

1. Disparity between HS AP students and HCC students is pronounced when considering the proportion of letter grades earned. HS AP students have a much more right-skewed distribution. Similarly, HS AP students significantly outperform HCC students on CA items.
2. Collective HCC results (16 semesters) compared to national results indicate the proportion of HCC students answering each CA question correctly has been significantly lower than the national proportion.
3. Mean Course Grade indicates SLO results remain consistent with previous CA results.

Follow-up:

1. Off campus sections of this course are offered in a strictly AP environment. A higher proportion of A and B grades is to be expected as the on campus students are not held to AP level entrance requirements. Similarly, higher scores on CA items is to be expected as the CA items are selected from AP and Praxis exams whereas the on campus sections do not rise to this level of rigor.
2. HCC results have been remarkably consistent. Effort to address specific weaknesses were not indicated. However, efforts to address overall weakness are strongly indicated.
3. Previous CA results and Mean Course Grade (at current level of rigor) indicate course revision is required to more consistent with our transfer institution partners.

Closing the Loop:

1. Content objectives/performance expectations for this course have not been revised pending new developmental course pathway and Gen-Ed course offerings for delivery in FA19.
2. A new mathematics course, MAT115 – Quantitative Reasoning, has been developed to address the needs of those students requiring general studies math credit but not needing any additional mathematics for their program, transfer, or career intentions. This new course (offered FA19) should draw many non-STEMM students from MAT109 -Statistics.
3. MAT109 will be revised for rigor to be more consistent with our transfer institution partners and historical HCC offerings.
4. Dependent on the rate of non-STEMM student pathway transition to MAT115, the initial offering of a revised MAT109 course is anticipated to be SP20 or FA20.
5. Lead instructor will work with Rebecca Westmeyer to develop a “Mathy-Friendly” CA that is externally validated and consistent in content and rigor with our transfer institution partners.
6. A new CA will be instituted across all sections of this course.

Budget Justification:

1. No extraordinary funding is required for this course at this time.

Course: MAT 109

Lead Faculty: T. Crawford

	SU 2014	FA 2014	SP 2015	SU 2015	FA 2015	SP 2016	SU 2016	FA 2016	SP 2017	SU 2017	FA 2017	SP 2018	SU 2018	FA 2018	SP 2018
# Active students	120	214	234	90	225	212	94	267	236	51	244	178	80	268	190
# Withdraw % Withdraw	16 13.3%	22 10.3%	23 9.8%	13 14.4%	19 8.4%	19 9.0%	10 10.6%	26 9.7%	14 5.9%	7 13.7%	33 13.5%	18 10.1%	6 7.5%	18 6.7%	25 13.2%
# Walk-Away Fs* % Walk-Away Fs*	9 7.5%	24 11.2%	25 10.7%	0 0.0%	19 8.4%	29 13.7%	3 3.2%	25 9.4%	25 10.6%	10 19.6%	10 4.1%	23 12.9%	16 20%	27 10.1%	24 12.6%
# Success (A,B,C) % Success (A,B,C)	85 70.8%	125 58.4%	136 58.1%	69 76.7%	157 69.8%	139 65.6%	69 73.4%	188 70.4%	153 64.8%	29 56.9%	143 58.6%	95 53.4%	47 58.8%	167 62.3%	108 56.8%
Gen Ed SLOA	66.1%	64.4%	66.0%	N/A	64.9%	63.8%	62.0%	61.8%	59.0%	59%	63.5%	60.3%	57.0%	63.1%	60.1%
Course SLOA	43.3%	43.4%	43.1%	N/A	43.8%	42.5%	39.1%	42.2%	42.9%	43.1%	46.7%	61.2%**	N/A	65.2%**	81.6%**
SLOA Item Analysis	No Sig. Items	W - 12	No Sig. Items	N/A	No Sig. Items	No Sig. Items	No Sig. Items	No Sig. Items	No Sig. Items	Overall Imp.	Overall Imp. & New CA	Cumulative Final Exam See Grade Distribution	Cumulative Final Exam See Grade Distribution	Mid-Term Final Exam See Grade Distribution	Mid-Term Final Exam See Grade Distribution
Mean Course Grade	2.55	2.14	1.96	2.66	2.41	2.38	2.69	2.40	2.15	2.05	2.07	1.79	2.11	1.98	2.03

*Did not take the final exam and received a grade of F.

** Old CA only administered to HS AP Dual Enrolled Students