

Core Competencies
Mathematical, Information and Computer Sciences
2023-24

Core Competency Measures in MICS:

- Oral Communication: Students will be able to speak about their work with precision, clarity and organization.
- Written Communication: Students will be able to write about their work with precision, clarity and organization.
- Information Reasoning: Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.
- Quantitative Reasoning: Students will be able to understand and create arguments supported by quantitative evidence.
- Critical Thinking:
 - Computer Science: Students will be able to apply their technical knowledge and critical thinking to solve problems.
 - Information Systems: Students will be able to apply their technical knowledge and critical thinking to solve problems.
 - Mathematics/Data Science: Students will be able to apply their mathematical knowledge and critical thinking to solve problems.

Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to speak about their work with precision, clarity and organization (Oral Communication).

Outcome Measure: Annual: Each student will be required to give an oral presentation on a topic in their field as a part of their participation in the Senior Seminar. The audience for this talk will include department faculty, fellow students and possibly some alumni. The students will be given the evaluation criteria in advance of their presentation and will be rated by the faculty using a rubric with a scale of 4 (outstanding) to 1 (unsatisfactory) in the following areas:

- Command of background material
- Organization
- Oral presentation skills (added as part of the new rubric in the spring of 2010)
- Use of presentation tools
- Ability to field questions from the audience

Criteria for Success: 80% of the students should have an average score of at least 2.5 in each of the major areas in the department rubric.

Longitudinal Data:

Oral Presentation	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Background	100%	95%	100%	100%	95%	100%	100%	95%	100%	100%
Organization	100%	100%	92%	94%	100%	100%	94%	100%	94%	100%
Oral Presentation Skills	100%	95%	100%	100%	95%	100%	100%	100%	100%	100%
Presentation Tools	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ability to Field Questions	89%	100%	100%	100%	94%	94%	100%	100%	100%	100%

Conclusions Drawn from Data: In general, the students have been performing reasonably well in the area of giving oral presentations. We attribute this to the fact that we intentionally have students presenting technical material in front of others starting in their freshman year.

Changes to be Made Based on Data: Over time we have increased our standards and expanded the rubric to increase clarity for students and to push them to speak at a professional level.

Oral Presentation Rubric Update (4/12/17)

Criteria	Outstanding	High Satisfactory	Low Satisfactory	Unsatisfactory
Command of background material	<input type="checkbox"/> Clearly knows material and key facts by memory <input type="checkbox"/> Expands on PPT slides <input type="checkbox"/> Content appropriate for audience	<input type="checkbox"/> Clearly knows key facts with a few memory slips <input type="checkbox"/> Some expansion on PPT slides <input type="checkbox"/> Partial audience adaptation of content	<input type="checkbox"/> Reads some information; knows some facts from memory <input type="checkbox"/> No expansion on PPT slide content <input type="checkbox"/> Little audience adaptation of content	<input type="checkbox"/> Reads sentences from slides <input type="checkbox"/> Dependent on notes <input type="checkbox"/> Lacks audience adaptation of content
Organization	<input type="checkbox"/> Clear and concise outline <input type="checkbox"/> Relevant graphics and key text items on slides <input type="checkbox"/> Presentation is between 10-15 minutes	<input type="checkbox"/> Clear outline <input type="checkbox"/> Too much information on slides (not concise) <input type="checkbox"/> Presentation 1 minute outside of the range (10-15 minutes)	<input type="checkbox"/> Some sense of outline <input type="checkbox"/> Too much detailed information on slides <input type="checkbox"/> Presentation 2 minutes outside of the range (10-15 minutes)	<input type="checkbox"/> No clear outline <input type="checkbox"/> Slides are in paragraphs; too much detailed information on one slide <input type="checkbox"/> Presentation 3 minutes outside of the range (10-15 minutes)
Oral presentation skills	<input type="checkbox"/> Clearly has practiced several times; smooth transitions Engages audience in content multiple times and engagement is well connected to talk (questions, examples, etc.) <input type="checkbox"/> Free of disfluencies (ah, umh) Is clearly heard in the room and uses inflection for emphasis <input type="checkbox"/> Engages audience through eye contact <input type="checkbox"/> Engages audience through gestures	<input type="checkbox"/> Has practiced but transitions are not smooth Engages audience at least twice in content (questions, examples, etc.) <input type="checkbox"/> A few disfluencies (ah, umh, er) <input type="checkbox"/> Can be understood most of the time and uses some inflection <input type="checkbox"/> Some engagement of audience through eye contact <input type="checkbox"/> Some engagement of audience through gestures	<input type="checkbox"/> Has practiced presentation but cannot verbally make transitions between slides Audience engagement at least once with content (questions, examples, etc.) <input type="checkbox"/> Many disfluencies (ah, umh, er) <input type="checkbox"/> Can sometimes be understood and uses little inflection <input type="checkbox"/> Infrequent eye contact <input type="checkbox"/> Distracting gestures or mannerisms	<input type="checkbox"/> Clearly did not practice presentation; Does not anticipate content of next slide <input type="checkbox"/> No audience involvement <input type="checkbox"/> Disfluencies (ah, umh, er) detract from presentation <input type="checkbox"/> Can not be heard and/or speaks in a monotone <input type="checkbox"/> Little audience awareness or eye contact <input type="checkbox"/> Frequent distracting gestures or mannerisms
Use of presentation tools	<input type="checkbox"/> PPT background is matched to content, legible font, seamless transitions <input type="checkbox"/> Graphics imbedded and matched to topic, necessary hyperlinks work	<input type="checkbox"/> Appropriate PPT slide backgrounds, transitions & font <input type="checkbox"/> Most graphics imbedded and matched to topic, most necessary hyperlinks work	<input type="checkbox"/> Distracting PPT slide backgrounds and transitions, font hard to read <input type="checkbox"/> Some inappropriate graphics or use of PPT embellishments, necessary hyperlinks don't work	<input type="checkbox"/> No attention given to PPT slide backgrounds and transitions, font illegible <input type="checkbox"/> Distracting use of embellishments, graphics not connected to topic
Ability to field questions	<input type="checkbox"/> Able to answer questions clearly and without hesitation and prepared material to answer anticipated questions	<input type="checkbox"/> Can answer all questions with some hesitation	<input type="checkbox"/> Able to answer half of the questions with hesitation	<input type="checkbox"/> Unable to answer any questions

Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to write about their work with precision, clarity and organization (Written Communication).

Outcome Measure: Annual: Each student will be required to write a paper on a topic in their field as a part of their participation in the Senior Seminar. The audience for this talk will include department faculty, fellow students and possibly some alumni. The students will be given the evaluation criteria in advance of their presentation and will be rated by the faculty using a rubric with a scale of 4 (outstanding) to 1 (unsatisfactory) in the following areas:

- Bibliography and other supporting documentation
- Organization
- Grammar and spelling
- Depth of information
- Clarity of writing

Criteria for Success: 80% of the students should have an average score of at least 2.5 in each of the major areas in the department rubric.

Longitudinal Data:

Written Report	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Bibliography and Support	100%	89%	100%	76%	89%	81%	88%	58%	81%	69%
Organization	100%	100%	92%	94%	100%	100%	100%	100%	88%	85%
Grammar and Spelling	89%	84%	100%	88%	94%	94%	94%	89%	88%	92%
Depth of Information	78%	89%	85%	76%	83%	94%	94%	95%	94%	62%
Clarity of Writing	78%	89%	85%	88%	94%	88%	100%	89%	94%	85%

Conclusions Drawn from Data: In general, the students have been performing reasonably well in writing technical reports. We saw some weakness in both references/support and depth of the information in the papers this year. However, the sample size was 13, so the “miss” of the benchmark is the performance of 2-3 students.

Changes to be Made Based on Data: Over time we have increased our standards and expanded the rubric to increase clarity for students and to push them to write at a professional level. The current rubric has been in use for the last 11 years. We have instituted more formal faculty reviews of their draft papers and are trying to give more specific feedback, particularly about the use of references and that seems to be helping with the quality of the papers. We saw some return to weakness in the use of references (and the corresponding depth of coverage) this year. We need to discuss what happened as a department, but we think that it may have come from students not following through in meeting with their faculty advisor as frequently as expected. The information literacy data below provides some more in-depth information about at least part of the source of the problem.

MICS Written Presentation Rubric (12/31/22)

Criteria	Outstanding	High Satisfactory	Low Satisfactory	Unsatisfactory
Bibliography and supporting documents	<input type="checkbox"/> Multiple references from distinct reputable sources <input type="checkbox"/> References cited in the body of the document	<input type="checkbox"/> Most references from distinct reputable sources <input type="checkbox"/> Some citation of references in the body of the document	<input type="checkbox"/> Some references from reputable sources <input type="checkbox"/> Limited citation of references in the body of the document	<input type="checkbox"/> No bibliography or all references from untrusted sites on the internet <input type="checkbox"/> No citation of references in the body of the document
Organization	<input type="checkbox"/> Conveys a central theme with all ideas connected, arrangement of ideas clearly related to topic <input type="checkbox"/> Clear introduction, body (with sections), and conclusion includes summary and closure <input type="checkbox"/> Includes both an abstract and table of contents	<input type="checkbox"/> Conveys a central idea or topic with some ideas connected to the topic <input type="checkbox"/> Includes introduction, body and conclusion <input type="checkbox"/> Includes abstract and table of contents (one partial and one complete)	<input type="checkbox"/> Attempts to focus on an idea or topic with many ideas not connected to the topic <input type="checkbox"/> Introduction, body, conclusion detectable but not clear <input type="checkbox"/> Includes partial abstract and partial table of contents	<input type="checkbox"/> Has little or no focus on central idea or topic <input type="checkbox"/> Introduction, body or conclusion absent <input type="checkbox"/> No abstract or table of contents
Grammar and spelling	<input type="checkbox"/> No use of first-person tense <input type="checkbox"/> No grammatical or spelling errors	<input type="checkbox"/> Few uses of the first-person tense <input type="checkbox"/> Few grammatical and spelling errors	<input type="checkbox"/> Several uses of the first-person tense <input type="checkbox"/> Some grammatical and spelling errors	<input type="checkbox"/> Written in first-person tense <input type="checkbox"/> Many grammatical and spelling errors
Depth of information	<input type="checkbox"/> Highly accurate and substantive content <input type="checkbox"/> Appropriately synthesizes information from multiple distinct sources <input type="checkbox"/> Draws conclusions and personal insights from synthesis <input type="checkbox"/> Has the minimum number of pages including penalty pages; subject coverage is excellent	<input type="checkbox"/> Content is accurate, though key concepts are missing <input type="checkbox"/> Synthesis of information from at least three distinct sources <input type="checkbox"/> At least two personal insights or conclusions stated <input type="checkbox"/> Has the minimum number of pages including penalty pages; subject coverage is good	<input type="checkbox"/> Content is flawed, and/or a significant number of key concepts are missing <input type="checkbox"/> Synthesis of information from at least two distinct sources <input type="checkbox"/> At least one personal insight or conclusion stated <input type="checkbox"/> Has the minimum number of pages including penalty pages; subject coverage is adequate	<input type="checkbox"/> Content is significantly flawed and/or content is trivial <input type="checkbox"/> Summary reporting of information without synthesis <input type="checkbox"/> No personal insights <input type="checkbox"/> Does not have the minimum number of pages including penalty pages
Clarity of writing	<input type="checkbox"/> Sentences flow <input type="checkbox"/> Smooth transitions between paragraphs <input type="checkbox"/> Any and all terms and acronyms are defined <input type="checkbox"/> Provides evidence to support points	<input type="checkbox"/> Good sentence structure <input type="checkbox"/> Adequate transitions between paragraphs <input type="checkbox"/> Most terms and acronyms are defined <input type="checkbox"/> Lacks support for some points	<input type="checkbox"/> Occasional poor sentence structure <input type="checkbox"/> Transitions between paragraphs unclear <input type="checkbox"/> Some terms and acronyms are defined <input type="checkbox"/> Provides minimal support for points	<input type="checkbox"/> Frequent poor sentence structure <input type="checkbox"/> Lacked transitions between paragraphs <input type="checkbox"/> Many terms and acronyms are undefined <input type="checkbox"/> Ideas not supported

Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand (Information Literacy).

Outcome Measure: Annual: Each student will be required to write a paper on a topic in their field as a part of their participation in the Senior Seminar. The audience for this talk will include department faculty, fellow students and possibly some alumni. The students will be given the evaluation criteria in advance and their paper will be rated by the faculty using a rubric with a scale of 4 (outstanding) to 1 (unsatisfactory) in the following areas:

- References: Multiple references from distinct reputable sources
- Citation: References cited in the body of the document
- Synthesis: Appropriately synthesizes information from multiple distinct sources

Criteria for Success: 80% of the students should have an average score of at least 2.5 in each of the major areas.

Longitudinal Data:

Information Literacy	Percentage of Students at 2.5 or Higher								
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
References	95%	100%	71%	89%	81%	94%	74%	81%	69%
Citation	84%	92%	76%	89%	81%	88%	74%	75%	69%
Synthesis	84%	85%	82%	78%	81%	94%	95%	81%	92%

Conclusions Drawn from Data: The students are generally meeting our expectations. This is still one of the areas with which the students have some challenges particularly with citation. We saw a dip in performance in 2023-24 but the sample size was 13, so if two fewer students had done a better job, the target would have been met.

Changes to be Made Based on Data: We found that we needed to be very specific about our expectations for the use and citation of information in papers. We continue to work with students in giving them clear feedback about the need to do a better job with references in technical papers. We plan on having some conversation in the department about what is happening with students gathering references and making use of them in their paper.

Rubric: Next Page.

MICS Written Presentation Rubric (12/31/22)

Criteria	Outstanding	High Satisfactory	Low Satisfactory	Unsatisfactory
Bibliography and supporting documents	<input type="checkbox"/> Multiple references from distinct reputable sources <input type="checkbox"/> References cited in the body of the document	<input type="checkbox"/> Most references from distinct reputable sources <input type="checkbox"/> Some citation of references in the body of the document	<input type="checkbox"/> Some references from reputable sources <input type="checkbox"/> Limited citation of references in the body of the document	<input type="checkbox"/> No bibliography or all references from untrusted sites on the internet <input type="checkbox"/> No citation of references in the body of the document
Organization	<input type="checkbox"/> Conveys a central theme with all ideas connected, arrangement of ideas clearly related to topic <input type="checkbox"/> Clear introduction, body (with sections), and conclusion includes summary and closure <input type="checkbox"/> Includes both an abstract and table of contents	<input type="checkbox"/> Conveys a central idea or topic with some ideas connected to the topic <input type="checkbox"/> Includes introduction, body and conclusion <input type="checkbox"/> Includes abstract and table of contents (one partial and one complete)	<input type="checkbox"/> Attempts to focus on an idea or topic with many ideas not connected to the topic <input type="checkbox"/> Introduction, body, conclusion detectable but not clear <input type="checkbox"/> Includes partial abstract and partial table of contents	<input type="checkbox"/> Has little or no focus on central idea or topic <input type="checkbox"/> Introduction, body or conclusion absent <input type="checkbox"/> No abstract or table of contents
Grammar and spelling	<input type="checkbox"/> No use of first-person tense <input type="checkbox"/> No grammatical or spelling errors	<input type="checkbox"/> Few uses of the first-person tense <input type="checkbox"/> Few grammatical and spelling errors	<input type="checkbox"/> Several uses of the first-person tense <input type="checkbox"/> Some grammatical and spelling errors	<input type="checkbox"/> Written in first-person tense <input type="checkbox"/> Many grammatical and spelling errors
Depth of information	<input type="checkbox"/> Highly accurate and substantive content <input type="checkbox"/> Appropriately synthesizes information from multiple distinct sources <input type="checkbox"/> Draws conclusions and personal insights from synthesis <input type="checkbox"/> Has the minimum number of pages including penalty pages; subject coverage is excellent	<input type="checkbox"/> Content is accurate, though key concepts are missing <input type="checkbox"/> Synthesis of information from at least three distinct sources <input type="checkbox"/> At least two personal insights or conclusions stated <input type="checkbox"/> Has the minimum number of pages including penalty pages; subject coverage is good	<input type="checkbox"/> Content is flawed, and/or a significant number of key concepts are missing <input type="checkbox"/> Synthesis of information from at least two distinct sources <input type="checkbox"/> At least one personal insight or conclusion stated <input type="checkbox"/> Has the minimum number of pages including penalty pages; subject coverage is adequate	<input type="checkbox"/> Content is significantly flawed and/or content is trivial <input type="checkbox"/> Summary reporting of information without synthesis <input type="checkbox"/> No personal insights <input type="checkbox"/> Does not have the minimum number of pages including penalty pages
Clarity of writing	<input type="checkbox"/> Sentences flow <input type="checkbox"/> Smooth transitions between paragraphs <input type="checkbox"/> Any and all terms and acronyms are defined <input type="checkbox"/> Provides evidence to support points	<input type="checkbox"/> Good sentence structure <input type="checkbox"/> Adequate transitions between paragraphs <input type="checkbox"/> Most terms and acronyms are defined <input type="checkbox"/> Lacks support for some points	<input type="checkbox"/> Occasional poor sentence structure <input type="checkbox"/> Transitions between paragraphs unclear <input type="checkbox"/> Some terms and acronyms are defined <input type="checkbox"/> Provides minimal support for points	<input type="checkbox"/> Frequent poor sentence structure <input type="checkbox"/> Lacked transitions between paragraphs <input type="checkbox"/> Many terms and acronyms are undefined <input type="checkbox"/> Ideas not supported

Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to understand and create arguments supported by quantitative evidence (Quantitative Reasoning).

Outcome Measure: Annual: MTH3083 Mathematical Probability and Statistics Signature Assignment (Math and Data Science Majors). Alternating Year: ISS4014 Database and Web Signature Assignment (CS and IS Majors).

Previous: Annual: Each student will participate in the ETS Proficiency Profile exam.

Criteria for Success: 80% of the students will score a 2 or higher on the 5-point rubric for MTH3083 and 2.5 or higher on the 4-point rubric for ISS4014

Previous: 90% of the students will be Marginal or Proficient at Level 2.

Longitudinal Data:

ISS4014:

	Percentage of Class at 2.5 or Higher						
	2011-12	2013-14	2015-16	2017-18	2019-20	2021-22	2023-24
Relevant Information Chosen	100%	100%	88%	89%	88%	76%	88%
Query Correctness	25%	100%	48%	41%	83%	82%	79%

MTH3083:

	MTH3083 Percentage of the Class with Average Score of 2 or Higher	
	2022-23	2023-24
Students will be able to formulate a mathematical model from a verbal description of a problem.	100%	75%
Students will be able to construct solutions to problems using computational techniques.	100%	67%
Students will be able to interpret visual data.	20%	50%

Previous:

ETS Proficiency Profile	Percentage of Students Marginal or Proficient									
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
ETS Proficiency Profile Level 2 Mathematics	100%	100%	100%	100%	92%	82%	95%	93%	81%	90%

Conclusions Drawn from Data: Students are in general meeting our criteria. The variation often comes down to a single student because of small sample sizes. The Spring of 2021 was during COVID and students were exhausted by the time that they took the ETS exam, so this may explain the lower score for that year. In spring of 2023 we pilot tested the new assessment in MTH3083 and the results were mixed. We repeated it in 2024 and still have mixed results.

Changes to be Made Based on Data: We do not believe that the ETS exam is accurately measuring student quantitative ability in the department disciplines. Starting the 2022-23 academic year we will be measuring quantitative reasoning in the following classes:
Computer Science and Information Systems: ISS4014 Data Base Systems and Web Integration. We are making use of an ongoing assessment so have past values that have been inserted here. For Mathematics and Data Science: MTH3083 Mathematical Probability and Statistics we added an additional assessment in 2023. We are monitoring the new assessment to see what adjustments we need to make in either the assessment or the curriculum.

Rubrics:

ETS Proficiency Profile (no rubric involved)

ISS4014: Rubric below

MTH3083: Rubric below

ISS4014 Rubric Used

	Unsatisfactory (1)	Satisfactory (2)	Good (3)	Excellent (4)
Recognition of relevant information	3 errors (an error is defined as missing a relevant database field or listing an irrelevant field)	2 errors (an error is defined as missing a relevant database field or listing an irrelevant field)	1 error (an error is defined as missing a relevant database field or listing an irrelevant field)	All relevant database fields are listed and no irrelevant fields are listed for both queries
Query correctness	3 mistakes in the 2 queries	2 mistakes in the 2 queries	1 mistake in the 2 queries	No mistakes in the two queries

MTH3083 Quantitative Reasoning Rubric

	Unsatisfactory (0)	Low Satisfactory (1)	Satisfactory (2)	High Satisfactory (3)	Outstanding (4)
Students will be able to formulate a mathematical model from a verbal description of a problem.	Completely incorrect	Missed more than one key step or concept	Missed one key step or concept	Made a minor error	Completely correct
Students will be able to construct solutions to problems using computational techniques.	Completely incorrect	Missed more than one key step or concept	Missed one key step or concept	Made a minor error	Completely correct
Students will be able to interpret visual data.	Completely incorrect	Missed more than one key step or concept	Missed one key step or concept	Made a minor error	Completely correct

Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to apply their technical knowledge and critical thinking to solve problems (Computer Science).

Outcome Measure: Alternating Year: CSC4093 Software Project (alternating year course). Signature Assignment related to constructing a software application.

Previous: ETS Proficiency Profile: Critical Thinking.

Criteria for Success: CSC4093: 80% of the students will score at least 70%.

Previous: ETS PP: 85% of the students will be marginal or proficient at Level 2 Reading/Critical Thinking.

Longitudinal Data:

	Percentage of Class at 70% or Higher					
	2012-13	2014-15	2016-17	2018-19	2020-21	2022-23
Problem Solving and Critical Thinking	67%	86%	77%	86%	74%	85%

Previous:

ETS Proficiency Profile	Percentage of Students Marginal or Proficient								
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
ETS Proficiency Profile Level 2 Critical Thinking	92%	100%	84%	92%	76%	79%	80%	88%	79%

Conclusions Drawn from Data: CSC4093: In 2013, 2015 and 2017 changes in the course were made. At each adjustment, the questions were updated. The data from the spring of 2021 was gathered during the COVID pandemic and students were both tired and stressed by the third semester of course disruption. The students are meeting our standards. The class will next be taught 2024-25.

Changes to be Made Based on Data: The prompt for the assignment has been modified based on student questions. We continue the need to engage in careful software development processes and the change from waterfall to agile development methodology was made in 2016-17. We are seeing consistent patterns in data and will continue to monitor outcomes.

Rubric Used

We will score the questions according to the following table:

Questions	Maximum Points
1. Briefly describe the problem you were trying to solve.	0
2. Give one functional requirement by cutting and pasting from your user stories.	1
3. Give one non-functional requirement by cutting and pasting from your user stories.	1
4. From your software test plan, give one test case that you developed for each of the requirements given in #2 and #3 above. Cut and paste the two test cases from your software test document.	2
5. Attach the source code listing for the relevant portions of the code which satisfy the functional requirement given in #2 above. Please use a highlighter to highlight the relevant functions/code.	0
6. Did your final project iteration pass these two test cases? If not, why not?	0
7. Out of _____ tests in the Software Test Plan, _____ tests passed for the final project.	3
8. How many core requirements did you have in the User Stories? _____. How many were implemented in the final version of the software? _____	3
9. Explain the functionality of your final delivered code (1 point), highlighting similarities and differences with the initial problem requirements (1 point).	2
10. What programming language(s) did you use and why?	1
11. What operating system did you use and why?	1
12. What software tools (e.g. programming IDE, automated test tools, CASE tools, etc.) did you use and why?	1
13. Did you reuse software? Describe what libraries, frameworks, etc. you used and why.	1
14. Customer Satisfaction Rating.	4

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Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to apply their technical knowledge and critical thinking to solve problems (Information Systems).

Outcome Measure: Alternating Year: ISS4014 Signature Assignment using data bases.

Previous: ETS Proficiency Profile: Critical Thinking/Reading Portion.

Criteria for Success: 80% of the students should have an average score of at least 2.5 in each of the major areas.

Previous: ETS PP: 85% of the students will be marginal or proficient at Level 2 Reading/Critical Thinking.

Longitudinal Data:

	Percentage of Class at 2.5 or Higher						
	2011-12	2013-14	2015-16	2017-18	2019-20	2021-22	2023-24
Relevant Information Chosen	100%	100%	88%	89%	88%	76%	88%
Query Correctness	25%	100%	48%	41%	83%	82%	79%

Previous:

ETS Proficiency Profile	Percentage of Students Marginal or Proficient								
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
ETS Proficiency Profile Level 2 Critical Thinking	92%	100%	84%	92%	76%	79%	80%	88%	79%

Conclusions Drawn from Data: ISS4014 Assignment: The 2012 class was relatively small and that led to a fairly large standard deviation. Seventy-five percent of the class would have passed query correctness if the benchmark had been 2.3. We once again saw some problems with query correctness in 2015-16 and in 2017-18. In both cases, had the threshold for success been lowered slightly (2 vs 2.5), many more students would have succeeded. In 2019-20 the assignment was modified a bit to be clearer for students and we saw a marked improvement in scores both in 2019-20 and 2021-22 and it has been sustained in 2023-24.

Changes to be Made Based on Data: Spend more time in class emphasizing queries. This class was revised in light of some curricular changes. The signature assignment was updated in 2019- 20 based on the review of content. Because the ETS exam is measuring critical reading skills, the department believes that we would be better served by using our home-grown assessment to measure students critical thinking ability in information systems.

Rubric Used

	Unsatisfactory (1)	Satisfactory (2)	Good (3)	Excellent (4)
Recognition of relevant information	3 errors (an error is defined as missing a relevant database field or listing an irrelevant field)	2 errors (an error is defined as missing a relevant database field or listing an irrelevant field)	1 error (an error is defined as missing a relevant database field or listing an irrelevant field)	All relevant database fields are listed and no irrelevant fields are listed for both queries
Query correctness	3 mistakes in the 2 queries	2 mistakes in the 2 queries	1 mistake in the 2 queries	No mistakes in the two queries

Assessment Data Mathematical, Information and Computer Sciences Core Competencies, 2023-24

Learning Outcome: Students will be able to apply their mathematical knowledge and critical thinking to solve problems (Mathematics).

Outcome Measure: Signature assignment in MTH2033 Linear Algebra (Annual)

Previous:

ETS Major Field Test in Mathematics: Applied subscore (Annual).

ETS Proficiency Profile – Reading/Critical Thinking (Annual).

Criteria for Success: 80% of the students will be at a 2.5 or higher on the rubric.

Previous:

ETS MFT: The department subscore will be at the 50th percentile or higher.

ETS Proficiency Profile: 85% of the students will be marginal or proficient at Level 2

Longitudinal Data:

	Percentage of Students at 2.5 or Higher	
	2022-23	2023-24
Computing Eigenvalues	71%	100%
Understanding Mutually Orthogonal	71%	100%

Previous: ETS MFT

<i>Year</i>	<i>Percentile</i>
2010-11	70
2011-12	96
2012-13	60
2013-14	39
2014-15	*
2015-16	55
2016-17	55
2017-18	*
2018-19	32
2019-20	N/A

2020-21	N/A
2021-22	N/A

** Insufficient students for score to be calculated.*

ETS changed the Mathematics test in 2012-13. The department discontinued use in 2019-20.

ETS Proficiency Profile	Percentage of Students Marginal or Proficient								
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
ETS Proficiency Profile Level 2 Critical Thinking	92%	100%	84%	92%	76%	79%	80%	88%	79%

Conclusions Drawn from Data: The students consistently met our expectations using the ETS PP. We became concerned about the consistency of the questions in the ETS MFT and resulted in the department discontinuing the use of that measure. In spring of 2023 we pilot tested the new assessment in MTH2033. The students nearly met our benchmark; if one more student had been successful, we would have crossed the threshold. In 2024, the students met our benchmark.

Changes to be Made Based on Data: None at this time. We will continue to monitor the use of our new assessment.

Rubric Used:
See the next page.

MTH2033 Signature Assignment Rubric

Students will be able to apply their mathematical knowledge and critical thinking to solve problems (CC:CT)

	Unsatisfactory (1)	Low Satisfactory (2)	High Satisfactory (3)	Outstanding (4)
Computing Eigenvectors	More than one major error including completely incorrect.	Made a major error	Made a minor error	Completely correct
Understanding mutually orthogonal	More than one major error including completely incorrect.	Made a major error	Made a minor error	Completely correct