

Information Systems Assessment Report

2023-24

Information Systems Program Learning Outcomes

1. Students will be able to write correct and robust software.
2. Students will analyze the interaction between hardware and software.
3. Students will demonstrate general knowledge of theories and practices in the core areas of business.
4. Students will critically analyze and apply business knowledge to solve complex business situations.
5. Students will be able to apply their technical knowledge and critical thinking to solve problems.
6. Students will demonstrate effective business communication through both written and verbal means.
 - *Students will be able to speak about their work with precision, clarity and organization.*
 - *Students will be able to write about their work with precision, clarity and organization.*
 - *Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.*
7. Students will collaborate effectively in teams.
8. Students will be able to understand and create arguments supported by quantitative evidence.
9. Students will formulate business decisions informed by ethical attitudes and values.
10. Students will understand the professional, ethical and social issues and responsibilities with the implementation and use of technology.

Assessment Data Mathematical, Information and Computer Sciences Information Systems PLOs, 2023-24

Learning Outcome: Students will be able to write correct and robust software.

Outcome Measure: Annual: CSC2054 Signature Assignment. This assessment has switched to being in CSC2052 which is the first half of CSC2054. This will enable us to capture this outcome for mathematics and data science majors.

Criteria for Success: 80% of the students should have an average score of at least 2 in each of the major areas.

Longitudinal Data:

	Percentage of Class at 2 or Higher									
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20*	2020-21**	2021-22	2022-23	2023-24
Runtime Correctness	100%	62%	72%	95%	60%	45%	42%	19%	61%	37%
Problem Solving	75%	92%	83%	80%	85%	70%	78%	69%	96%	91%

*Note that the instrument was changed in 2019.

**Note that 2020 was a fully remote semester due to COVID.

Conclusions Drawn from Data: The students find the run-time correctness the most challenging. This is because this is the area of programming that is the most detail oriented. The instrument was changed in 2019. In 2021 we began assessing in CSC2052 rather than CSC2054 which is the midpoint in the class for computer science students (CSC2052 is cross listed with CSC2054 and is the first quad of CSC2054) but the end of the class for information systems, mathematics and data science students. We are still seeing challenges with runtime correctness.

Changes to be Made Based on Data: Continue to emphasize the need to carefully de-bug computer code during development. The rubric was modified to clarify the definition of run-time correctness which has made scoring simpler (Fall 2017). To capture the data for students in mathematics, data science, and information systems, we have moved the assessment to the mid-term point in the semester (see explanation above). The scores improved as we moved past the pandemic, but we are still seeing challenges. We have made some curricular changes and will monitor if the scores are improving.

CSC 2054 Signature Assignment

	Unsatisfactory (1)	Satisfactory (2)	Good (3)	Excellent (4)
Runtime Correctness	<ul style="list-style-type: none">• Less than 60% correct	<ul style="list-style-type: none">• Between 60% – 79% correctness	<ul style="list-style-type: none">• 80% - 89% correct	<ul style="list-style-type: none">• 90% – 100% correct
Problem Solving	<ul style="list-style-type: none">• Analysis of program source code indicates that program is NOT close to working, and could NOT easily be modified to work given additional time.	<ul style="list-style-type: none">• Analysis of program source code indicates that the student partially understands the problem solution or understands the solution but could not efficiently translate the solution to C++ code.	<ul style="list-style-type: none">• Analysis of program source code indicates that program is close to working, and could be modified to work given additional time.	<ul style="list-style-type: none">• All tasks execute correctly indicating that the code is both correct and robust (can catch user input errors).

Criterion: 80% of students will average 2 in Runtime Correctness and Problem Solving.

**Assessment Data Mathematical, Information and Computer Sciences
Information Systems PLOs, 2023-24**

Learning Outcome: Students will analyze the interaction between hardware and software.

Outcome Measure: Annual (CS and IS): CSC3014 Signature Assignment.

Criteria for Success: CSC3014 Assignment: 75% of the students should have an average score of at least 7.

Longitudinal Data:

	Percentage of Class at 7 or Higher									
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Hardware/software interaction understanding	92%	88%	75%	69%	100%	92%	44%	62%	59%	64%

Conclusions Drawn from Data: There is some variation in the data and some of it appears to be related to sample size. However, in 2020-21 the score dropped significantly. This could be due to this assessment being part of a final exam given in the Spring of 2021 during the COVID pandemic. Students were very tired and this score may be an indication of that fact as much as an indication of their knowledge. The scores improved in 2021-22, 2022-23, and 2023-24 but are still lagging behind historical values.

Changes to be Made Based on Data: Continue to require operating systems (CSC3014) of all CS and IS students. The 2022-23 assessment was changed and we have an analysis by question for both spring 2023 and spring 2024. This will help us to better understand patterns of what is being missed. In spring 2023 there were two questions that were missed by at least 75% of the students, the 2024 data is not showing the same pattern, but we need to continue to dig into the question by question analysis of the data.

Rubric Used (CSC3014): The scoring for this assignment is purely points based.

Students will demonstrate general knowledge of theories and practices in the core areas of business.

Waiting on data from FSB.

Students will critically analyze and apply business knowledge to solve complex business situations.

Waiting on data from FSB

**Assessment Data Mathematical, Information and Computer Sciences
Information Systems PLOs, 2023-24**

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

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 the students have continues that improvement in 2023-24.

Changes to be Made Based on Data: Spend more time in class emphasizing queries. This class is being revised in light of some curricular changes. The signature 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 Information Systems PLOs, 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 Information Systems PLOs, 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 Information Systems PLOs, 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
Information Systems PLOs, 2023-24**

Learning Outcome: Students will collaborate effectively in teams.

Outcome Measure: Alternating year: CSC324 Signature Assignment – evaluation of group while working on a project (before 2015-16) and ISS3042 Project Management – evaluation of group while working on a project (2016-17 and beyond).

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:

	Percent of students with average at least 2.5					
	Fall 2012 CSC324	Fall 2014 CSC324	Fall 2016 ISS3042	Fall 2018 ISS3042	Fall 2020 ISS3042	Fall 2022 ISS3042
Contributes to team meetings	86%	80%	90%	100%	100%	100%
Encourages team members	93%	84%	N/A	100%	100%	100%
Contributes individually outside of team meetings	93%	88%	86%	100%	100%	100%
Attitude	100%	96%	N/A	100%	100%	100%
Fosters constructive team climate	100%	92%	N/A	100%	100%	100%
Responds to conflict	100%	100%	90%	100%	100%	100%

Conclusions Drawn from Data: The students are performing well as members of teams. This will next be assessed in fall of 2024.

Changes to be Made Based on Data: Continue to make use of group activities throughout the curriculum.

MICS Teamwork Rubric

Definition

Teamwork is behaviors under the control of individual team members (effort they put into team tasks, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions).

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet unsatisfactory (cell one) level performance.

The purpose of this is to evaluate individual team members. Although no team member will ever see your evaluation of them, please take it seriously.

Directions:

- **Do not put your own name anywhere on this form, the evaluations are to be anonymous.**
- **Please write the name of the person you are evaluating here.....**_____
- **Please fill out one copy of this form for every person who was on your team, including one for yourself.**
- **For each row, place a checkmark in the box that best describes your teammate's performance.**

	Outstanding	High Satisfactory	Low Satisfactory	Unsatisfactory
Contributes to team meetings	<input type="checkbox"/> Helps the team move forward by articulating the merits of alternative ideas or proposals.	<input type="checkbox"/> Offers new suggestions to advance the work of the group.	<input type="checkbox"/> Shares ideas but does not advance the work of the group.	<input type="checkbox"/> Sits quietly in team meetings and does not contribute.
Encourages members of the team	<input type="checkbox"/> Actively seeks to find opportunities to encourage all members of the team.	<input type="checkbox"/> Offers encouragement to all members of the team.	<input type="checkbox"/> Offers words of encouragement to friends.	<input type="checkbox"/> Does not offer word of encouragement to anyone.
Individual contributions outside of team meetings	<input type="checkbox"/> Completes all assigned tasks by deadline; work accomplished is thorough. Proactively helps other team members complete their assigned tasks.	<input type="checkbox"/> Completes all assigned tasks by deadline; work accomplished is thorough.	<input type="checkbox"/> Completes all assigned tasks by deadline.	<input type="checkbox"/> Does not complete all assigned tasks by deadline.
Attitude	<input type="checkbox"/> Demonstrates (comments, facial expressions, etc.) a negative attitude rarely and helps others to become more positive.	<input type="checkbox"/> Demonstrates (comments, facial expressions, etc.) a negative attitude rarely .	<input type="checkbox"/> Demonstrates (comments, facial expressions, etc.) a negative attitude less often than a positive attitude.	<input type="checkbox"/> Demonstrates (comments, facial expressions, etc.) a negative attitude more often than a positive attitude.

<p>Fosters constructive team climate</p>	<p><input type="checkbox"/> Supports a constructive team climate by doing <u>all of the following</u>:</p> <ul style="list-style-type: none"> • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. 	<p><input type="checkbox"/> Supports a constructive team climate by doing <u>any two of the following</u>:</p> <ul style="list-style-type: none"> • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. 	<p><input type="checkbox"/> Supports a constructive team climate by doing <u>any one of the following</u>:</p> <ul style="list-style-type: none"> • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. 	<p><input type="checkbox"/> Supports a constructive team climate by doing <u>none of the following</u>:</p> <ul style="list-style-type: none"> • Treats team members respectfully by being polite and constructive in communication. • Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. • Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it.
<p>Responds to conflict</p>	<p><input type="checkbox"/> Identifies and acknowledges conflict and acknowledges that relationships can be damaged. Seeks to restore relationships.</p>	<p><input type="checkbox"/> Identifies and acknowledges conflict and acknowledges that relationships can be damaged.</p>	<p><input type="checkbox"/> Identifies and acknowledges conflict but will not acknowledge that relationships can be damaged.</p>	<p><input type="checkbox"/> Will not acknowledge that conflict has occurred or that relationships can be damaged.</p>

Assessment Data Mathematical, Information and Computer Sciences Information Systems PLOs, 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

	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 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

Formulate business decisions informed by ethical attitudes and values.

Waiting in data from FSB

Assessment Data Mathematical, Information and Computer Sciences Information Systems PLOs, 2023-24

Learning Outcome: Students will understand the professional, ethical and social issues and responsibilities with the implementation and use of technology.

Outcome Measure:

Alternating year: ISS3042 Signature Assignment
 Alternating year: CSC3023 Signature Assignment
 Alternating year: ISS4012 Signature Assignment
 Annual: CSC4133 Signature Assignment
 Annual: ISS4072 Signature Assignment

Note that this list is long because there is no single class that captures all CS and IS majors.

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

Longitudinal Data:

	ISS3042: Percent of students with average at least 2.5	
	2020-21	2022-23
Average from both scenarios (ISS3042)	62%	74%

	CSC3023: Percent of Students at or Above 2.5
	2022-23
Can identify an ethical issue in a problem or scenario.	27%
Can make and support plausible ethical decision(s).	80%

	ISS:4072 Percent of Students at or Above 2.5	
	2022-23	2023-24
Can identify an ethical issue in a problem or scenario.	100%	78%
Can apply an ethical framework to ethical issue (virtue, utilitarianism, deontology, analogies) to scenario.	67%	67%
Can make and support plausible ethical decision(s).	100%	67%

	CSC-ISS-MTH4033 Percent of Students at or Above 2.5	
	2022-23	2023-24
Can identify an ethical issue in a problem or scenario.	73%	82%
Can apply an ethical framework to ethical issue (virtue, utilitarianism, deontology, analogies) to scenario.	67%	73%
Can make and support plausible ethical decision(s).	100%	91%

	ISS4012 Percent of Students at or Above 2.5
	2023-24
Can identify an ethical issue in a problem or scenario.	82%
Can apply an ethical framework to ethical issue (virtue, utilitarianism, deontology, analogies) to scenario.	73%
Can make and support plausible ethical decision(s).	91%

Conclusions Drawn from Data: The students did not meet our standards in the early assessments. The three students in ISS4072 in 2022-23 were assessed in the spring of 2023 and these three students had also been part of the assessment in ISS3042 in the fall of 2022. So hopefully we are seeing improvement. ISS3042, CSC3023 and CSC/ISS/MTH4133 will next

be assessed in the fall of 2024. ISS4072 data includes students who did internships summer 2023-spring of 2024.

Changes to be Made Based on Data: We are in the process of constructing a set of modules that will be embedded in several MICS classes with the intent that students will have multiple exposures to ethics-related issues and case studies. Our hope is that this scaffolding will ultimately support well-developed ethical responses in the classes where we gather data. As can be seen by the data, we are using a few different rubrics and it will simplify our analysis by getting all assessments on the same rubric.

getting all assessments on the same rubric.

Ethics Rubric (ISS3042 and CSC3023)

	1	2	3	4	5
Question 1	Activity is found to be ethical and no other supporting information is provided.	Activity is found to be unethical, but the support for this behavior is limited and lacks an implied defined framework. Response is a simple, “we shouldn’t do this” with a harsh feeling.	Activity is found to be unethical and is supported by an ethical framework (explicit or clearly implied with a deontology framework). Response is a reasoned “we should do this” but is still a somewhat harsh response.	Activity is found to be unethical and is supported by an ethical framework (explicitly stating a deontology framework). Response is a reasoned “we should do this” but is tempered with keeping the issue private between the two people.	Activity is found to be unethical and is supported by an ethical framework (explicitly stating a deontology framework). Response is a reasoned “we should do this” but express a clear justification, is not overly reactive and is kept private.
Question 2	The response does not identify an ethical issue with system reliability and does not clearly apply an ethical framework. The reliability issue is more of an inconvenience to users and does not create actual harm or violate a rule or law.	The response identifies an ethical issue or at least implies (clearly implied or explicitly) an ethical framework. But not both.	The response identifies an ethical issue and at least implies an appropriate ethical framework that correctly relates to the issues and contains a good explanation of why the framework applies to the issue.	The response identifies a clearly ethical issue and explicitly and correctly relates the issue to ethical framework along with explaining why the two are related.	The response identifies a clearly ethical issue and explicitly and correctly relates the issue to ethical framework along with explaining why the two are related. The response goes on to give examples of why the issue is an ethical problem.

	Unsatisfactory (1)	Satisfactory (2)	Good (3)	Excellent (4)
Can identify an ethical issue in a problem or scenario. (Ethical Issue Recognition)	Student is unable to identify the core ethical issue of the scenario.	Student identifies a concern of the scenario, but not a core ethical issue.	Student identifies a core ethical issue, but not a secondary concern.	Student identifies a core ethical issue along with secondary concerns.
Can make and support plausible ethical decision(s). (Informed Judgement)	Student is unable to form and support a plausible ethical decision.	Student forms a plausible ethical decision, however no support is given.	Student forms a plausible ethical decision and provides minimum support.	Student forms a plausible ethical decision and provides strong support.

For MICS: Student will understand the professional, ethical and social issues and responsibilities with implementation and use of technology.

MTH4062, MTH4072, CSC/ISS/ MTH4133, ISS4012

	Unsatisfactory (1)	Satisfactory (2)	Good (3)	Excellent (4)
Can identify an ethical issue in a problem or scenario. (Ethical Issue Recognition)	Student is unable to identify the core ethical issue of the scenario.	Student identifies a concern of the scenario, but not a core ethical issue.	Student identifies a core ethical issue, but not a secondary concern.	Student identifies a core ethical issue along with secondary concerns.
Can apply an ethical framework to an ethical issue (virtue, utilitarianism, deontology, analogies) to scenario. (Application of Ethical Perspectives/Concepts)	Student is unable to state an ethical framework.	Student states an ethical framework and makes an attempt to apply it to the scenario.	Student states an ethical framework and is mostly correct in applying it to the scenario.	Student states an ethical framework and can correctly apply it to the scenario.
Can make and support plausible ethical decision(s). (Informed Judgement)	Student is unable to form and support a plausible ethical decision.	Student forms a plausible ethical decision, however no support is given.	Student forms a plausible ethical decision and provides minimum support.	Student forms a plausible ethical decision and provides strong support.