

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Chemistry	222	CEM 222 07/24/2023- Organic Chemistry II
College	Division	Department
Inactive Divisions	Math, Science and Engineering Tech	Chemistry
Faculty Preparer		Nagash Clarke
Date of Last Filed Assessment Report		12/17/2019

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

Yes

This course was assessed Summer 2021 but was not approved by the committee.

2. Briefly describe the results of previous assessment report(s).

Students only met outcome (#1) -nomenclature and outcome (#3)- lab reports

3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

We decided to assess students during the semester for outcome 2 (spectroscopy) vs. the end of the semester.

II. Assessment Results per Student Learning Outcome

Outcome 1: Classify and name organic compounds based on their organic and biological functional groups. Apply nomenclature rules to recognize correct chemical names and formulas.

- Assessment Plan
 - Assessment Tool: Departmental exam
 - Assessment Date: Spring/Summer 2022
 - Course section(s)/other population: All
 - Number students to be assessed: All

- How the assessment will be scored: Answer key
- Standard of success to be used for this assessment: 70% of students will score 75% or higher
- Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	18

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

There were some students who withdrew from the course.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were all day students.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

The students were given a multiple-choice department final exam, which was administered during the last week of class. This was scored by a full-time faculty member.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
All 18 students scored 75% or higher, meeting the standard of success.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students handled IUPAC (International Union of Pure and Applied Chemistry) nomenclature well. This is typically the strongest area in this course. It is very systematic, and once students figure out the naming system in organic chemistry 1, it carries over to organic chemistry 2.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Students can improve in alkyl group nomenclature (like biphenyl ether). Common names and names based on alkyl groups can be less accessible. It is less systematic, and more has to be committed to memory compared to the above-mentioned IUPAC naming system.

Outcome 2: Recognize and apply spectroscopic data to organic structure analysis.

- Assessment Plan
 - Assessment Tool: Departmental exam
 - Assessment Date: Spring/Summer 2022
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Answer key
 - Standard of success to be used for this assessment: 70% of students will score 75% or higher.
 - Who will score and analyze the data: Department faculty
1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	20

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students dropped the course. This was the unit 2 exam. Some students who took this exam dropped later and did not complete the assessment for the other outcomes.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were all day students.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Students were assessed using the unit 2 exam which covered spectroscopy.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

70% (14/20) students achieved the outcome (scoring at least 75%). The standard was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students tend to do well when presented with graphs of spectroscopic data (NMR, IR and MS). They also did well using the reference data (IR absorbancies for example) to pin point where functional groups will appear. This is helpful when attempting to identify an unknown.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Students need more help understanding diastereotopic vs enantiotopic protons, as well as predicting the number of signals for NMR spectroscopy. Since the outcome was met, we will continue to assess this outcome early in the semester. We will afford students more practice to shore up the deficiencies mentioned.

Outcome 3: Perform laboratory procedures related to the synthesis, isolation, and analysis of organic compounds. Collect data, perform calculations and draw conclusions based on the results.

- Assessment Plan

- Assessment Tool: Laboratory reports
- Assessment Date: Spring/Summer 2022
- Course section(s)/other population: All
- Number students to be assessed: All
- How the assessment will be scored: Departmentally-developed rubric
- Standard of success to be used for this assessment: 70% of the students assessed will score 6 out of 9 or higher on the lab report.
- Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	17

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students dropped the course. 17 random samples were gathered.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were day students.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Lab reports were selected randomly, and evaluated using a rubric by a full-time chemistry faculty member.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this

learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

100% (17/17) of the students scored 75% or higher, meeting the standard of success.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students were overall good at the following:

- Presenting sections in the proper order
- Interpreting results
- Following directions
- Responding to pre-lab and post lab questions appropriately

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Some students could improve in presentation to make the lab reports easier to read. All 17 students met the standard of success. As faculty we can make sure the lab handouts are more easily understood by students. There are some ambiguous parts that require us to keep explaining to students (sometimes several times), which can take up more time during lab sessions.

Outcome 4: Complete reaction mechanisms with products and reaction conditions.

- Assessment Plan
 - Assessment Tool: Departmental exam
 - Assessment Date: Spring/Summer 2022
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Answer key
 - Standard of success to be used for this assessment: 70% of students will score 75% or higher.
 - Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2023	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	18

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students withdrew from the course.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were day students.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A multiple-choice departmental exam was used, and administered during the last day of class. This was scored by a full-time faculty member.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No
Only 50% (9/18) of students scored 75% or higher. The standard was not met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students were strong at predicting product for reactions. They also generally did well selecting the appropriate reagents.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Students tended to struggle with reactions that did not get covered extensively. This can be seen, for example, in epoxide reactions. This is the only area where they did not meet the standard. It is tricky, as there are many reactions to categorize in the course. One solution would be to identify certain questions each semester during the unit tests for assessment. Using a cumulative assessment tool at the end requires them to remember all the reactions covered in one sitting.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

We decided to assess outcome 2 during the semester to better reflect what the students learned. Spectroscopy is only addressed in unit 2. So we decided to assess them while the material was fresh earlier in the course.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

There was no surprise. Students struggle the most with reactions in this course. This is particularly true for synthesis. They don't always grasp how to do a series of transformations. Looking at all the unit exams (except for test 2) approximately 50% (9 to 10 students) students achieved 75% or more on the tests, and 50% scored above the standard on the final. These were mostly reactions, and confirms that that is the most challenging part of the course.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

This will be shared with organic chem faculty.

4. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Assessment Tool	We will compile more than one semester's worth of data.	This is to get more data points to confirm the results from this assessment.	2023

5. Is there anything that you would like to mention that was not already captured?

6.

III. Attached Files

[CEM 222 assessment2023 updated](#)

Faculty/Preparer: Nagash Clarke **Date:** 08/30/2023
Department Chair: Tracy Schwab **Date:** 09/05/2023
Dean: Tracy Schwab **Date:** 09/05/2023
Assessment Committee Chair: Jessica Hale **Date:** 04/17/2025

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Chemistry	222	CEM 222 08/08/2019- Organic Chemistry II
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Physical Sciences	Nagash Clarke
Date of Last Filed Assessment Report		12/11/2017

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

Yes

July 2017

2. Briefly describe the results of previous assessment report(s).

Students performed well on all the outcomes except for spectral identification of compounds.

3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

Spectral determination was going to be covered during the semester versus at the end. This was not done.

II. Assessment Results per Student Learning Outcome

Outcome 1: Classify and name organic compounds based on their organic and biological functional groups, as well as apply nomenclature rules to recognize correct chemical names and formulas.

- Assessment Plan
 - Assessment Tool: Departmental exam
 - Assessment Date: Spring/Summer 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All

- How the assessment will be scored: Answer key
- Standard of success to be used for this assessment: 70% of students will score 75% or higher
- Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2018		2019

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
32	27

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

All students who completed the course were assessed

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All sections are taught in a face-to-face format during the day

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A departmental exam was used. Responses for questions addressing the outcome were tallied. The students responded on a scantron, and an item analysis was performed.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

The number of students correctly responding to the questions was noted. The average was taken for all the questions. Students scored an overall average of 84% on the outcome related questions. This satisfies the outcome that 70% of students must achieve a score of 75%. Looking at the questions individually, 70% of the students correctly answered 6 of 9 (66%) of the questions.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Nomenclature was revisited repeatedly throughout the semester. This tends to be a very strong area for students.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Students scored lowest on question #39 where they were asked to name a compound. The compound name is an anomaly in the naming structure and would require that they memorize the name. This questions doesn't test the outcome stated above and should be removed from consideration for the assessment.

Outcome 2: Recognize and apply spectroscopic data to organic structure analysis.

- Assessment Plan
 - Assessment Tool: Departmental exam
 - Assessment Date: Spring/Summer 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Answer key
 - Standard of success to be used for this assessment: 70% of students will score 75% or higher.
 - Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2018		2019

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
32	27

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

All students who completed the test were assessed.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All sections are taught in a face-to-face format during the day.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Students were administered a departmental exam. They responded to multiple-choice questions on a scantron, and an item analysis was performed.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No

The percentage of students correctly responding to the question was tallied. On average, 54% of students answered the questions properly. The students scored an overall average of 54% on the outcome related questions. Looking at the questions individually, 70% of the students correctly answered 3 of 8 (37.5%) of the questions. The outcome of at least 70% getting at least 75% correct was not met. Students scored best on questions 33, 34 and 35. Students did very poorly on questions 1, 28 and 29.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

This area is often a struggle. Students do enjoy the topic once we get into the middle, as it is like solving a puzzle.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

This topic is only taught once during the semester, so students tend to forget how to apply it when assessed in the end. This knowledge and skill is very important for a student who wants to continue in the field of chemistry. We should keep it

before them throughout the semester or do assessment on this outcome earlier in the semester.

Outcome 3: Perform laboratory procedures related to the synthesis, isolation, and analysis of organic compounds. Collect data, perform calculations and draw conclusions based on the results.

- Assessment Plan
 - Assessment Tool: Laboratory reports
 - Assessment Date: Spring/Summer 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Departmentally-developed rubric
 - Standard of success to be used for this assessment: 70% of the students assessed will score 6 out of 9 or higher on the lab report.
 - Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
		2019

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
18	14

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Students who completed the lab assignment during Spr/Sum 2019 were assessed.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All sections are taught in a face-to-face format during the day.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

The lab report for lab 3 (synthesis and characterization lab) was scored. Each lab report was assessed based on parameters above.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

14 of 14 students (100%) scored 18 (72%) or higher on the lab report.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Once they get into the habit of writing lab reports, they are attentive to the rules and details for the most part. They are good at suggesting why an experiment did not go well.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Students need to be more self-reliant in lab especially towards the end of the semester and not rely on the instructor to walk them through different procedures. This will improve problem-solving skills.

Outcome 4: Complete reaction mechanisms with products, reaction conditions and any relevant stereochemistry.

- Assessment Plan
 - Assessment Tool: Departmental exam
 - Assessment Date: Spring/Summer 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Answer key
 - Standard of success to be used for this assessment: 70% of students will score 75% or higher.

- Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2018		2019

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
32	27

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

All students who completed the course were assessed

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

All sections were offered in a face-to-face format during the day.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Students were administered the departmental exam. They responded on a scantron, and an item analysis was performed. The percentage of students responding correctly to the questions was noted.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
 Students scored an overall average of 75% on the outcome related questions. However, when considered individually, students scored 75% or higher on only 11 of 25 (44%) of the questions.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Synthesis and mechanism are like puzzles. Students tend to do well with these once they realize there is a system.

- Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Students need to be encouraged to see the patterns. We do a lot of in-class problems. We will continue to do these and more. As well as helping them to organize the information as we cover lots of reactions and mechanisms. Individual questions will be analyzed to identify where additional instruction would improve performance.

III. Course Summary and Intended Changes Based on Assessment Results

- Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

Students received more practice in the areas; however, the timing of assessment key. This is particularly a problem with outcome #2. We did not do a built-in assessment as indicated.

- Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

Students are learning how to problem solve and classify information. We need to approach outcome #2 differently and either reinforce the information throughout the semester or assess earlier.

- Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

There will be a discussion with the appropriate faculty.

- Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Assessment Tool	Reinforce spectral analysis throughout the semester, and assess earlier in the semester.	Students tend not to recall the information that well at the end as it is not something reinforced throughout the semester.	2019

Assessment Tool	Outcome #2 will be assessed earlier in the semester.	Since this concept is not carried through the semester, students should be assessed closer to the instruction	2019
Assessment Tool	Outcome #1 questions will be reviewed and revised as needed	Question #39 will be evaluated to determine if it should be included in the assessment	2019
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Additional in-class problems related to Outcome 4.	To encourage students to see patterns in reactions and mechanisms.	2019

5. Is there anything that you would like to mention that was not already captured?

None

III. Attached Files

[CEM 222 data](#)

Faculty/Preparer: Nagash Clarke **Date:** 08/13/2019
Department Chair: Suzanne Albach **Date:** 08/13/2019
Dean: Victor Vega **Date:** 09/26/2019
Assessment Committee Chair: Shawn Deron **Date:** 12/17/2019

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Chemistry	222	CEM 222 07/13/2017- Organic Chemistry II
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Physical Sciences	Nagash Clarke
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Classify and name organic compounds based on their organic and biological functional groups, as well as apply nomenclature rules to recognize correct chemical names and formulas.

- Assessment Plan
 - Assessment Tool: Departmental Exam
 - Assessment Date: Fall 2018
 - Course section(s)/other population: All
 - Number students to be assessed: all
 - How the assessment will be scored: answer key
 - Standard of success to be used for this assessment: 70% of students will score 75% or higher
 - Who will score and analyze the data: Department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	17

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

This was a combination of two semesters. Some attrition occurred, and some data was not retrieved for winter.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were day sections on campus.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A departmental final was used to assess the outcome. Scantrons were scored and an item analysis performed.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
82% of students achieved the standard of success.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students overall did very well with the nomenclature. Results were very satisfactory.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

We will continue to reinforce nomenclature throughout the semester as we have been doing.

Outcome 2: Recognize and apply spectroscopic data to organic structure analysis.

- Assessment Plan
 - Assessment Tool: Departmental Exam

- Assessment Date: Fall 2018
- Course section(s)/other population: All
- Number students to be assessed: all
- How the assessment will be scored: answer key
- Standard of success to be used for this assessment: 70% of students will score 75% or higher.
- Who will score and analyze the data: department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	17

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

This was a combination of Winter and Spring students. There was attrition and some data was not retrieved from Winter.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were two day sections on campus.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

The test was administered, scantrons were collected and scored, and an item analysis was performed. There were 7 questions related to this outcome on the exam.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No

None of the students scored 75% or higher, therefore, 0% of students achieved this outcome. On two of the questions students did very well, with 82% of them answering the questions correctly.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students did very well on two of the exam questions, with 82% correctly responded. They did well on the questions related to NMR. This topic was discussed at length in the class.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

This topic is taught at the beginning of the semester and is not used afterward. Students see the final exam questions not having worked with this content for several months. In addition, spectroscopy is used most often in research activities. While students may need to apply this learning in the future, it would be rather limited. Therefore, rather than using the final exam questions, we will use the until test questions to assess this outcome.

Outcome 3: Perform laboratory procedures related to the synthesis, isolation, and analysis of organic compounds. Collect data, perform calculations and draw conclusions based on the results.

- Assessment Plan
 - Assessment Tool: Laboratory reports
 - Assessment Date: Winter 2019
 - Course section(s)/other population: All
 - Number students to be assessed: all
 - How the assessment will be scored: departmentally-developed rubric
 - Standard of success to be used for this assessment: 70% of the students assessed will score 6 out of 9 or higher on the lab report.
 - Who will score and analyze the data: Department faculty
1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
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2016		
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2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
16	22

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Combination of Fall 2016/Sp2017 students. There was some attrition during both of these semesters.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were both day/on campus classes.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Student lab reports were used to measure this outcome. Students were graded on their ability to synthesize, isolate and characterize compounds. Also being able to perform recovery and yield calculations. They were also evaluated on the ability to make conclusive statements based on results.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Students were evaluated based on preparation and characterization of organic compounds. Melting points and/or spectroscopic data were used to confirm results. 81% of students were successful in this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students generally do well in labs. It's a cooperative learning environment, but we stress individual attempt as well.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

We will continue to do written lab reports and continue to stress time management and efficiency so that students can get results in the allotted time given for labs.

Outcome 4: Relate stereochemistry of reactants to reaction type in order to predict synthetic pathways as well as products.

- Assessment Plan
 - Assessment Tool: Departmental Exam
 - Assessment Date: Fall 2018
 - Course section(s)/other population: All
 - Number students to be assessed: all
 - How the assessment will be scored: answer key
 - Standard of success to be used for this assessment: 70% of students will score 75% or higher.
 - Who will score and analyze the data: department faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
23	18

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Combination of Winter and Spring 2017. There was some attrition and some data could not be retrieved from Winter semester.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

These were both day classes on campus.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A departmental exam was administered. Only three of the exam questions related to this outcome. Scantrons were scored, and an item analysis was performed.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No

Two students (12%) scored 100% on the three exam questions. Seven students (41%) answered two of three questions correctly but this only earned them a 66.7% success rate. The balance of the students correctly answered one of the three questions correctly.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students see more stereochemistry in Organic Chemistry I but it's not discussed as much in Organic Chemistry II. However they seemed to remember the concepts when it was brought up in class.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

The student learning outcome does not get at the important processes in Stereochemistry. This topic needs have more than a cameo appearance. It needs to be kept before them, and more questions need to be devoted to this concept in the final exam. In addition, the student learning outcome, which assesses spectroscopy needs to be revised to assess the broad topic of chemical reactions.

II. Course Summary and Action Plans Based on Assessment Results

1. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

I was not surprised at the spectroscopy and stereochemistry results as these topics are not the meat of the course. The chemical reactions are the most important part of the course. However, they were not assessed because of the way the student learning outcome was written. We will need to assess chemical reactions to assure that students are learning the most important concepts in the class.

2. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

This will be discussed over summer 2017 and during in-service of fall 2017.

3. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Outcome Language	Revise students learning outcome #4 to reflect a focus on chemical reactions rather than stereochemistry.	Stereochemistry is a 3-D spatial structure of the molecule. While important it should not be at the level of a student learning outcome.	2018
Assessment Tool	Use the unit test as the assessment tool for outcome #2. It is more timely and would determine student learning better.	This topic is covered at the beginning of the semester and not used again.	2018

4. Is there anything that you would like to mention that was not already captured?

5.

III. Attached Files

[CEM 222 Assessment Data](#)

Faculty/Preparer: Nagash Clarke **Date:** 07/19/2017
Department Chair: Kathleen Butcher **Date:** 08/17/2017
Dean: Kristin Good **Date:** 08/18/2017

Assessment Committee Chair: Michelle Garey **Date:** 11/28/2017

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
 Course Discipline Code and Number: CEM 222
 Course Title: Organic Chemistry 2
 Division/Department Codes: MNBS/ PHY

2. Semester assessment was conducted (check one):
 Fall 2006
 Winter 2008_
 Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
 Portfolio
 Standardized test
 Other external certification/licensure exam (specify):
 Survey
 Prompt
 Departmental exam
 Capstone experience (specify):
 Other (specify):

4. Have these tools been used before?
 Yes
 No

If yes, have the tools been altered since its last administration? If so, briefly describe changes made.
 Not applicable

5. Indicate the number of students assessed/total number of students enrolled in the course.
 23, all students in all sections

6. Describe how students were selected for the assessment.
 All students were assessed.

II. Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.
 Not applicable as this is the first time the test was used.

2. State each outcome (verbatim) from the master syllabus for the course that was assessed.
 Outcomes:
 - a. Characterize the major organic and biological functional groups, and the mechanisms of their major types of reactions.
 - b. Apply spectroscopic techniques to organic structure analysis.

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. *Please attach a summary of the data collected.*

 Overall, students scored an average of 61.9% on the test. The standard was set at 70% of students should score 70% or higher, so it was not achieved. See attached Excel sheet with raw data.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. *Please attach the rubric/scoring guide used for the assessment.*
 Test was multiple choice so scoring was done by scantron.
 Outcome 1 had an average score of 62.6%
 Outcome 2 had an average score of 58.3%

COURSE ASSESSMENT REPORT

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

Strengths: Outcome 1 was higher than 2 but out of a total of 26 questions 23 were for outcome 1, so the test was not equally weighted. However in outcome 1 it was obvious that the last topic covered was well answered with an average of 78.5% for the two questions in the test. So retention of material was somewhat sketchy for most students as a topic covered at the beginning of the semester had an average score of 37%.

Weaknesses: Outcome 2, spectroscopy was the weakest area but this could have been caused by the small number of questions on this topic, and this topic was covered in the first half of the semester. So as noted above retention of material is obviously a factor in the low score here.

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

As the students did not achieve the stated outcomes action will have to be taken.

- a. By the end of the course even the high achieving students are tired of test taking and as they have figured out their average of the tests taken they may not have studied very well for this test, it was only worth 5% of overall grade and many students by the end of the semester didn't need the extra 5% to change their final grade in the class. **I was told this by several students including some of the highest achievers in my class.** Common test questions will be used on the class tests in the future and the results amalgamated at the end of the semester, these test questions will be very similar but not identical to the ACS test questions.
- b. The questions will also reflect the outcomes more evenly.
- c. More student based activities will be added to encourage better retention of the material. *I see, I forget. I hear, I remember. I do, I understand.* Chinese Proverbs

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

- a. Outcomes/Assessments on the Master Syllabus

Change/rationale: No changes to outcomes on Master Syllabus. However, the assessment tool will be changed to more evenly reflect the course outcomes, and to cover the entire semester.

- b. Objectives/Evaluation on the Master Syllabus

Change/rationale:

- c. Course pre-requisites on the Master Syllabus

Change/rationale:

- d. 1st Day Handouts

Change/rationale: Will include an On-Course principle of a calendar on the syllabus so students can map the semester out. Also as there is not a separate final test the weighting of the unit tests will change.

- e. Course assignments

Change/rationale: Will include more student and group activities so retention of material is better. Also more real-life examples to make the material more relevant, and an ARIS based homework system.

- f. Course materials (check all that apply)

- Textbook

- Handouts: More learning centered handouts with guided inquiry type information.

- Other:

- g. Instructional methods

Change/rationale: More student based activities, less lecture, and more student assigned reading of the book at home. Put more emphasis on student responsibility for their own learning.

- h. Individual lessons & activities

Please return completed form to the Office of Curriculum & Assessment, SC 247.

COURSE ASSESSMENT REPORT

Change/rationale: Day-to-day activities will be changed to more guided inquiry/ student based learning where possible with the teacher acting more as a guide to learning and not the "fountain of knowledge".

- 3. What is the timeline for implementing these actions? Next time I teach the course in Winter 2009, although I will be starting with the same type of activities and lesson plans in the prerequisite course cem211, organic chemistry 1 in Fall 2008.

IV. Future plans

- 1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.

The tool was effective although not equally weighted for both outcomes tested. Also as noted the students may not have studied enough for this test as it was at the end of the semester and only worth 5% of the grade and for several students it wasn't going to change their overall grade.

- 2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

Ensure all outcomes tested are equally represented on the assessment. Split the test into common questions on the unit tests, as these are worth more points to the students and given throughout the semester it should be a more accurate reflection of student understanding.

- 3. Which outcomes from the master syllabus have been addressed in this report?

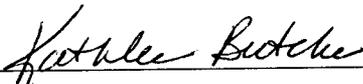
All _____ Selected: Outcomes 1-2 were assessed; outcomes 3 will be assessed Winter 2009.

If "All", provide the report date for the next full review: _____

If "Selected", provide the report date for remaining outcomes: Summer 2009

Submitted by:

Name: Breege Concannon  Date: May 27th 08
 Print/Signature

Department Chair: Kathy Butcher  Date: 5/27/08
 Print/Signature

Dean: Marty Showalter  Date: MAY 28 2008
 Print/Signature

logged 6/4/08 sj