Student Learning Assessment Report, Academic

Report Year 2022-2023

Program Actuarial Science Major

Department Head John O'Neill

Submitted By

John O'Neill

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Mission

The Actuarial Science Program and the Risk Management Certificates were approved by the Siena College BOI and NYSED in academic year 2008 for offering in the 2009-2010 academic year. These programs are interdisciplinary programs jointly offered by the Schools of Science and Business. Through AY 2016-2017, the program was administratively housed in the School of Science. As of AY 2017-2018 it is administratively housed in the School of Business.

The mission of the program is to meet the educational standards set forth by the Casualty Actuary Society (CAS) and the Society of Actuaries (SOA) which provided the central education necessary for aspiring actuaries. First and foremost, students in these programs need to have strong mathematical backgrounds stemming from a classical treatment of mathematics. Second, students need working knowledge of the types of problems encountered in business by actuaries, particularly in the areas of Economics, Finance, and Applied Statistics. Third, the program offers a firm understanding of the mathematical principles that govern these disciplines.

Due to the interdisciplinary nature of the program, the majority of learning assurance will take place in MATH 371, MATH 470 and BAAS 280. Further applied outcomes will be obtained by compiling results from component courses that contribute towards other majors; thus the assessment plan for actuarial science is dependent upon the progress of the individual departments (Mathematics, Economics, Finance and Business Analysis & Actuarial Science) in their own assessment plans.

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Solve basic mathematical problems using differentiation and integration

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [x] **Collecting/ analyzing assessment data**
- [x] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

PreTest
Homework and Examination Problems

When does assessment occur?

MATH 371

How often does assessment occur?

Spring of any academic year

Criteria (How do you know students are achieving learning outcome?)

At least 80% of the students score 70% or better on each skill listed.

4. Assessment Results (Collecting/ analyzing, please identify the samplle size and course number when appropriate)

In Spring 2023, 22 students in MATH 371 were given a pretest of basic skills. This examination as moved from Canvas to paper for 2023. On the integration portion of the exam, students performed as follows:

Q7: 100% (over 70%)
Q8: 95.5%
Q9: 91%
Q10: 73%
Q11:73%

Learning Outcome Met? (Based on Criteria)

Yes

5. Use of Results (Discussing/ using results)

Additional emphasis was placed in class on integration by parts and definite integration using logarithms

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Solve mathematical problems using multivariate calculus

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [x] **Collecting/ analyzing assessment data**
- [x] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Homework and Exam problems

When does assessment occur?

MATH 371

How often does assessment occur?

Spring semester, annually

Criteria (How do you know students are achieving learning outcome?)

At least 80% of the students score 70% or better on each skill listed.

4. Assessment Results (Collecting/ analyzing, please identify the samplle size and course number when appropriate)

In Spring 2023, students were given one multistep, multivariate integration problem.
60% of them answered at least 75% correctly.
81% answered at least 50% correctly.

Learning Outcome Met? (Based on Criteria)

Yes

5. Use of Results (Discussing/ using results)

Remediation was provided in the class for students interested in beefing up their multivariate integration skills. However, the societies have deemphasized command of this topic for the initial examination sequence. The program director maintains that command of this subject is necessary for deeper understanding of mathematics encountered later in the curriculum and in the career and will continue to assess this skill, remediating though the use of in-class homewOrk when (and where) necessary

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Be proficient in determining whether series are convergent/divergent and determining their sum if convergent.

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [x] **Collecting/ analyzing assessment data**
- [x] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Homework and Exam problems

When does assessment occur?

MATH 371

How often does assessment occur?

Spring of any academic year

Criteria (How do you know students are achieving learning outcome?)

At least 80% of the students score 70% on the pretest.

4. Assessment Results (Collecting/ analyzing, please identify the samplle size and course number when appropriate)

82% (18 of 22) scored better than 66% on the first 6 questions of the pretest
68% (15 of 22) scored better than 83% on the first 6 questions of the pretest

Learning Outcome Met? (Based on Criteria)

Yes

5. Use of Results (Discussing/ using results)

Based on the intent of the criteria, no further remediation of sequences and series was necessary in this semester.

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Apply methods learned in the solutions of basic problems to more advanced problems encountered in actuarial science.

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [x] **Planning/ Redesigning based on past assessment**
- [x] **Collecting/ analyzing assessment data**
- [x] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Final Examination

When does assessment occur?

Final examination of MATH 371

How often does assessment occur?

Annually in the spring.

Criteria (How do you know students are achieving learning outcome?)

At least 80% of the students score 70% or better.

4. Assessment Results (Collecting/ analyzing, please identify the samplle size and course number when appropriate)

By the end of the course, only 20 students were left
Basic Probability (75% over 70; no)
Counting (85% over 70; yes)
Discrete Distributions: Binomial and Geometric (65% over 70; no)
Poisson/Exponential relationship (70% over 70; no)
Inverse Function Theorem (65% over 70; no)
Order Statistics for the Max and Min (85% over 70)
Central Limit Theorem (50% over 70)
Multivariate Probability (80% over 70)
Actuarial Problem Solving (75% over 70)

Learning Outcome Met? (Based on Criteria)

No

5. Use of Results (Discussing/ using results)

This class was unique in that weather cancellations forced us to cancel a week's worth of classes. It showed in the assessment results in terms of efficiency. The main concern of course is that the CLT is integral to statistics. More time will be spent on that in Fall 2024 to help remediate as further skill is developed; similar opportunities exist for multivariate transformation in regard to the change of variables technique to reinforce the inverse function theorem. This is, unfortunately, exactly the same result as last year.

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Use of Statistics and actuarial Mathematics to partially address problems in fields such as insurance, financial forecasting and investment

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [ ] **Collecting/ analyzing assessment data**
- [ ] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [x] **Objective not assessed this year**

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Describe fundamental practice in business from the viewpoint of financial mathematics

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [x] **Planning/ Redesigning based on past assessment**
- [ ] **Collecting/ analyzing assessment data**
- [ ] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**

- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Final exam in BAAS 280

When does assessment occur?

Fall 2024

How often does assessment occur?

Periodically

Criteria (How do you know students are achieving learning outcome?)

At least 80% will score 70% or higher on final examination problems

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Effectively communicate results in written and oral presentation

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [x] **Collecting/ analyzing assessment data**
- [ ] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Oral presentation in BAAS 320; actuarial students/teams in the class

When does assessment occur?

Fall 2023

How often does assessment occur?

Annually in BAAS 320

Criteria (How do you know students are achieving learning outcome?)

80% of actuarial students meet or exceed standards on the School, of Business oral presentation rubric.

4. Assessment Results (Collecting/ analyzing, please identify the samplle size and course number when appropriate)

Students were asked to present results on a time series data of their choosing as a final project in BAAS 320.
All 6 students met or exceeded standards in all areas.

Learning Outcome Met? (Based on Criteria)

Yes

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Effectively utilize technology in the organization of data and solving problems.

2. Phase

Check all that apply

- [x] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [ ] **Collecting/ analyzing assessment data**
- [ ] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Excel project in MATh 470

When does assessment occur?

Fall 2024

How often does assessment occur?

Biannually

Criteria (How do you know students are achieving learning outcome?)

80% of students will score over 70% on an Excel project given in MATH 470.

Assessment

1. Major/Program Student Learning Outcomes

Student will be able to...

Be employable in actuarial fields

2. Phase

Check all that apply

- [ ] **Planning/ determining procedure**
- [ ] **Planning/ Redesigning based on past assessment**
- [x] **Collecting/ analyzing assessment data**
- [ ] **Discussing/ using result**
- [ ] **Determining if Changes had an Impact on Student Learning**
- [ ] **Objective not assessed this year**

3. Assessment Procedures (Planning/ determining)

Method: (ex. tests, presentations, research paper, describe the assessment course and student sample when it is applicable, etc.)

Student Self report

When does assessment occur?

Graduatng seniors in the spring semester

How often does assessment occur?

Annually

Criteria (How do you know students are achieving learning outcome?)

When they get a J-O-B (or go to grad school

4. Assessment Results (Collecting/ analyzing, please identify the samplle size and course number when appropriate)

Of the 7 students who completed the ACSC degree in the last academic year:
5 have passed Exam P
3 have passed Exam FM
4 have had an actuarial internship
4 have jobs with actuarial firms.

For the remaining 3:
1 completed the degree in 3 years; the decision to complete was communicated the semester before he graduated. He is actively applying
1 is pursuing jobs as a Certified Financial Analyst and made that decision in his sophomore year.
1 is a double degree major who is currently pursuing opportunities in State Government with DFS and NYSDoI

Learning Outcome Met? (Based on Criteria)

Insufficient data

Package History

Date	User	Action	
5/17/2023 4:29:52 PM	John O'Neill		Submitted 'Student Learning Assessment Report'
5/17/2023 4:30:46 PM	Joseph McCollum		Received
5/17/2023 4:30:47 PM	School of Business - Asst. Dean		Received
5/17/2023 4:30:47 PM	School of Business - Dean		Received
5/17/2023 4:30:47 PM	John O'Neill		Received
5/17/2023 4:30:47 PM	Provost and Senior Vice President		Received
5/17/2023 4:30:48 PM	School of Science - Asst. Dean		Received
5/17/2023 4:30:48 PM	Institutional Effectiveness		Received
5/17/2023 4:33:12 PM	John O'Neill		Decision Approved
5/17/2023 5:49:05 PM	Margaret Madden		Decision Approved