FY 2016 Enrollment:624; Graduates: 175

Bachelor of Science in Nuclear Engineering Technology

Program Educational Objectives

Program Educational Objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years of graduation. Program Educational Objectives are based on the needs of the program's constituencies.

PEO 1: Apply general and discipline-specific concepts and methodologies to identify, analyze and solve technical problems in the nuclear discipline.
PEO 2: Demonstrate an individual desire and commitment to remain technical current with, and adaptive to, changing technologies through continuous learning and self-improvement.
PEO 3: Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/industrial environment.
PEO 4: Communicate effectively in a professional/industrial environment.
PEO 5: Perform ethically and professionally in business, industry and society.
PEO 6: Attain increasing levels of responsibility and leadership in the nuclear field.

Program / Student Learning Outcomes: What Will I Learn?

Select an outcome statement to see the related measures and results.

Graduates of the Bachelor of Science in Nuclear Engineering Technology will be able to:

1. Select and apply appropriate knowledge, techniques, skills, and modern tools of the natural sciences, including physics, chemistry, thermodynamics, atomic physics, and nuclear physics to solving problems in nuclear engineering technology areas.
2. Demonstrate the ability to understand, measure, and provide quantitative expressions for natural phenomena, including observation, standard tests, experimentation, and accurate measurement.
3. Select and apply appropriate knowledge, techniques, skills, and modern tools of algebra, trigonometry, and calculus to solving problems in nuclear engineering technology areas.
4. Make oral technical presentations in Standard English using graphics and language appropriate to the audience.
5. Demonstrate proficiency in the written and graphical communication of technical information supported by appropriate technical references using Standard English.
6. Demonstrate a working knowledge of computer applications or documentation of the use of one or more computer software packages for technical problem solving appropriate to the nuclear engineering technology discipline.
7. Demonstrate technical competency in the electrical theory, nuclear and engineering materials, reactor core fundamentals, power plant systems, heat transfer, fluids, health physics/radiation protection, and radiation measurement.
8. Demonstrate comprehension of currently applicable rules and regulations in the areas of radiation protection, operations, maintenance, quality control, quality assurance, and safety.
9. Integrate and apply knowledge of the functional areas of nuclear engineering technology in the safe operation and maintenance of nuclear systems.
10. Design systems, components, or processes while demonstrating a commitment to quality, timeliness, and continuous improvement of the design and operation of nuclear systems.
11. Participate effectively as a member or a leader of technical teams.

12. Demonstrate an understanding of and commitment to professional, ethical and social responsibilities, including the effects of culture, diversity, and interpersonal relations.
13. Demonstrate a commitment and ability to engage in self-directed continuing professional development.

Assessment Methodology

Metrics, Assessments, and Levels of Achievement

The table below provides a brief overview of the measures selected to assess program outcomes for the Bachelor of Science in Nuclear Engineering Technology program. Assessment of program outcomes includes both direct and indirect measures. Benchmarks have been established to differentiate between three levels of program outcome achievement (highly achieved, meets standard, and needs improvement). These three levels of achievement are color coded and used in the section below to indicate the level of achievement for each measure, for each learning outcome.

Metric Type	**Direct Measures**		**Indirect Measures**	
Assessments	Capstone Course	Course-Embedded	Exit Alumni Survey	One-Year Post-graduation Alumni Survey
Metrics	The percentage of the NUC 495 students who receive a grade of 2 (out of 3) or higher on the Capstone Rubric for the designated program outcome.*	The percentage of the students who receive a grade of B or higher on two selected course embedded assessments.	The mean of the graduates' perceptions of their achievement of the related program outcomes (on a 6-pt Likert-type scale).	The mean of the graduates' perceptions of their achievement of the related program outcomes (on a 6-pt Likert-type scale).
Highly Achieved	≥ 85%		Mean ≥ 5%	
Meets Standard	70 - 84%		4.0 - 4.99	
Needs Improvement	< 70%		Mean < 4	

Note: The results of the one year post-graduation survey are used as a reference to provide a longitudinal perspective on students' attainment of program (student) outcomes.
**NUC 495 was revised from a portfolio to a project-based course prior to the start of the Spring 2016 term. Data from Spring 2016 is not included in the direct measures because the new rubrics were not comparable.*

The new data was reviewed separately. Although, the capstone exam remained the same, resulting in a larger sample size than what is seen in the direct measures.

Key: Result / N

Program Outcome Achievement Results

May 2015 Term to March 2016 Term

Program / Student Learning Outcome 1

Select and apply appropriate knowledge, techniques, skills, and modern tools of the natural sciences, including physics, chemistry, thermodynamics, atomic physics, and nuclear physics, to solving problems in nuclear engineering technology areas.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	97% n = 107	Exit Survey	5.46 n = 37
M1A1 in NUC 255 Electrical Theory	90% n = 10	One-Year Survey	4.75 n = 12
M3A1 in NUC 245 Thermodynamics	86% n = 14		

Program / Student Learning Outcome 2

Demonstrate the ability to understand, measure, and provide quantitative expressions for natural phenomena, including observation, standard tests, experimentation, and accurate measurement.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	97% n = 107	Exit Survey	5.55 n = 37
M4A1 in NUC245 Thermodynamics	93% n = 14	One-Year Survey	5.25 n = 12
M5A1 in NUC 211 Radiation Measurement Lab	100% n = 4		

Program / Student Learning Outcome 3

Select and apply appropriate knowledge, techniques, skills, and modern tools of algebra, trigonometry, and calculus to solving problems in nuclear engineering technology areas.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	97% n=107	Exit Survey	5.32 n=37
M5A1 in NUC325 Nuclear Materials	93% n=91	One-Year Survey	4.67 n=12
M2A2 in NUC330 Reactor Core Fundamentals	98% n =124		

Program / Student Learning Outcome 4

Make oral technical presentations in Standard English using graphics and language appropriate to the audience.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	98% n = 107	Exit Survey	5.41 n = 37
M8 Term Paper in NUC 255 Electrical Theory	90% n = 10	One-Year Survey	5.17 n = 12
M8A2 in NUC 350 Plant Systems Overview	100% n = 3		

Program / Student Learning Outcome 5

Demonstrate proficiency in the written and graphical communication of technical information supported by appropriate technical references using Standard English.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	98% n=108	Exit Survey	5.59 n=37
M8A1 Research Paper in NUC325 Nuclear Materials	92% n=91	One-Year Survey	5.17 n=12
M7A1 Research Paper in NUC260 Power Plant Components	100% n=3		

Program / Student Learning Outcome 6

Demonstrate a working knowledge of computer applications or documentation of the use of one or more computer software packages for technical problem solving appropriate to the nuclear engineering technology discipline.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	98% n=108	Exit Survey	5.16 n=37
M3A2 Assignment in NUC211 Radiation Measurement Lab	100% n = 6	One-Year Survey	5.33 n=12
M3A1 in NUC210 Health Physics and Radiation Protection	100% n = 6		

Program / Student Learning Outcome 7

Demonstrate technical competency in electrical theory, nuclear and engineering materials, reactor core fundamentals, power plant systems, heat transfer, fluids, health physics/radiation protection, and radiation measurement.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	97% n=107	Exit Survey	5.51 n=37
M4A2 Midterm Exam in NUC330 Reactor Core Fundamentals	92% n=126	One-Year Survey	5.00 n=12
M8A1 Final Exam in NUC250 Introduction to Heat Transfer and Fluid Mechanics	100% n = 13		

Program / Student Learning Outcome 8

Demonstrate comprehension of currently applicable rules and regulations in the areas of radiation protection, operations, maintenance, quality control, quality assurance, and safety.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	94% n = 107	Exit Survey	5.53 n = 37
M4 Midterm Exam in NUC350 Plant Systems Overview	0% n = 3	One-Year Survey	4.82 n = 12
M8 Final Exam in NUC210 Health Physics and Radiation Protection	67% n = 6		

Program / Student Learning Outcome 9

Integrate and apply knowledge of the functional areas of nuclear engineering technology to the safe operation and maintenance of nuclear systems.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	95% n=107	Exit Survey	5.53 n =37
M8 Final Exam in NUC350 Plant Systems Overview	0% n = 3	One-Year Survey	4.83 n = 12
	95%		

M4A1 Midterm Exam in NUC271 Fundamentals of Reactor Safety	n = 22

Program / Student Learning Outcome 10

Design systems, components, or processes while demonstrating a commitment to quality, timeliness, and continuous improvement of the design and operation of nuclear systems.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	88% n = 107	Exit Survey	5.12 n = 37
M6A3 in NUC325 Nuclear Materials	88% n = 92	One-Year Survey	n/a n = 3
M2A1 in NUC350 Plant Systems Overview	67% n = 3		

Program / Student Learning Outcome 11

Participate effectively as a member or a leader of technical teams.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	99% n = 107	Exit Survey	5.55 n = 37
M6A1 Lab Report in NUC211 Radiation Measurement Lab	100% n = 6	One-Year Survey	5.33 n = 12
	100%		

M4A1 Lab Report in NUC211 Radiation Measurement Lab	n = 6

Program / Student Learning Outcome 12

Demonstrate an understanding of and commitment to professional, ethical, and social responsibilities, including the effects of culture, diversity, and interpersonal relations.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	100% n = 107	Exit Survey	5.55 n = 37
M6A3 in NUC330 Reactor Core Fundamentals	95% n = 122	One-Year Survey	5.00 n = 12
M6A3 in NUC495 Integrated Technology Assessment	100% n = 107		

Program / Student Learning Outcome 13

Demonstrate a commitment and ability to engage in self-directed continuing professional development.

Direct Measure		Indirect Measure	
Capstone Rubric NUC 495 Integrated Technology Assessment	100% n = 107	Exit Survey	5.53 n = 37
M8A1 Research Paper in NUC320 Materials	94% n=223	One-Year Survey	5.42 n =12

M6A4 in NUC495 Integrated Technology Assessment	100%
	n=107

Capstone Exam Results

A comprehensive capstone examination has been administered to all baccalaureate degree students at the conclusion of the NUC 495 Integrated Technology Assessment since September 2010. The capstone examination consists of 120 objective questions that assess the most common and most important topics and skills in seven core content areas within the College's baccalaureate degree electrical engineering technology curriculum.

From May 2015 term to March 2016 term, the total number of students who took the capstone exam was 118. The mean score on each of the program's core content areas is shown below:

- 77.6% - Basic Natural Sciences
- 59.9% - Experimentation and Lab Techniques
- 85.5% - Basic Mathematics and Applications
- 64.8% - Technical Problem Solving and Computer Usage
- 70.4% - Basic Nuclear Reactor Theory and Technology
- 93.6% - Health Physics and Radiation Aspects
- 82.8% - Nuclear Power Plant Operation and Maintenance