

**Oregon Institute of Technology
Medical Imaging Technology Department
Radiologic Science Program Assessment
2014-2015**

I. Introduction

The Radiologic Science (RDSC) program at Oregon Institute of Technology is entering its 63 year of educating future Radiologic Technologists. The program is proud of its strong retention rates from the sophomore (professional courses) to the senior year (externship). Because of limited space and teacher ratio, the radiology program limits the selection numbers to 48 students into the sophomore professional level each year. The program generally graduates between 44-48 students a year with 40 students graduating in 2015. The average salaries of those reporting for the 2014 graduating class was \$53,482.

Summary of Program Purpose, Objectives and Student Learning Outcomes

The RDSC faculty established the program purpose, objectives, and student learning outcomes in 2007 and reviewed them in 2011 and 2015. The faculty will revisit this fall 2015 to modify the assessment cycle to align with the new Essential Student Learning Outcomes (ESLO). However, the RDSC program purpose, objectives, and outcomes will remain as stated below.

Program Purpose

The purpose of the Radiologic Science Bachelor's Degree Program at Oregon Institute of Technology is to provide graduates with the knowledge, clinical skills, and compassion that will allow them to become exemplary medical imaging technologists and future leaders in radiology and advanced imaging professions.

Educational Objectives

The Radiologic Science program prepares graduates to:

- Be advanced leaders in the profession.
- Be compassionate, caring healthcare professionals.
- Be eligible, well-prepared, and able to sit for and pass the ARRT credentialing examination.
- Have immediate job placement within six months of graduation.
- Work in advanced imaging fields and sit for advanced imaging registries.

Expected Student Learning Outcomes

The Radiologic Science student will:

1. Demonstrate knowledge of x-ray physics and related math.
2. Demonstrate professional conduct and ethical decision making.
3. Demonstrate teamwork while conducting patient procedures.
4. Demonstrate effective critical thinking and problem solving skills.

5. Demonstrate effective patient care skills.
6. Utilize both written and oral communication effectively.
7. Recognize quality diagnostic images for both technical and anatomical criteria and have the technical ability to correctly repeat images when the quality is not adequate for diagnostics.
8. Demonstrate radiation safety for self, staff, and patients as set forth by the ALARA standards.
9. Demonstrate an understanding of advanced multiple ARRT imaging modalities and the need for lifelong learning.

Additional Student Learning Opportunities

RDSC students have additional learning opportunities through participation in Association of Collegiate Educators in Radiologic Technology (ACERT) conferences held in Las Vegas each year and attendance at the Oregon Society of Radiologic Technologists conference. The Radiologic Science student club participates in a joint venture with the Federal Fish and Wildlife Services of Klamath Falls, to identify fish species through digital imaging of the fish. In addition the junior imaging students have joined forces with the natural science department to image and record complete anatomical structures of 3 cadavers.

III. Three-Year Cycle for Assessment of Student Learning Outcomes

The current cycle of assessment is shown in Table 1.

Radiologic Science Outcome Assessment	2014 2015	2015 2016	2016 2017	2017 2018
1. Demonstrate knowledge of x-ray physics and related math.	X			X
2. Demonstrate professional conduct and ethical decision making.		X		
3. Demonstrate teamwork while conducting patient procedures.		X		
4. Demonstrate effective critical thinking and problem solving skills			X	
5. Demonstrate effective patient care skills	X			X
6. Utilize both written and oral communication effectively			X	
7. Recognize quality diagnostic images for both technical and anatomical criteria and have the technical ability to correctly repeat images when the quality is not adequate for diagnostics		X		
8. Demonstrate radiation safety for self, staff, and patients as set forth by the ALARA standard.	X			X
9. Demonstrate an understanding of advanced multiple ARRT imaging modalities and the need for lifelong learning			X	

Table 1. Three year cycle for assessment of student learning outcomes.

IV. Summary of 2014-15 Assessment Activities

The program faculty formally assessed three student learning outcomes this year, as follows.

PSLO #1: Demonstrate knowledge of x-ray physics and related math. The faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome to the Radiologic Science curriculum can be found in Appendix A-1.

Direct assessment #1

The faculty assessed x-ray physics and related math in RDSC 202 Imaging Techniques II Winter term 2015, using a lab project graded with a rubric. There were 44 students assessed, results by proficient and highly proficient are listed in table 2 below.

Assessment method	Measurement scale	Minimal acceptable performance	Proficient	Highly Proficient
Rubric scored lab project	1 – 4 proficiency	80% at 3 or 4	11.4%	88.6%

Table 2. Assessment results for SLO 1, RDSC 202, Winter 2015, faculty ratings of math/physics.

Direct Assessment # 2

The spring 2014 clinical instructor survey was not administered due to unforeseen circumstances.

Direct Assessment #3

ARRT exam results for the June 2014 RDSC graduates using the ARRT Annual Program Summary Report 2014. The results for the image production and evaluation were used to assess this outcome. The exam had 45 questions for image production and evaluation which requires students to calculate miliampere and kilovoltage equations in relationship to a body part thickness to produce diagnostic images. Therefore this is a good measure of students' ability to apply math and physics to produce technical factors directly related to image production. The results of the 48 students who took the exam can be found in table #3.

Performance Criteria	Assessment method	Measurement scale	Minimal acceptable performance	Results
Image production and evaluation	ARRT National Certification Exam Questions (45)	1-10	80% of students at or above the National average (8.2)	83.8%

Table 3. Assessment results for SLO 1, ARRT exam, April 2014-April 2015

Faculty are generally pleased with the above results. However, there is some concern that three of the 2014 graduates did not pass the ARRT registry exam. While these failures did not hinge on the image acquisition and evaluating portion of the exam, all three did score low in this section. Measures will be taken to address this deficiency. Comparing our results to the national average on this section of the exam, our students averaged 8.3 while the national average is 8.2. This section of the exam is often the most difficult part of the exam because it is measuring students' ability to calculate and apply math and physics for imaging production. While the national average exam pass rate is 88.9%, 93.8% of our students are above the 75% passing score for the ARRT registry exam.

Indirect Assessment # 1

The faculty assessed student learning on this outcome by surveying graduating senior extern students. The students were asked to rate their level of preparation. With 45 extern students reporting, the results showed that 47.7% indicated that they were highly prepared, while 50% indicated that they were adequately prepared, for a total of 97.7% at prepared or better.

PSLO #5: Demonstrate effective patient care skills The faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome to the Radiologic Science curriculum can be found in Appendix A-2.

Direct assessment #1

The faculty assessed patient care skills in RDSC 205 Patient Care winter term 2012 using a lab project graded with a rubric. There were 44 sophomore students assessed, results by proficient and highly proficient are listed in table 4 below.

Performance criteria	Assessment method	Measurement scale	Minimal acceptable performance	Results
Vital signs (blood pressure, pulse, and respiration)	Rubric scored presentation	1 – 4 proficiency	90% at 3 or 4	100%
Sterile and aseptic technique	Rubric scored presentation	1 – 4 proficiency	90% at 3 or 4	100%
Venipuncture	Rubric scored presentation	1 – 4 proficiency	90% at 3 or 4	100%
Transfer of patient	Rubric scored presentation	1 – 4 proficiency	90% at 3 or 4	100%
Care of patient medical equipment	Rubric scored presentation	1 – 4 proficiency	90% at 3 or 4	100%

Table 4. Assessment results for SLO 5, RDSC 205, winter 2015 patient care.

Direct Assessment # 2

The spring 2014 clinical instructor survey was not administered due to unforeseen circumstances.

Direct Assessment #3

ARRT exam results for the June 2014 RDSC graduates using the ARRT Annual Program Summary Report 2014. The results for Patient Care and Education were used to assess this outcome. The exam had 30 questions for Patient Care and Education. The results of the 48 graduates who took the exam can be found in table #5.

Performance Criteria	Assessment method	Measurement scale	Minimal acceptable performance	Results
Patient Care and Education	ARRT National Certification Exam Questions (30)	1-10	The class scores at or above the national average (8.5)	8.8

Table 5. Assessment results for SLO 1, ARRT exam, April 2014-April 2015

Faculty are satisfied with the above results. Comparing our results to the national average on this section of the exam, our students average 8.8 while the national average is 8.5. Patient care is paramount in healthcare as not to inflict additional harm or injury to already unstable people.

Indirect assessment # 1

The faculty assessed student learning on this outcome by surveying graduating senior extern students. The students were asked to rate their level of preparation. With 44 extern students reporting, the results showed that 68.2% indicated that they were highly prepared, while 29.6% indicated that they were adequately prepared, for a total of 97.8% graduates felt that they were at a level of prepared or better.

PSLO #8: Demonstrate radiation safety for self, staff, and patients as set forth by the ALARA standard

Direct Assessment #1

The faculty assessed radiation safety in RDSC 272 spring term using multiple choice exam questions. There were 44 sophomore students assessed, results by proficient and highly proficient are listed in table 6 below.

Performance criteria	Assessment method	Measurement scale	Minimal acceptable performance	Results
Demonstrates Knowledge of ALARA	Multiple Choice Exam Questions	1 – 4 proficiency	90% at 3 or 4	100%

Table 6. Assessment results for SLO 8, RDSC 272, spring 2015 radiation safety

Direct Assessment #2

The faculty assessed radiation safety in RDSC 211 Radiographic Positioning spring term using a practical exam graded with a rubric. There were 44 students assessed, results by proficient and highly proficient are listed in table 7 below.

Performance criteria	Assessment method	Measurement scale	Minimal acceptable performance	Results
Appropriate shielding use	Rubric scored presentation	1 – 4 proficiency	90% at 3 or 4	97.7%

Table 7. Assessment results for SLO 8, RDSC 211, spring 2015 radiation safety

Direct Assessment # 3

The year-end clinical instructor survey was administered spring 2014; therefore, there is no data to be reported.

Direct Assessment #3

ARRT exam results for the June 2014 RDSC graduates using the ARRT Annual Program Summary Report 2014. The results for Radiation Protection were used to assess this outcome. The exam had 45 questions for Radiation Protection. The results of the 48 students who took the exam can be found in table #8.

Performance Criteria	Assessment method	Measurement scale	Minimal acceptable performance	Results
Radiation Protection	ARRT National Certification Exam Questions (45)	1-10	The class scores at or above the national average (8.5)	8.7

Table 8. Assessment results for SLO 8, ARRT exam, April 2014-April 2015

Faculty are pleased with the above results. Comparing our results to the national average on this section of the exam, our students average 8.7 while the national average is 8.5. Radiation protection of patients, staff and self should be of utmost importance in keeping the general population safe when having radiation procedures.

Detailed records of this assessment can be found in the Radiologic Science coordinator's notebook.

V. Summary of Student Learning Outcomes

The program faculty met in June 2015 to review the assessment work for the year and drew the following conclusions.

PSLO #1: Demonstrate knowledge of x-ray physics and related math.

Strengths: Students exceeded expectations and demonstrated mastery of techniques upon completion of the Oregon Tech RDSC program.

Weaknesses: Students demonstrated the ability to apply these technical aspects of the imaging profession, however, in the practicing phase some student struggled with the 15% rule. This could be attributed to vague exam questions.

Actions: No action is required at this time; however, attention will be given to the delivery of calculating the 15% rule during the sophomore year.

PSLO #5: Demonstrate effective patient care skills.

Strengths: Students have once again exceeded faculty expectations in this PSLO. The faculty are reassured that the students are prepared by the way that graduates rated themselves as being proficient or better.

Weaknesses: No weaknesses were identified.

Actions: No action is required at this time.

PSLO #8: Demonstrate radiation safety for self, staff, and patients as set forth by the ALARA standard.

Strengths: Students have demonstrated a solid understanding of ALARA in the didactic and application.

Weaknesses: No weaknesses were identified at this time.

Actions: No action is required at this time.

**Appendix A-1
Radiologic Science
SLO-Curriculum Map**

Student Learning Outcome PSLO # 1. Demonstrate knowledge of x-ray physics and related math.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on their performance on the SLO.

I = Introduced
R = Reinforced
E = Emphasized

	Sophomore			Junior			Senior		
Fall	RDSC 201	Imaging Techniques I	I	RDSC 301	Radiographic Positioning III	E	RDSC 410	Extern	E
	RDSC 235	Equipment Operation & Maintenance	I	RDSC 320	Surgical, Trauma & Mobile Radiography	E			
	PHY 217	Physics of Medical Imaging	I	BIO 336	Pathophysiology				
				RDSC 355	Computed Tomography	I			
Win	RDSC 202	Imaging Techniques II	R	RDSC 356	Magnetic Resonance	I R			
	RDSC 205	Patient Care					RDSC 410	Extern	E
	RDSC 210	Radiographic Positioning I							
	RDSC 366	Radiographic Pathology							
Spr	RDSC 211	Radiographic Positioning II	E R	RDSC 326	Cardiovascular/ Interventional Technology		RDSC 410	Extern	E
	RDSC 233	Contrast Media Procedures		RDSC 354	Mammography				
	BIO 335	Cross-Sectional Anatomy		RDSC 365	Advanced Quality Assurance/Quality Control				
	RDSC 272	Radiation Protection	I	RDSC 388	Externship Prep				

**Appendix A-2
Radiologic Science
SLO-Curriculum Map**

PSLO # 5 Demonstrate effective patient care skills.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on their performance on the SLO.

I = Introduced
R = Reinforced
E = Emphasized

	Sophomore			Junior			Senior		
Fall	RDSC 201	Imaging Techniques I		RDSC 301	Radiographic Positioning III	R E	RDSC 410	Extern	E
	RDSC 235	Equipment Operation & Maintenance		RDSC 320	Surgical, Trauma & Mobile Radiography	R E			
	PHY 217	Physics of Medical Imaging		BIO 336	Pathophysiology				
				RDSC 355	Computed Tomography				
Win	RDSC 202	Imaging Techniques II		RDSC 356	Magnetic Resonance				
	RDSC 205	Patient Care	I				RDSC 410	Extern	E
	RDSC 210	Radiographic Positioning I	I						
	RDSC 366	Radiographic Pathology							
Spr	RDSC 211	Radiographic Positioning II	R E	RDSC 326	Cardiovascular/ Interventional Technology	R E	RDSC 410	Extern	E
	RDSC 233	Contrast Media Procedures	R E	RDSC 354	Mammography	R E			
	BIO 335	Cross-Sectional Anatomy		RDSC 365	Advanced Quality Assurance/Quality Control				
	RDSC 272	Radiation Protection		RDSC 388	Externship Prep				

**Appendix A-1
Radiologic Science
SLO-Curriculum Map**

Student Learning Outcome PSLO # 8. Demonstrate radiation safety for self, staff, and patients as set forth by the ALARA standard.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on their performance on the SLO.

I = Introduced
R = Reinforced
E = Emphasized

	Sophomore			Junior			Senior		
Fall	RDSC 201	Imaging Techniques I	I	RDSC 301	Radiographic Positioning III	R E	RDSC 410	Extern	E
	RDSC 235	Equipment Operation & Maintenance	I	RDSC 320	Surgical, Trauma & Mobile Radiography	R E			
	PHY 217	Physics of Medical Imaging	R	BIO 336	Pathophysiology				
				RDSC 355	Computed Tomography	I			
Win	RDSC 202	Imaging Techniques II	I R	RDSC 356	Magnetic Resonance				
	RDSC 205	Patient Care					RDSC 410	Extern	E
	RDSC 210	Radiographic Positioning I	R E						
	RDSC 366	Radiographic Pathology							
Spr	RDSC 211	Radiographic Positioning II	R E	RDSC 326	Cardiovascular/ Interventional Technology	R	RDSC 410	Extern	E
	RDSC 233	Contrast Media Procedures	R E	RDSC 354	Mammography				
	BIO 335	Cross-Sectional Anatomy		RDSC 365	Advanced Quality Assurance/Quality Control				
	RDSC 272	Radiation Protection	I	RDSC 388	Externship Prep				