UNIVERSITY OF NEVADA, LAS VEGAS

Program Review Self-Study

Program Reviewed: Nuclear Medicine

Degrees: B.S.

Program Chair or Director: Dr. Art Meyers

Dean: Dr. Ron Brown

Date of Report: March 24, 2018

GENERAL INSTRUCTIONS

1. Please provide Faculty CVs as a single electronic file (PDF preferred) or on a thumb drive *for the external reviewers*.
2. **Please complete the program review self-study using this template**.
3. If this review is covering several degree levels, please be sure to address ***each level*** in your responses to the questions.
4. Contacts for questions:
   Chair of the Faculty Senate Program Review Committee found here:
   https://www.unlv.edu/facultysenate/committees/program-review
   - or the Chair of the Graduate College Program Review Committee found here:
     https://www.unlv.edu/graduatecollege/program-review-committee
   - Dr. Rainier Spencer, Vice Provost for Academic Programs: rainier.spencer@unlv.edu, 702-895-5833
   - Nora Carroll, Academic Programs Analyst, Eleonora.carroll@unlv.edu, 702-895-1888

I. Program Description

A. College/Department/Program

1. College or School: Allied Health Sciences
2. Unit: Nuclear Medicine Technology Department Health Physics Web address: unlv.edu.hpds
3. Program(s) being reviewed: Nuclear Medicine Technology
   a. Degrees and their abbreviations: (BS) Bachelor of Science

B. Primary individual completing this worksheet

1. Name: Art Meyers
2. Title: Nuclear Medicine Program Director
3. Date of self-study: 3/22/18
4. Campus Phone: 702-895-0976
5. Mail Stop: 3037
6. E-mail: arthur.meyers@unlv.edu
7. Fax Number: 702- 895-4819

C. Other faculty involved in writing this report: None

D. Please insert the most recent catalog description(s) of the program(s). Due to display complications, this description must be typed into this form and **not** pasted from the Catalog.
Nuclear Medicine is the medical specialty that utilizes radioactive materials to make diagnostic evaluations of the anatomic and/or physiologic conditions of the body and provide therapy with unsealed radioactive sources. The nuclear medicine program at UNLV is designed to train students for entry levels positions in nuclear medicine. Additionally, graduates will meet many of the prerequisites required for post-graduate studies in health related areas.

1. Is the description correct? If not, what needs to be changed?
   Yes

II. Centrality to Mission

A. Department/Program Mission

What is the program's mission statement (or the department's if the program does not have one)?

The mission of the B.S. in Nuclear Medicine program is to provide a high quality undergraduate experience for students in diagnostic and therapeutic applications of nuclear medicine. The educational experience is accomplished through rigorous classroom instruction, clinical experiences at local imaging facilities, and mentoring. The products of this experience are entry-level professionals capable of critical thinking, devoted to a lifetime of learning, able to effectively communicate with patients and medical personnel, committed to ethical standards of their profession, and highly sought after by employers.

B. Department/Program Mission Alignment

Briefly describe how this program is aligned to the mission of the University as described in the most recent mission statement, UNLV Mission https://www.unlv.edu/toptier/vision, and how it supports achievement of the institution's mission:

UNLV's mission statement includes meeting community needs and providing a solid academic educational setting for its students. Our mission is to provide the nuclear medicine students with the foundation of knowledge necessary to be successful in the health care industry and provide opportunities for various graduate studies. Furthermore, nuclear medicine graduates meet the community need of hospitals, outpatient clinics, cardiology centers, and diagnostic and therapeutic cancer centers for entry level nuclear medicine technologists in these facilities.

C. Core Themes

Briefly describe how this program supports UNLV's Core Themes (the core themes can be found at: https://www.unlv.edu/provost/nwccu/core-themes

The program supports two of the major Core Themes set forth by the University;

Core Theme1: Advance Student Achievement'

The nuclear medicine students work through a rigorous program including courses in Chemistry, Physics, and Biology before entering the program. Most of the students accepted into the nuclear medicine program are some of the best and brightest in the Health Physics undergraduate imaging programs. Nuclear Medicine students typically score grades of A's and B's and are extremely successful on the national registry examination taken at the end of the program.

Core Theme 4: Foster Community Partnership

The Nuclear Medicine Technology program has developed relationships with most hospitals, outpatient clinics, cardiology centers, and cancer centers in the Las Vegas community. 90-95% of all nuclear medicine technologists working in Las Vegas facilities are graduates of our UNLV program. Many graduates of the UNLV Nuclear Medicine program have successfully completed various graduate degrees.

Excellence

List and briefly describe five highlights or areas of excellence of the program:

1. The average pass rate on the national registry examination for graduates completing a nuclear medicine technology program nationwide is 84%. UNLV nuclear medicine students that successfully completed the program have NOT failed the national registry examination in 11 years! That's a 100% pass rate!
2. The nuclear medicine program only accepts students every other year. When students graduate the success rate for employment has historically been very high. The last class graduated in May 2016 and all graduates were fully employed within three months of completing program.
3. Many graduates of our nuclear medicine program have continued their education and become; lawyers, doctors, dentists, health physicists, CEO of hospitals, radiology managers, sales representatives, equipment experts, and radiation safety officers. One of our graduates is the General Counsel for the University; Elda Luna Sidhu, Esq.
4. The Program Director has 34 years of teaching experience at UNLV. He teaches 12 different classes in the Health Physics Department including most of the nuclear medicine classes and two introductory courses that have 50-60 students in them.

5. The nuclear medicine program has developed excellent community relationships with various hospitals and clinics. Students do clinical rotations in any one of a number of nuclear medicine department throughout Las Vegas including; Sunrise Humana Hospital, Valley Hospital, St Rose Hospital, Summerlin Hospital, UMC, Desert Springs Hospital, Steinberg's Diagnostic center, Cancer Centers of Nevada, Desert Radiology, Henderson Hospital, and North Vista Hospital.

III. External Demand for Program

A. Stakeholders

1. Who are the main local and regional stakeholders of your educational programs, i.e., employers and entities benefiting from these programs, hiring the graduates, or admitting them to graduate and/or professional programs?

The major regional stakeholders of the UNLV nuclear medicine program are the local hospitals and outpatient clinics. All accredited hospitals must have a nuclear medicine department that is staffed by certified nuclear medicine technologists. Most of the outpatient facilities also require certified nuclear medicine technologists in order to be reimbursed through Medicare today. Due to the lack of programs nationwide, students come from other regions of the country to apply for our program. Hawaii has no nuclear medicine technology degree program, thus we typical get students that come to UNLV to take the nuclear medicine program.

Our nuclear medicine students receive a strong foundation in science, math, cognitive skills and computer applications; thus they are typically strong candidates for graduate studies in Health Physics, Health Administration, Physicians Assistant programs, and medical school.

2. What are specific stakeholder needs for graduates?

The nuclear medicine graduate possesses the following skills that stakeholders seek;
Solid foundation in Math and Science
Understanding and appreciation of radiation and its safe use
Be able to analyze various measurements and decays related to proper radiation use
Properly inject and measure radioactive tracers
Be able to calculate various diagnostic and therapeutic radiopharmaceutical doses
Understand patient needs and concerns and assist in patient care in nuclear medicine departments
Be able to utilize and understand gamma camera equipment and Positron Emission Imaging equipment used in various setting in nuclear medicine
Work in a professional and ethical manner, communicating with other modalities in hospital settings
Understand and utilize various computer processing techniques and filters for imaging patient
Be able to analyze imaging results and assist the physicians in their interpretation of findings

B. Needs for Graduates and Future Plans

1. What are the anticipated needs for program graduates over the next 3-5 years? Please cite sources of information. There is much excitement in the field of nuclear medicine in the last few years. Advances in Solid state detectors, new radiopharmaceuticals, PET/CT imaging, and the raise of Molecular Imaging has fueled a growth spurt in the field. Job outlook for 2016-2026 is 10% faster than the national average. Cited sources include; Bureau of Labor Statistics(2016), BiMed Research International(Nov 2014), Journal of NM(July 2014), Society of NM(March 2016), Contrast Media & Molecular Imaging, Stanford U(April 2017)

2. What changes to the program will those require? Changes in course methodology, new aspects of radiopharmaceuticals, PET/CT and molecular Imaging techniques will be added to program.

C. Success of Graduates

1. What steps does the department take to facilitate the success of graduates (e.g. internships, career fairs, employment talks etc.

The Nuclear medicine Program's Clinical Coordinator interactions with the Chief Technologists and Radiology Managers at the clinical sites bimonthly while students are attending various facilities.

2. Discuss the placements of recent graduates:

All eleven nuclear medicine technology graduates this past May/2016 secured employment within three months of completing program.

3. If the department or program does not have placement information on graduates, what is the plan to implement gathering that information?

3. Do placements match stakeholder needs as identified above in A of this section?

Yes

4. If not, please explain.

5. Does the program assess whether the graduates are meeting employer's needs?

Yes, a survey is given to clinical sites to evaluate students that recently graduated.

6. If not, what will the program do to place this NSHE-required assessment in place and by what date?

7. Additional Comments

IV. Program Resources

A. Faculty Time

1.Faculty and GA Resources

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Number of Full Time Faculty	1	1	1	1
Number of State-Supported GA lines				
Number of PTIs				1
Number of FIRS & Visiting				

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Percent of Classes Taught by Full Time Faculty	100%	100%	100%	75%
Percent of Classes Taught by Number of State-Supported GA lines				
Percent of Classes Taught by Number of PTIs				25%
Percent of Classes Taught by Number of FIRS & Visiting				

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Student Credit Hours Taught by Full Time Faculty	12	12	12	12
Student Credit Hours Taught by Number of State-Supported GA lines				
Student Credit Hours Taught by Number of PTIs				3
Student Credit Hours Taught by Number of FIRS & Visiting				

2. For other non-major courses – e.g., upper division for the college or university, estimate the unit's resources allocated to them:

B. Budget

1. Please fill in the table with three years of financial expenditures to be used to respond to questions 2 and 3 below.

Budget category	FY 14–15	FY 15–16	FY 16–17
State Operating (2101)	$ 63,000	$ 63,000	$ 63,0000
Student Fees	$	$	$
Indirect Cost Recovery	$	$	$
Self-supporting	$ 3,000	$ 3,000	$ 3,000
Total Allocations	$ 66,000	$ 66,000	$66,000
Number of Graduate Assistantships (including GAs on grants)			

2. Are these resources sufficient to meet the degree program's instructional and scholarship needs?
   Yes
3. If not, approximately what line items and amounts would be needed?

C. General Education

1. If your program or unit offers General Education courses, please estimate what proportion of the unit's resources are allocated to this area: N/A

2. Does the combined load from A and B above affect your unit's ability to offer courses for its major? If so, please describe:

D. Other Funding and Resources

1. Is funding from other sources sufficient to assist the program in achieving its outcomes? Other sources to be considered include: differential tuition, grants and contracts, endowment income, and one-time gifts for student scholarships, other one-time gifts. *Yes, Out of State tuition*

2. If not, which funding streams could most reasonably be increased to help the program attain its outcomes?

3. Has any new donor revenue been generated since the last program review? No

4. Has the unit engaged in fundraising activities to support the program over the last 5 years? No

5. What has been the result of these fundraising activities?

6. Review the space data for your department and comment on its amount and quality. These data will need to be accessed by an individual with Archibus® access.
   Classroom and Computer in classroom are the only items used by NM students on campus. All labs and clinical are performed in hospitals and outpatient centers.

7. Is the quality and quantity of available consumable materials and supplies (e.g., office supplies or lab supplies) adequate and if not, explain why not: Yes

8. Is the quality and quantity of available technology resources, such as computers adequate and if not, explain why not: Yes

9. Is the quality and quantity of available equipment (other than computing) adequate and if not, explain why not: Yes
10. Is the quality and quantity of available library and information resources adequate and if not, explain why not: Yes
11. Staffing
    a. Are available department staff resources sufficient to attain the program's outcomes? Yes
    b. If not, what additional staff resources are needed and how would they be funded?

12. Additional Comments
    The NM program only accepts 10-15 students every other year. There is only one full time faculty that acts as Program Director, Clinical Coordinator and teaching 75% of courses. He also teaches Introductory classes Rad 100 and Rad 102.

V. Size of Program

1. Below are headcount, course enrollment, and degrees conferred data from Decision Support.

Academic Level Key	
Undergraduate (UGRD):	Graduate (GRAD):
10 – Freshman	GR - Graduate
20 – Sophomore	PHD – PhD
30 – Junior	
40 – Senior	
50 – Post Bacc Undergrad	

Headcount

Nuclear Medicine BS (NUCBS)

Academic Level - Beginning of Term	Fall 2012 Prelim	Spring 2013 Prelim	Fall 2013 Prelim	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
20	2	0	0	0	0	0	0	0	0	0
30	8	4	2	0	4	1	0	0	4	0
40	2	7	9	11	6	9	10	11	5	8
50	1	1	1	1	2	1	1	1	3	3

Source: UNLV Analytics - Official Preliminary Enrollment
Office of Decision Support, January 2018

Course Enrollments

Department Name of Course	Sub	Course Number Level	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
Health Phy and Diagnostic Sci	NUC	300-Level		36	22			36	24
		400-Level	20			11	22		

Note: Includes lecture courses only.
Source: UNLV Analytics - Official Preliminary Enrollment
Office of Decision Support, January 2018

Degrees conferred

Department	Health Phy and Diagnostic Sci
Academic Career	UGRD
Academic Plan	Nuclear Medicine BS
Description	(NUCBS)
Degree	BS
Degree Description	Bachelor of Science

Academic Year - July to June	Degree Count
2005-06	12

2006-07	11
2007-08	13
2008-09	13
2009-10	9
2010-11	3
2011-12	9
2012-13	1
2013-14	9
2014-15	1
2015-16	10
2016-17	0

Source: UNLV Analytics - Degrees Conferred
Office of Decision Support, December 2017

The NM program is a two year upper division program. Students take the following courses in Nuclear Medicine;

Junior Year:

Course number	headcount	Course number	headcount
Fall			
Nuc 315	12	Nuc 420	12
Nuc 315L	12	Nuc 487	12
Nuc 350	12	CMI 387	12
Nuc 360	12	CMI 490	12

Senior Year

Course number	headcount	Course number	headcount
HPS 420	12	Nuc 480	12
Nuc 450	12	Nuc 494	12
CMI 490	12	CMI 479	12
		CMI 490	12

Note CMI 490 is taken 3 different times because they reflect three semesters of clinical experiences for NM students in various hospitals and clinic sites.

The NM program has accepted 12 students in both the last two rounds of acceptance into the program, thus for the past 5 years the headcount is the same.

Degrees conferred
BS degree

2. Discuss the headcounts from the last five years, i.e., are the trends in line with projections in your unit's strategic plan? Constant (see above) Yes

3. If not, why not?

4. Does your program's enrollment trend differ from national trends?
   No
5. If yes, please discuss the reasons:

6. Additional Comments

VI. Retention, Progression, Completion

A. Major Course Offerings

1. Are enough courses offered to meet enrollment demands? Yes

2. How many major courses have been added or eliminated in the last 5 years? None
   ____ Added ____ Eliminated

3. Why were the actions taken?

4. After reviewing the program, what additional actions should be taken to improve retention, progression, and completion? None

5. Are there any courses that students routinely have difficulty getting enrolled in, that slow progression and/or graduation? If so, please identify them: No

6. If last question was answered yes, what steps can be taken to reduce "bottle-necks" in these courses. Please indicate *both* financially-based and non-financially-based solutions.

7. Can any changes in sequencing of courses be made to facilitate graduations? No

B. Curriculum

1.Is the program's curriculum aligned with current developments in the field? Yes

2. If not, what needs to be done to make it current?

C. Graduation Rates

Program graduation numbers and rates are summarized below.

First-time, Full-time Freshmen Graduating within Six Years (Nuclear Medicine BS - NUCPRE, NUCBS)

Fall 2001 - Fall 2011 Cohort

Cohort		Graduated			
Term	Number	in Department	%	any Department	%
Fall 2001	6	3	50.0%	4	66.7%
Fall 2002	4	0	0.0%	0	0.0%
Fall 2003	8	3	37.5%	4	50.0%
Fall 2004	6	1	16.7%	2	33.3%
Fall 2005	11	1	9.1%	2	18.2%
Fall 2006	4	0	0.0%	1	25.0%
Fall 2007	3	0	0.0%	0	0.0%
Fall 2008	8	1	12.5%	2	25.0%
Fall 2009	8	2	25.0%	3	37.5%
Fall 2010	6	0	0.0%	1	16.7%
Fall 2011	2	0	0.0%	0	0.0%
Combined Cohort	*66*	*11*	*16.7%*	*19*	*28.8%*

Source: UNLV Analytics - RPC Benchmarks Dashboard;
StudentTracking
Office of Decision Support,
January 2018

Junior students accepted in 2016- 12 students, all will graduate in May/ 2018 rate 12/12 =100%
Junior students accepted in 2014 - 12 students, 11 graduated, rate 11/12 = 92%
Junior students accepted in 2012 - 12 students, 11 graduated, rate 11/12= 92%

Using the data in the tables above, please answer these questions:

1. Are trends in 6-year cohort graduation close to the University's goals (UNLV's undergrad goal is 50%)?
   Much better
2. If not, what is being done to reach the goal?

3. Discuss how and why the graduation rate is changing.
   Approximately 90 percent
4. Additional Comments

VII. Relationship to Other Programs

1. What relationship does your program have to other programs (such as transfers, collaborations, partnerships) in the NSHE system?
   The Nuclear Medicine program accepts students that have completed their Associates of Science or Arts from Community College programs. The program also accepts transfer credits for other regionally accredited Colleges.

2. What the relationship does this program have to other programs at UNLV (e.g., collaborations, partnerships,
   Nuclear Medicine program works closely with other Medical Imaging Modality programs in the Department of Health Physics including; Radiography, Ultrasound and Comprehensive Imaging. There is collaborative effort and a partnership on numerous Introductory courses that intersect and translate to all the Imaging Programs. Furthermore, our clinical affiliations with hospitals and outpatient clinics overlap, so many clinical affiliation agreements between UNLV and Medical Imaging Programs are under one umbrella accord.

3. Additional Comments

VIII. Impact

1. What impact has this program had or will have in the following areas:

   a. University – Meeting and attaining core themes of Advance Student Achievement and fostering community partnerships

   b. Community – Meeting Las Vegas and regional needs with highly qualified competent nuclear medicine technologist.

   c. Field – Meeting demand with certified registered technologists that are up to date in the newest imaging procedures

2. What are the benefits to the institution of offering this program? Attaining core themes and meeting a medical imaging need in the community.

3. Are there examples of the integration of teaching, research, & service that you would like to highlight (e.g., faculty mentoring leading to student presentations at conferences, service learning classes, community service activities involving students, or other student activities and/or achievements that you think are noteworthy)?
   Not in past five years, because there is only one faculty to teach entire curriculum. Faculty member Teaches 12 different classes, and attends national conferences to keep up with changes in field.
4. Additional Comments

IX. Productivity

1. Please provide an indication of faculty productivity appropriate for your unit (lists of publications by type, grants by type, performances by type, installations by type, etc.): This program is an undergraduate degree, some former students have participated in research, but not in the past five years.

2. Additional Comments
   The program is currently limited to one full time faculty who typically teaches 12 credits/ semester, acts as Program Director and Clinical Coordinator (visiting all clinical affiliates bimonthly), thus has minimal time for other activities. Faculty member teaches 12 different courses over the two year program and is consistently working diligently to keep up with changes in the field.

X. Quality

A. Admission and graduation requirements

1. Please insert program admission requirements from the current UNLV catalog. Due to display complications, this description must be typed into this form and **not** pasted from the Catalog.
Admission to the Nuclear Medicine program is competitive. The minimum requirements to be considered a student for interview is; 2.75 GPA, 60 college credits, Science and Math prerequisites completed, and letters from student expressing their interest in nuclear medicine. Again, the program only accepts students every other year. Interviews are performed in March, on even years in the calendar 2016, 2108 etc. In 2016, we interviewed 32 students and accepted 12.
Graduation requirements include that all students in the program complete the nuclear medicine courses, all co-requisites required for Bachelor of Science in the College, clinical hours in hospitals and outpatient centers and demonstrate competency in a variety of areas in nuclear medicine.

2. Are there any updates that need to be made to the catalog and if so, what are they?
No
3. How many full-time advisors are available at the college level?
2-3 assigned to NM from advisement center for Health Sciences.

B. Outcomes and Assessment

1. Student Learning Outcomes and Program Assessment Plans and Reports by program concentration are listed at http://provost.unlv.edu/Assessment/plans.html. Please attach the most recent assessment report as Appendix 3. (See attached assessment report for 2017)

2. Describe specific program changes made based on the program's evaluation of its assessment reports:
As describes in report, after interactions with clinical affiliates and radiology managers more time in PET/CT was added to program requirements for students.
3. Has the program revised its curriculum such as changing prerequisites, adding or eliminating required or elective courses, or co-curricular experiences for the degree(s) in the last 5 years? No

   a. If yes, what changes were made and why?

4. Has the program revised course content or instructional approaches (pedagogy, technology) in the last 5 years? Yes
   a. I f yes, what changes were mad and why?
Course content in various courses such as NM Procedures 1, NM Procedures 11, Radiopharmaceuticals, PET/CT, and Advanced Procedures have all been altered over the past five years to reflect changes in the field of nuclear medicine.

5. Describe any other changes made in the last 5 years (for example, advising) based on assessment reports:
Changes in radiopharmaceutical laboratory time in clinic, PET/CT time in clinical, various changes in course content

6. List and describe two specific improvements in student learning outcomes and why they represent forward movement.

Learning outcome # 1

Nuclear Medicine students recently completed their first year of the program in August of 2017. The emphasis on these first year nuclear medicine students is on understanding and appreciating the importance of radiation and the effects on biological cells in the human body. Through multiple courses, lectures and presentations; students learned aspects of radiation safety, radiation detection, computer applications of imaging of gamma rays and effective methods of equipment quality control. Nuclear Medicine students were assessed on their knowledge through examination throughout course work and required annual lectures by University Radiation Safety Officer. Students are also required to demonstrate competency in understanding radiation by efficiently using radiation monitoring equipment, utilizing appropriate and proper shielding and demonstrating knowledge and understand of gamma camera equipment in hospitals and outpatient clinical to minimize patient and technologist exposure levels.

Learning Outcome # 2

Many applied theoretical concepts learned in the classroom were assessed in practical applications in the nuclear medicine clinical environment in the following ways;

A. Individual testing and observation of students by Clinical coordinator or Certified Technologist in the clinical site the students were assigned. These tests and observations required students to either verbally explain or demonstrate how specific concepts of Instrument, radiation protection, radiopharmaceutical use and computer manipulations taught in the class were applied and properly used in clinical environment.
B. Through clinical competency evaluations performed on each student during their clinical rotation demonstrating understanding of basic concepts in classroom setting translating to hospital and outpatient setting.
C. Clinical sites supervisor's evaluation of students and end of the year survey forms.

7. Additional Comments

XI. Conclusions, Self-Assessment

A. Faculty Review of self-study

1. On what date did the program and/or department faculty review this self-study?

Program self-study was completed by Program Director on March 22, 2018. There are NO other faculty to share results; it's a one man show!

2. What were the results of the faculty review? N/A

3. What are the top 3 priorities and/or needs for the future development of the program?
    1. Continue to meet local and regional needs in provided quality nuclear medicine technology graduates.
    2. Provide excellent nuclear medicine curriculum to meet changes as they develop in field.
    3. Continue to lead nuclear medicine technology programs in success rate on national registry exam.
4. What are the strengths of the program?
    1. Program Director has over 40 years of experience in the field of nuclear medicine.
    2. Program has been developed a strong community relationship with hospitals and outpatient clinics.
    3. Program has been very successful in placing graduates and passing national registry examination.
5. What are the challenges facing the program?
    Meeting the changing needs of the field
6. What recent additions, corrections, or other changes have been made to the program that reflect changes or developments in the field?
    The program has implemented addition clinical hours in radiopharmaceutical laboratory and PET Imaging.

B. Other comments

1. Is there anything else you would like to discuss about the program? No

The NSHE also requires that any action steps identified based on the review of the program and the status of the action steps be ready for consideration at the December board meeting the year the program review is completed. You will be contacted about this after the external review has been completed.

NEXT STEPS:

A. Email the self-study to:

- Chair of the Faculty Senate Program Review Committee found here: http://facultysenate.unlv.edu/committees/program-review or the Chair of the Graduate College Program Review Committee found here: https://www.unlv.edu/graduatecollege/program-review-committee.
- Dr. Rainier Spencer, Vice Provost for Academic Programs, rainier.spencer@unlv.edu, 702-895-5833.
- Nora Carroll, eleonora.carroll@unlv.edu, 702-895-1888

Congratulations on completing the self-study!

UNLV

UNIVERSITY OF NEVADA, LAS VEGAS

Program Review Self-Study

Program Reviewed: CMI – Radiography

Degrees: B.S. / Certificate

Program Chair or Director: George Pales

Dean: Ronald Brown

Date of Report: March 2018

GENERAL INSTRUCTIONS

1. Please provide Faculty CVs as a single electronic file (PDF preferred) or on a thumb drive *for the external reviewers.*
2. **Please complete the program review self-study using this template**.
3. If this review is covering several degree levels, please be sure to address ***each level*** in your responses to the questions.
4. Contacts for questions:

- Chair of the Faculty Senate Program Review Committee found here: http://facultysenate.unlv.edu/committees/program-review or the Chair of the Graduate College Program Review Committee found here: https://www.unlv.edu/graduatecollege/program-review-committee
- Gail Griffin in the Office of the Senior Vice Provost: Gail Griffin, gail.griffin@unlv.edu, 702-895-0482.

I. Program Description

A. College/Department/Program

1. College or School: School of Allied Health Science
2. Unit: Health Physics & Diagnostic Science Web address: www.unlv.edu/hpds/rdiography
3. Program(s) being reviewed: CMI- Radiography
   a. Degrees and their abbreviations: B.S. ; Certificate

B. Primary individual completing this worksheet

1. Name: George Pales
2. Title: Radiography Program Director
3. Date of self-study: March 2018
4. Campus Phone: 702-895-1859
5. Mail Stop: 5-3017
6. E-mail: George.pales@unlv.edu
7. Fax Number: 702-895-1312

C. Other faculty involved in writing this report: Chad Hensley

Program was awarded FULL eight year accreditation by the Joint Review Committee on Education in Radiologic Technology APRIL 2016.

D. Please insert the most recent catalog description(s) of the program(s). Due to display complications, this description must be typed into this form and **not** pasted from the Catalog.

In concert with the mission and goals of the University of Nevada, Las Vegas, the Radiography Program is dedicated to the education of students in preparation for entry level clinical practice. Program administration, faculty and staff provide didactic and clinical education opportunities, which adhere to recognized standards, to all eligible students. The Program is committed to graduating students who are prepared to become practicing radiography professionals.

1. Is the description correct? YES If not, what needs to be changed?

See UNLV RADIOGRPHY website at https://www.unlv.edu/hpds/radiography for ALL Program information, descriptions, Goals, outcomes and Program requirements.

II. Centrality to Mission

A. Department/Program Mission

What is the program's mission statement (or the department's if the program does not have one)?

As above – letter D

B. Department/Program Mission Alignment

Briefly describe how this program is aligned to the mission of the University as described in the most recent mission statement, UNLV Mission https://www.unlv.edu/toptier/vision, and how it supports achievement of the institution's mission:

UNLV's Radiography Program is a diversified program with students from many cultures and several countries learning both didactic and clinical medical imaging techniques and procedures.

C. Core Themes

Briefly describe how this program supports UNLV's Core Themes (the core themes can be found at https://www.unlv.edu/toptier/vision:

The Radiography Program produces entry level imaging technologists, many of which remain in the greater Clark County area to practice. Faculty members visit clinical sites on a weekly basis to follow student progress and meet with imaging technologists in a community awareness and communication between UNLV and the clinical sites/employees in support of the UNLV core themes.

D. Excellence

List and briefly describe five highlights or areas of excellence of the program:

Program has a 95% completion rate over the past five years

Program graduates have a 95% "first time pass rate" on the national board exam

Program graduates have a 95% job rate placement within 6 months of completing the Program

The Program fully accredited (full 8 year accreditation granted in 2016) by the Joint Review Committee on Education in Radiologic Technology (www.jrcert.org).

The program is affiliated with 11 local medical centers and six outpatient imaging centers to give students a well rounded clinical exspoerience.

III. External Demand for Program

A. Stakeholders

1. Who are the main local and regional stakeholders of your educational programs, i.e., employers and entities benefiting from these programs, hiring the graduates, or admitting them to graduate and/or professional programs? Hospitals, clinics, imaging centers, doctor offices, urgent care centers

2. What are specific stakeholder needs for graduates? Entry level technologists and advanced imaging modality technologists

B. Needs for Graduates and Future Plans

1. What are the anticipated needs for program graduates over the next 3-5 years? Please cite sources of information. 20% increase in all imaging modalities in the next 10 years– American Society of Radiologic Technologists (www.asrt.org).

2. What changes to the program will those require? Perhaps an additional faculty line.

C. Success of Graduates

1. What steps does the department take to facilitate the success of graduates (e.g., internships, career fairs, employment talks, etc.)?

Clinical rotations to varied medical sites (medical centers and imaging centers). Employer and graduate evaluations conducted on an annual basis (see assessment form attachment).

2. Discuss the placements of recent graduates: Five year placement of graduates is 94%

3. If the department or program does not have placement information on graduates, what is the plan to implement

gathering that information?

3. Do placements match stakeholder needs as identified above in A of this section? Yes
4. If not, please explain.
5. Does the program assess whether the graduates are meeting employer's needs? Yes
6. If not, what will the program do to place this NSHE-required assessment in place and by what date?
7. Additional Comments

IV. Program Resources

A. Faculty Time

1.Faculty and GA Resources

Insert data

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Number of Full Time Faculty	1	1	1	1
Number of State-Supported GA lines	0	0	0	0
Number of PTIs	2	2	2	2
Number of FIRS & Visiting	1	1	1	1

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Percent of Classes Taught by Full Time Faculty	40	40	40	40
Percent of Classes Taught by Number of State-Supported GA lines	0	0	0	0
Percent of Classes Taught by Number of PTIs	20	15	20	15
Percent of Classes Taught by Number of FIRS & Visiting	40	45	40	45

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Student Credit Hours Taught by Full Time Faculty	12	12	12	12
Student Credit Hours Taught by Number of State-Supported GA lines	0	0	0	0
Student Credit Hours Taught by Number of PTIs	4	2	4	2
Student Credit Hours Taught by Number of FIRS & Visiting	12	9	12	9

Several RAD classes are taught by "department faculty" and or PTI's that are NOT RAD faculty/PTI's and varies by semester.

2. For other non-major courses – e.g., upper division for the college or university, estimate the unit's resources allocated to them:

B. Budget

1. Please fill in the table with three years of financial expenditures to be used to respond to questions 2 and 3 below.

RAD budget is Health Physics and Diagnostic Sciences – not a separate budget.

Budget category	FY 14–15	FY 15–16	FY 16–17
State Operating (2101)	$	$	$
Student Fees	$	$	$
Indirect Cost Recovery	$	$	$
Self-supporting	$	$	$
Total Allocations	$	$	$
Number of Graduate Assistantships (including GAs on grants)	0	0	0

2. Are these resources sufficient to meet the degree program's instructional and scholarship needs? Could use another F.T. faculty line. The program is adequately supported via the department budget (estimate of 5% of total department budget).

3. If not, approximately what line items and amounts would be needed? At least one entry level registered technologist educator would be nice (estimated entry level salary of $80,000.00 at the master's level).

C. General Education

1. If your program or unit offers General Education courses, please estimate what proportion of the unit's resources are allocated to this area:

2. Does the combined load from A and B above affect your unit's ability to offer courses for its major? If so, please describe:

D. Other Funding and Resources

1. Is funding from other sources sufficient to assist the program in achieving its outcomes? Other sources to be considered include: differential tuition, grants and contracts, endowment income, and one-time gifts for student scholarships, other one-time gifts. One –time funding sources for radiography students include the Harry and Rebecca Lahr Foundation and the Ray Goldworthy Radiography Leadership Scholarship.

2. If not, which funding streams could most reasonably be increased to help the program attain its outcomes? American Society of Radiologic Technologist as well as Elsevier radiography student scholarships are available.

3. Has any new donor revenue been generated since the last program review? Yes, a new scholarship was introduced and funding secured

4. Has the unit engaged in fundraising activities to support the program over the last 5 years? Lab fee increases and implementation of the Goldsworthy Scholarship as stated in #1 above.

5. What has been the result of these fundraising activities? Labs continue to be funded via student lab fees and one-time scholarship via the Goldsworthy Scholarship.

6. Review the space data for your department and comment on its amount and quality. These data will need to be accessed by an individual with Archibus® access. The program does not utilize Archibus data at this time.

7. Is the quality and quantity of available consumable materials and supplies (e.g., office supplies or lab supplies) adequate and if not, explain why not: Yes, adequate – however an additions entry level faculty member would be a welcome addition as stated in "program resources" above.

8. Is the quality and quantity of available technology resources, such as computers adequate and if not, explain why not: Yes

9. Is the quality and quantity of available equipment (other than computing) adequate and if not, explain why not: Additional, state of the art imaging equipment would be most welcomed, but is very expensive.
10. Is the quality and quantity of available library and information resources adequate and if not, explain why not: Yes
11. Staffing
    a. Are available department staff resources sufficient to attain the program's outcomes? yes

    b. If not, what additional staff resources are needed and how would they be funded?

12. Additional Comments

V. Size of Program

1. Below are headcount, course enrollment, and degrees conferred data from Decision Support.

Academic Level Key	
Undergraduate (UGRD):	Graduate (GRAD):
10 – Freshman	GR - Graduate
20 – Sophomore	PHD – PhD
30 – Junior	
40 – Senior	
50 – Post Bacc Undergrad	

Headcounts

Comprehensive Medical Img PRE (CMIPRE)

Academic Level - Beginning of Term	Fall 2012 Prelim	Spring 2013 Prelim	Fall 2013 Prelim	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
10	32	32	52	43	61	41	68	63	106	84
20	25	33	43	53	68	69	65	60	78	81
30	28	38	41	46	64	76	96	97	115	99
40	37	34	38	44	37	51	67	67	81	85
50	9	6	9	10	7	9	14	18	20	15

Comprehensive Medical Imaging BS (CMIBS)

Academic Level - Beginning of Term	Fall 2012 Prelim	Spring 2013 Prelim	Fall 2013 Prelim	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
10	3	1	0	2	1	1	0	0	2	1
20	8	4	2	0	0	0	0	0	1	0
30	12	15	14	6	13	6	2	4	0	5
40	24	29	45	32	70	56	45	49	39	47
50	6	8	11	10	14	7	3	3	2	4

Source: UNLV Analytics - Official Preliminary Enrollment

Office of Decision Support, January 2018

Course Enrollments

Department Name of Course	Sub	Course Number Level	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
Health Phy and Diagnostic Sci									
	CMI	300-Level	98	108	93	102	116	158	132
		400-Level	57	43	53	55	44	31	48

Note: Includes lecture courses only.

Source: UNLV Analytics - Official Preliminary Enrollment

Office of Decision Support, January 2018

Degrees conferred

Department	Health Phy and Diagnostic Sci
Academic Career	UGRD
Academic Plan Description	Comprehensive Medical Imaging BS (CMIBS)
Degree	BS
Degree Description	Bachelor of Science

Academic Year - July to June	Degree Count
2005-06	5
2006-07	12
2007-08	10
2008-09	17
2009-10	21
2010-11	23
2011-12	21
2012-13	21

2013-14	21
2014-15	27
2015-16	34
2016-17	31

Source: UNLV Analytics - Degrees Conferred
Office of Decision Support, December 2017

Degrees conferred "40" senior students CMI-RAD B.S.,/RAD Certificate 24 total students per year ("30"/"40"). 200-300 pre-RAD students ("10" and "20' above).

2. Discuss the headcounts from the last five years, i.e., are the trends in line with projections in your unit's strategic plan? Yes. 24 students are accepted each year at this time, due to only 2 F.T. faculty.

3. If not, why not?

4. Does your program's enrollment trend differ from national trends? No.

5. If yes, please discuss the reasons:

6. Additional Comments

VI. Retention, Progression, Completion

A. Major Course Offerings

1. Are enough courses offered to meet enrollment demands? Yes

2. How many major courses have been added or eliminated in the last 5 years?
__1_ Added ___0_ Eliminated

3. Why were the actions taken? Additional ethics requirements necessitated an additional class

4. After reviewing the program, what additional actions should be taken to improve retention, progression, and completion? Retention s and completion rates continue to be very high

5. Are there any courses that students routinely have difficulty getting enrolled in, that slow progression and/or graduation? No. If so, please identify them: BIO 189, 223, 224 ; Math 126/127 .

6. If last question was answered yes, what steps can be taken to reduce "bottle-necks" in these courses. Please indicate *both* financially-based and non-financially-based solutions. The BIO courses are being moved to Kinesiology Fall 2018 which may help reduce the "bottleneck" – Math courses are just required by most students, so will continue to be filled sections.

7. Can any changes in sequencing of courses be made to facilitate graduations?

B. Curriculum

1.Is the program's curriculum aligned with current developments in the field? Yes

2. If not, what needs to be done to make it current?

C. Graduation Rates

Program graduation numbers and rates are summarized below.

Insert tables5 year period 2013-2017 106/120 finished the program *88%
95% passed the ARRT national board exam on the first attempt
94% of those seeking jobs had jobs within 6 months of graduating
Additional information may be found at: https://www.unlv.edu/hpds/radiography

First-time, Full-time Freshmen Graduating within Six Years (Comprehensive Medical Imaging BS - CMIPRE, CMIBS)

Fall 2003 - Fall 2011 Cohort

Cohort		Graduated			
Term	Number	in Department	%	any Department	%
Fall 2003	2	0	0.0%	0	0.0%
Fall 2004	0	-	-	-	-
Fall 2005	3	2	66.7%	2	66.7%
Fall 2006	3	1	33.3%	2	66.7%
Fall 2007	3	1	33.3%	1	33.3%
Fall 2008	5	1	20.0%	2	40.0%
Fall 2009	5	0	0.0%	3	60.0%
Fall 2010	8	3	37.5%	5	62.5%
Fall 2011	4	0	0.0%	2	50.0%
Combined Cohort	*33*	*8*	*24.2%*	*17*	*51.5%*

Source: UNLV Analytics - RPC Benchmarks Dashboard; StudentTracking

Office of Decision Support, January 2018

UNLV RADIOGRAPHY PROGRAM EFFECTIVENESS DATA

Completion Rate	Number admitted/Number completed	Percent Finishing
2013	24 / 18	72%
2014	24 / 22	92%
2015	24 / 21	88%
2016	24 / 21	88%
2017	24 / 24	100%
5 Year totals	**120 / 106**	**88%**

Credentialing Pass Rate	Number attempted / Number passed	Percent Passed on 1st attempt within 6 months
2013	18 / 17	94%
2014	22 / 21	95%
2015	19 / 18	95%
2016	21 /20	95%
2017	24 / 23	96%
5 Year totals	**104 / 99**	**95%**

Job Placement Rate	Looking for a job / Found a job	Percent finding a job within 12 months
2013	15 / 13	87%
2014	21 / 19	90%
2015	21 / 19	90%
2016	20 / 20	100%
2017	22 / 22	100%
5 Year totals	**99 / 93**	**94%**

Using the data in the tables above, please answer these questions:

1. Are trends in 6-year cohort graduation close to the University's goals (UNLV's undergrad goal is 50%)? Radiography graduation rates are much higher than the undergrad goal (mid 90% grade rate).

2. If not, what is being done to reach the goal? N/A

3. Discuss how and why the graduation rate is changing. Radiography has been taught at UNLV well over 55 years and has "strong" faculty, clinical affiliates and continually receives full accreditation status by the Joint Review Committee on Education in Radiologic Technology.

4. Additional Comments

VII. Relationship to Other Programs

1. What relationship does your program have to other programs (such as transfers, collaborations, partnerships) in the NSHE system? The RAD Program provides basic introduction courses for RAD, Ultrasound, Nuclear Medicine and CMI - CT & MRI (RAD 100, 102 and RAD 117)

2. What the relationship does this program have to other programs at UNLV (e.g., collaborations, partnerships, affiliated faculty, General Education requirements, etc.)? RAD classes (RAD 100. 102 and 117) are open to all UNLV students. Ultrasound and Nuclear Medicine students also interface with radiography students.

3. Additional Comments

VIII. Impact

1. What impact has this program had or will have in the following areas:

   a. University Radiography has been offered at UNLV since 1961

   b. Community Graduates are hired within hospitals, clinics, out patient imaging centers throughout Clark County

2. What are the benefits to the institution of offering this program? Interface with area hospitals, clinics and imaging centers.

3. Are there examples of the integration of teaching, research, & service that you would like to highlight (e.g., faculty mentoring leading to student presentations at conferences, service learning classes, community service activities involving students, or other student activities and/or achievements that you think are noteworthy)?

4. Additional Comments

IX. Productivity

1. Please provide an indication of faculty productivity appropriate for your unit (lists of publications by type, grants by type, performances by type, installations by type, etc.): The two radiography faculty members are active in state and national professional organizations as officers and award recipients.

2. Additional Comments

X. Quality

A. Admission and graduation requirements

1. Please insert program admission requirements from the current UNLV catalog. Due to display complications, this description must be typed into this form and **not** pasted from the Catalog.
Minimum GPA of 2.5 and completion of required prerequisite classes as listed; do a four hour clinical visit: meet with the program director and turn in the admission application packet.

2. Are there any updates that need to be made to the catalog and if so, what are they? no

3. How many full-time advisors are available at the college level? AHS/SON Advising Center where seven advisors advise the pre-RAD students.

B. Outcomes and Assessment

1. Student Learning Outcomes and Program Assessment Plans and Reports by program concentration are listed at http://provost.unlv.edu/Assessment/plans.html. Please attach the most recent assessment report as Appendix 3. 2016-17 assessment plan and results attached.

Program stats may be found at https;//www.unlv.edu/hpds/radiography

2. Describe specific program changes made based on the program's evaluation of its assessment reports: Additional outpatient imaging centers have been recruited (six Desert Radiology outpatient centers now are affiliated with the program to give students the opportunity to experience outpatient imaging processes and procedures.

3. Has the program revised its curriculum such as changing prerequisites, adding or eliminating required or elective courses, or co-curricular experiences for the degree(s) in the last 5 years? no

   a. If yes, what changes were made and why?

4. Has the program revised course content or instructional approaches (pedagogy, technology) in the last 5 years? yes

   a. If yes, what changes were made and why? Delete film/screen/ processing chemicals as imaging is now digital.

5. Describe any other changes made in the last 5 years (for example, advising) based on assessment reports:

6. List and describe two specific improvements in student learning outcomes and why they represent forward movement. Outpatient imaging opportunities have been added giving students the opportunity to gain clinical experiences.
Positioning lab evaluations/assessments have been revisited giving a more accurate evaluation in both the junior and senior year.

7. Additional Comments

XI. Conclusions, Self-Assessment

A. Faculty Review of self-study

1. On what date did the program and/or department faculty review this self-study? Mar. – Apr. 2018

2. What were the results of the faculty review? Completed this self study and attachments.

3. What are the top 3 priorities and/or needs for the future development of the program? Additional faculty; additional imaging equipment; more interfacing with CMI CT and MRI opportunities.

4. What are the strengths of the program? High quality faculty and graduates

5. What are the challenges facing the program? Too few faculty members

6. What recent additions, corrections, or other changes have been made to the program that reflect changes or developments in the field? With the advent of digital imaging replacing screen/film, the imaging labs on campus are being converted to total digital and removing the automatic processor. Also RAD Physics and Advance technique have been revised to include digital imaging and technique.

B. Other comments

1. Is there anything else you would like to discuss about the program?

The NSHE also requires that any action steps identified based on the review of the program and the status of the action steps be ready for consideration at the December board meeting the year the program review is completed. You will be contacted about this after the external review has been completed.

NEXT STEPS:

A. Email the self-study to:

- Chair of the Faculty Senate Program Review Committee found here: http://facultysenate.unlv.edu/committees/program-review or the Chair of the Graduate College Program Review Committee found here: https://www.unlv.edu/graduatecollege/program-review-committee.
- Gail Griffin, gail.griffin@unlv.edu, 702-895-0482.

Congratulations on completing the self-study!

UNLV

UNIVERSITY OF NEVADA, LAS VEGAS

Program Review Self-Study

Program Reviewed: Comprehensive Medical Imaging – option Ultrasound

Degrees: Bachelor of Science

Program Chair or Director: Steen Madsen

Dean: Ronald Brown

Date of Report: March 31, 2018

GENERAL INSTRUCTIONS

1. Please provide Faculty CVs as a single electronic file (PDF preferred) or on a thumb drive *for the external reviewers*.
2. **Please complete the program review self-study using this template**.
3. If this review is covering several degree levels, please be sure to address ***each level*** in your responses to the questions.
4. Contacts for questions:
   Chair of the Faculty Senate Program Review Committee found here:
   https://www.unlv.edu/facultysenate/committees/program-review
   - or the Chair of the Graduate College Program Review Committee found here:
     https://www.unlv.edu/graduatecollege/program-review-committee
   - Dr. Rainier Spencer, Vice Provost for Academic Programs: rainier.spencer@unlv.edu, 702-895-5833
   - Nora Carroll, Academic Programs Analyst, Eleonora.carroll@unlv.edu, 702-895-1888

I. Program Description

A. College/Department/Program

1. College or School: Allied Health Science
2. Unit: Web address:
3. Program(s) being reviewed: Comprehensive Medical Imaging – option Ultrasound
   a. Degrees and their abbreviations: Bachelor of Science- B.S.

B. Primary individual completing this worksheet

1. Name: Melinda Bechtel
2. Title: Director of Ultrasound
3. Date of self-study: 4/2/2018
4. Campus Phone: 702-895-1116
5. Mail Stop: 3037
6. E-mail: Melinda.bechtel@unlv.edu
7. Fax Number: 702-895-4819

C. Other faculty involved in writing this report:
None

D. Please insert the most recent catalog description(s) of the program(s). Due to display complications, this description must be typed into this form and **not** pasted from the Catalog.
The comprehensive medical imaging program at UNLV is an innovative academic program designed to educate students in a foundation of mathematics and the sciences applicable to the interdisciplinary and applied science of diagnostic imaging. The program currently offers theoretical and clinical course work in the advanced level modalities of Computed Tomography, Magnetic Resonance Imaging, and Ultrasound. Graduates of the program will meet the demand for professional personnel to perform patient imaging procedures on state-of-the-art advanced imaging systems, process and enhance computer images, prepare and administer contrast agents, maintain strict quality control guidelines, and conduct research in the comprehensive medical imaging area.

1. Is the description correct? If not, what needs to be changed?
   Yes

II. Centrality to Mission

A. Department/Program Mission

What is the program's mission statement (or the department's if the program does not have one)?

The comprehensive medical imaging program at UNLV is an innovative academic program designed to educate students in a foundation of mathematics and the sciences applicable to the interdisciplinary and applied science of diagnostic imaging. The program currently offers theoretical and clinical course work in the advanced level modalities of Computed Tomography, Magnetic Resonance Imaging, and Ultrasound. Graduates of the program will meet the demand for professional personnel to perform patient imaging procedures on state-of-the-art advanced imaging systems, process and enhance computer images, prepare and administer contrast agents, maintain strict quality control guidelines, and conduct research in the comprehensive medical imaging area.

B. Department/Program Mission Alignment

Briefly describe how this program is aligned to the mission of the University as described in the most recent mission statement, UNLV Mission https://www.unlv.edu/toptier/vision, and how it supports achievement of the institution's mission:

UNLV's mission is providing a tier one academic educational setting for its students and meeting the community needs for sonographers. The mission's purpose is to provide ultrasound students with the knowledge necessary to be successful in the health care industry and provide the background for various graduate studies.

Ultrasound graduates meet the needs of the community during the shortage we have in the area. They find placement in hospitals, outpatient clinics, doctor offices and cardiology centers.

C. Core Themes

Briefly describe how this program supports UNLV's Core Themes (the core themes can be found at: https://www.unlv.edu/provost/nwccu/core-themes

The program supports two of the major Core Themes set forth by the University.

Core Theme1: Advance Student Achievement
The ultrasound students participate in a rigorous science program that includes Biology, Chemistry, Math, and Physics before they are accepted into the program. The program is very competitive with the grades for the majority of students being at least 3.2 to 4.0 before they are accepted into the program. All didactic course work is completed before the student competes in be accepted into the program. The senior year the student performs in the clinical setting 32 to 50 hours per week until they complete at least 1680 contact hours. 90 percent of the students pass their Physics boards before they graduate from the program.

Core Theme 4: Foster Community Partnership.
The Ultrasound Program is an innovative academic program that meets the community's need for Medical Sonographers. We have developed relationships with most hospitals, and outpatient clinics in the Las Vegas community. The ultrasound accepts 15 to 17 students and place them in clinical sites where their academic knowledge enhanced with real patient experiences. The Ultrasound Program has a 95 to 100% completion rate with an 85% employment rate.

D. Excellence

List and briefly describe five highlights or areas of excellence of the program:

1. The University of Nevada, Las Vegas offers the only 4-year Bachelor program in Comprehensive Medical Imaging – Ultrasound Option in the state of Nevada. The student starts as a freshman out of high school and upon completion of 120 credits graduates with a Bachelor of Science in Comprehensive Medical Imaging. The program is approved by American Registry of Diagnostic Medical Sonography (ARDMS) and the students can take their specialty and physics' boards upon graduation.
2. Curriculum – Students have an 80% passing rate for both the physics and specialty boards on the first try.
3. Employment -Over three quarters of the ultrasound students in the program are offered jobs at their clinical sites.
4. The students can continue their education upon graduation. They have the academic foundation for completing a Master or Doctoral program.
5. We offer a one-year internship program their senior year of school. The student works from 30 to 40 hours in a clinical facility with a preceptor on a one to one basis and of the students accepted into the program 100% graduate (approx. 15 to 17 students per year).

III. External Demand for Program

A. Stakeholders

1. Who are the main local and regional stakeholders of your educational programs, i.e., employers and entities benefiting from these programs, hiring the graduates, or admitting them to graduate and/or professional programs?

Local Hospitals: Dignity Medical Centers, Southwest Medical Clinics, Valley Medical Centers and various other clinical sites in different states.

2. What are specific stakeholder needs for graduates?
Students with a solid background in anatomy, ultrasound disease pathology and 1680 hours implementing the didactic knowledge into the clinical setting.

B. Needs for Graduates and Future Plans

1. What are the anticipated needs for program graduates over the next 3-5 years? Please cite sources of information. There is a 17 - 22% job outlook from 2016 to 2026 according to the Bureau of Labor Statistics, *U.S. Department of Labor, and Occupational Outlook Handbook.*

2. What changes to the program will those require? Increase the number of students accepted into the program by increasing the number of clinical sites that see a value of having a registered sonographer performing ultrasound exams on their patient.

C. Success of Graduates

1. What steps does the department take to facilitate the success of graduates (e.g., internships, career fairs, employment talks, etc.)? The students do an 11-month 2 week internship at a hospital or clinic.

3. Discuss the placements of recent graduates:
10 of 13 May 2016 graduates found jobs in local hospitals. One student is from another community and has left the area, another student took a break from the workforce to attend a new baby and the third student quite clinicals to go back home and raise her child.

3. If the department or program does not have placement information on graduates, what is the plan to implement and gathering that information?
    1. We are going to implement a graduation survey for those student's going into the work place in May 2019.

3. Do placements match stakeholder needs as identified above in A of this section?
   Yes

4. If not, please explain.

5. Does the program assess whether the graduates are meeting employer's needs?
   Yes. The Program Director/Clinical Coordinator goes to each clinical site, twice per semester, to make sure the students are meeting the program and clinical site's needs. When talking to the clinical site we find out whether the student will be ready to be hired as a sonographer.

We are implementing a student and Facility questionnaire. This allows us to ask about the needs of the facility and student background.

6. If not, what will the program do to place this NSHE-required assessment in place and by what date? This should be in place by fall 2019.

7. Additional Comments

IV. Program Resources

A. Faculty Time

1.Faculty and GA Resources

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Number of Full Time Faculty	1	1	1	1
Number of State-Supported GA lines	0	0	0	0
Number of PTIs	0	0	0	1
Number of FIRS & Visiting	0	0	0	0

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Percent of Classes Taught by Full Time Faculty	100	100	100	71
Percent of Classes Taught by Number of State-Supported GA lines	0	0	0	0
Percent of Classes Taught by Number of PTIs	0	0	0	29
Percent of Classes Taught by Number of FIRS & Visiting	0	0	0	0

	Fall 2015	Spring 2016	Fall 2016	Spring 2017
Student Credit Hours Taught by Full Time Faculty	15	16	15	16
Student Credit Hours Taught by Number of State-Supported GA lines	0	0	0	0

Student Credit Hours Taught by Number of PTIs	0	0	0	6
Student Credit Hours Taught by Number of FIRS & Visiting	0	0	0	0

2. For other non-major courses – e.g., upper division for the college or university, estimate the unit's resources allocated to them: *N/A*

B. Budget

1. Please fill in the table with three years of financial expenditures to be used to respond to questions 2 and 3 below.

Budget category	FY 14–15	FY 15–16	FY 16–17
State Operating (2101)	$ 3,000	$ 3,000	$ 3,000
Student Fees	$	$	$ 5,200
Indirect Cost Recovery	$	$	$ 7,800
Self-supporting	$ 82,000	$ 82,000	$ 88,000
Total Allocations	$ 85,000	$ 85,000	$ 104,000
Number of Graduate Assistantships (including GAs on grants)	0	0	0

2. Are these resources sufficient to meet the degree program's instructional and scholarship needs?
Yes
3. If not, approximately what line items and amounts would be needed?

C. General Education

1. If your program or unit offers General Education courses, please estimate what proportion of the unit's resources are allocated to this area:

The student enters the program the last year of their bachelor's degree. We do not teach general education courses.

2. Does the combined load from A and B above affect your unit's ability to offer courses for its major?
If so, please describe: is needed to hire another full-time faculty. All 5 didactic courses and is the clinical are done by the Director of the program.

D. Other Funding and Resources

1. Is funding from other sources sufficient to assist the program in achieving its outcomes? Other sources to be considered include: differential tuition, grants and contracts, endowment income, and one-time gifts for student scholarships, other one-time gifts.

We collect $100.00 dollars per student for CMI 355 and CMI 490. This is for equipment and supplies used during the Clinical Practicum. This funding is sufficient for repair of the ultrasound machines, buy supplies such as washcloths, sheets, gel, and towels but it is not sufficient for any major purchases. A major purchase would be a rebuilt ultrasound machine, a rebuilt gurney, and/or the purchase of ultrasound chairs.

2. If not, which funding streams could most reasonably be increased to help the program attain its outcomes?
The University could allocate money for the purchase of rebuilt ultrasound machines, rebuilt gurneys, and ultrasound chairs.

4. Has any new donor revenue been generated since the last program review?
   No. We have not received funding from other sources. We have been able to obtain donated equipment from clinics and hospitals. This equipment, however, is twenty years old.

5. Has the unit engaged in fundraising activities to support the program over the last 5 years?
   No.

6. What has been the result of these fundraising activities? N/A

7. Review the space data for your department and comment on its amount and quality. These data will need to be accessed by an individual with Archibus® access.
   Adequate lab space is available.

8. Is the quality and quantity of available consumable materials and supplies (e.g., office supplies or lab supplies) adequate and if not, explain why not: Supplies (Gel, sheets, washcloths, pillows, beds, chairs, towels) are sufficient for the program. The University has 4 Ultrasound machines in the lab. Two of the machines are 30 years old and two are 11 years old. The students learn quicker on newer machines. The newer machines are also the ones they will use in hospitals. We have submitted requests to buy two additional rebuilt Ultrasound machines. This will increase efficiency to enable the Program to teach 8 students in each class. Unfortunately, the request was denied this year. We have divided the class into 4 groups, four times per week to meet needs and fulfill the requests of hospital preceptors request for students who are being trained.

9. Is the quality and quantity of available technology resources, such as computers adequate and if not, explain why not: The computers are adequate in my office. Of the ultrasound machines available though one is over 30 years old, a second is 25 years old and the newest machine is 10 years old. We have requested money to purchase new or rebuilt machines but have been denied.

10. Is the quality and quantity of available equipment (other than computing) adequate and if not, explain why not:

    No. We need two additional ultrasound machines, three gurneys and three ultrasound chairs. We have not, however, been able to obtain any additional funding for these equipment requirements.

11. Is the quality and quantity of available library and information resources adequate and if not, explain why not:
    Yes

12. Staffing

a. Are available department staff resources sufficient to attain the program's outcomes? The Ultrasound program would like to expand its curriculum by adding pediatrics and cardiology ultrasound courses. The program would like to become accredited by CAAHEP. Accreditation would allow the students from this program to get into the V.A. Hospital and several local facilities for clinical internships. Accreditation would allow the Ultrasound Program to expand, increase enrollment, and become more comprehensive.

b. If not, what additional staff resources are needed and how would they be funded? The Ultrasound Program needs a Clinical Coordinator to expand the curriculum and become accredited. The Department of Health Physics does not receive sufficient funding to pay for this position. The University would need to provide the funding for this position.

13. Additional Comments

V. Size of Program

1. Below are headcount, course enrollment, and degrees conferred data from Decision Support.

Academic Level Key

Undergraduate (UGRD):	Graduate (GRAD):
10 – Freshman	GR - Graduate
20 – Sophomore	PHD – PhD
30 – Junior	
40 – Senior	
50 – Post Bacc Undergrad	

Headcounts

Comprehensive Medical Img PRE (CMIPRE)

Academic Level - Beginning of Term	Fall 2012 Prelim	Spring 2013 Prelim	Fall 2013 Prelim	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
10	32	32	52	43	61	41	68	63	106	84
20	25	33	43	53	68	69	65	60	78	81
30	28	38	41	46	64	76	96	97	115	99
40	37	34	38	44	37	51	67	67	81	85
50	9	6	9	10	7	9	14	18	20	15

Comprehensive Medical Imaging BS (CMIBS)

Academic Level - Beginning of Term	Fall 2012 Prelim	Spring 2013 Prelim	Fall 2013 Prelim	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
10	3	1	0	2	1	1	0	0	2	1
20	8	4	2	0	0	0	0	0	1	0
30	12	15	14	6	13	6	2	4	0	5
40	24	29	45	32	70	56	45	49	39	47
50	6	8	11	10	14	7	3	3	2	4

Source: UNLV Analytics - Official Preliminary Enrollment

Office of Decision Support, January 2018

Course Enrollments

Department Name of Course	Sub	Course Number Level	Spring 2014 Prelim	Fall 2014 Prelim	Spring 2015 Prelim	Fall 2015 Prelim	Spring 2016 Prelim	Fall 2016 Prelim	Spring 2017 Prelim
Health Phy and Diagnostic Sci									
	CMI	300-Level	98	108	93	102	116	158	132
		400-Level	57	43	53	55	44	31	48

Note: Includes lecture courses only.

Source: UNLV Analytics - Official Preliminary Enrollment

Office of Decision Support, January 2018

Degrees conferred

Department	Health Phy and Diagnostic Sci
Academic Career	UGRD
Academic Plan Description	Comprehensive Medical Imaging BS (CMIBS)
Degree	BS
Degree Description	Bachelor of Science

Academic Year - July to June	Degree Count
2005-06	5
2006-07	12
2007-08	10
2008-09	17
2009-10	21
2010-11	23
2011-12	21
2012-13	21
2013-14	21
2014-15	27
2015-16	34
2016-17	31

Source: UNLV Analytics - Degrees Conferred
Office of Decision Support, December 2017

2. Discuss the headcounts from the last five years, i.e., are the trends in line with projections in your unit's strategic plan? N/A

2. If not, why not?
N/A

4. Does your program's enrollment trend differ from national trends? N/A

5. If yes, please discuss the reasons: N/A

6. Additional Comments

VI. Retention, Progression, Completion

A. Major Course Offerings

1. Are enough courses offered to meet enrollment demands? Yes

2. How many major courses have been added or eliminated in the last 5 years?
__3__ Added ____ Eliminated

3. Why were the actions taken?
When talking to the facilities that hire UNLV's graduates they suggested that the student's doing clinical at their facility should have more one- to- one scanning time in the Clinical Practicum. It was then decided that we would offer more, smaller Clinical Practicum courses.

4. After reviewing the program, what additional actions should be taken to improve retention, progression, and completion? We need to put more funds into the program for staffing, and equipment. We need to expand the number of clinical sites.

5. Are there any courses that students routinely have difficulty getting enrolled in, that slow progression and/or graduation? If so, please identify them:
PHY 151 and 152 and CMI 355 and 490.

6. If last question was answered yes, what steps can be taken to reduce "bottle-necks" in these courses. Please indicate *both* financially-based and non-financially-based solutions. Offer more 151 and 152 Physics courses. The second problem is that there are not enough clinical sites to increase enrollment and graduation. We are limited in the number of students accepted into the program because we compete with the community college in the area for clinical sites.

7. Can any changes in sequencing of courses be made to facilitate graduations? The sequencing of the courses was just revised in 2017.

B. Curriculum

1. Is the program's curriculum aligned with current developments in the field?
Yes

2. If not, what needs to be done to make it current?

C. Graduation Rates

Program graduation numbers and rates are summarized below.

First-time, Full-time Freshmen Graduating within Six Years (Comprehensive Medical Imaging BS - CMIPRE, CMIBS)

Fall 2003 - Fall 2011 Cohort

Cohort	Graduated

Term	Number	in Department	%	any Department	%
Fall 2003	2	0	0.0%	0	0.0%
Fall 2004	0	-	-	-	-
Fall 2005	3	2	66.7%	2	66.7%
Fall 2006	3	1	33.3%	2	66.7%
Fall 2007	3	1	33.3%	1	33.3%
Fall 2008	5	1	20.0%	2	40.0%
Fall 2009	5	0	0.0%	3	60.0%
Fall 2010	8	3	37.5%	5	62.5%
Fall 2011	4	0	0.0%	2	50.0%
Combined Cohort	*33*	*8*	*24.2%*	*17*	*51.5%*

Source: UNLV Analytics - RPC Benchmarks Dashboard; StudentTracking

Office of Decision Support, January 2018

Bachelors

Major	August 2016	December 2016	May 2017	Total
Athletic Training BS	0	0	13	13
Comprehensive Med Imaging BS	19	5	7	31
Health Physics BS	0	1	1	2
Kinesiological Sciences BS	37	68	101	206
Nutrition Sciences BS	6	6	22	34
Total	***62***	***80***	***144***	***286***

Using the data in the tables above, please answer these questions:

1. Are trends in 6-year cohort graduation close to the University's goals (UNLV's undergrad goal is 50%)?
   Yes
2. If not, what is being done to reach the goal?

3. Discuss how and why the graduation rate is changing. It is increasing as we accept more students into the program.

4. Additional Comments

VII. Relationship to Other Programs

1. What relationship does your program have to other programs (such as transfers, collaborations, partnerships) in the NSHE system? None

2. What the relationship does this program have to other programs at UNLV (e.g., collaborations, partnerships, affiliated faculty, General Education requirements, etc.)? Student's meet the general education requirements while taking ultrasound courses and internship.

3. Additional Comments

VIII. Impact

1. What impact has this program had or will have in the following areas:

   a. University
   The Ultrasound Program is well known in the community. UNLV offers one of the few Bachelor of Science programs in Comprehensive Medical Imaging – Ultrasound Option where the students start as freshmen and graduate from this university with a degree and a badly needed medical skill.

   b. Community
   There is a shortage of sonographers in Las Vegas. The program at UNLV helps fulfill that shortage.

   c. Field
   We require more general education, math and science classes than those required by ARDMS. These courses improve the critical thinking of those working in the field.

2. What are the benefits to the institution of offering this program?
   This the only Bachelor course in Ultrasound in the State of Nevada. The state has several 2 year programs in various areas of the state. Our program meets the needs of the Hospitals and Clinics. 10/13 to 12/12 students have been given employment at the local hospitals and clinics a majority of them were offered jobs before they have graduation.

3. Are there examples of the integration of teaching, research, & service that you would like to highlight (e.g., faculty mentoring leading to student presentations at conferences, service learning classes, community service activities involving students, or other student activities and/or achievements that you think are noteworthy)?

4. Additional Comments

IX. Productivity

1. Please provide an indication of faculty productivity appropriate for your unit (lists of publications by type, grants by type, performances by type, installations by type, etc.):

2. Additional Comments

X. Quality

A. Admission and graduation requirements

1. Please insert program admission requirements from the current UNLV catalog. Due to display complications, this description must be typed into this form and **not** pasted from the Catalog. Students must have completed all their general, science, ultrasound, and patient care courses with a 2.75 GPA before applying to the ultrasound program. Upon acceptance into the program the student has only 4 courses of clinical, two courses of case review and one clinical practicum course. It takes the student 12 months to finish these courses and graduate.

2. Are there any updates that need to be made to the catalog and if so, what are they? No

3. How many full-time advisors are available at the college level? 4 advisors for ultrasound

B. Outcomes and Assessment

1. Student Learning Outcomes and Program Assessment Plans and Reports by program concentration are listed at http://provost.unlv.edu/Assessment/plans.html. Please attach the most recent assessment report as Appendix 3.

2. Describe specific program changes made based on the program's evaluation of its assessment reports:

3. Has the program revised its curriculum such as changing prerequisites, adding or eliminating required or elective courses, or co-curricular experiences for the degree(s) in the last 5 years?

   a. If yes, what changes were made and why?

4. Has the program revised course content or instructional approaches (pedagogy, technology) in the last 5 years?

   a. If yes, what changes were made and why?

5. Describe any other changes made in the last 5 years (for example, advising) based on assessment reports:

6. List and describe two specific improvements in student learning outcomes and why they represent forward movement.

7. Additional Comments

XI. Conclusions, Self-Assessment

A. Faculty Review of self-study

1. On what date did the program and/or department faculty review this self-study? The self-study was reviewed on March 31, 2018 by the program director.

2. What were the results of the faculty review? There was not a faculty review.

3. What are the top 3 priorities and/or needs for the future development of the program? 1. A top priority for the program is for it to become accredited the Commission on Accreditation of Allied Health Education Programs (CAAHEP). 2. The Ultrasound program need a second full time ultrasound instructor in order to become accredited CAAHEP. If UNLV is placing student's in more than eight clinical sites CAAHEP requires a full time clinical coordinator. 3. An additional full time instructor would allow the program to expand its curriculum by adding a courses in pediatric and cardiac ultrasound making the program more comprehensive.

4. What are the strengths of the program? 1. UNLV offers a Bachelor in Comprehensive Medical Imaging-Ultrasound Option where the student completes the degree with 120 credits (start to finish). Most programs are 2 plus 2 where the students does the Ultrasound first, receives an Associate Degree, and finishes the last two years in general studies for the Bachelor Degree. 2. The student last year of school is performing an intern ship in Ultrasound 30 to 40 hours per week for 11 months and 14 days. This better prepares the student to work in the clinical setting. 3. The curriculum for the program is designed to prepare the student for advance degrees either in ultrasound or any other program the students' desires. 4. Although we are not an

accredited program UNLV's curriculum has been approved by American Registry for Diagnostic Medical Sonographers.

5. What are the challenges facing the program? The biggest challenges facing the program is the lack of funding and clinical sites for the internship. Money to hire a full time faculty member would allow the program to become accredited and expanding the curriculum in program at UNLV. This makes the Ultrasound Program desirable to students from both locally and other areas. Since we are competing with the College of Southern Nevada for clinical spots we have had trouble expanding the number of clinical intern spots in the community.

6. What recent additions, corrections, or other changes have been made to the program that reflect changes or developments in the field?

   N/A

B. Other comments

1. Is there anything else you would like to discuss about the program?
   N/A

The NSHE also requires that any action steps identified based on the review of the program and the status of the action steps be ready for consideration at the December board meeting the year the program review is completed. You will be contacted about this after the external review has been completed.

NEXT STEPS:

A. Email the self-study to:
- Chair of the Faculty Senate Program Review Committee found here: http://facultysenate.unlv.edu/committees/program-review or the Chair of the Graduate College Program Review Committee found here: https://www.unlv.edu/graduatecollege/program-review-committee.
- Dr. Rainier Spencer, Vice Provost for Academic Programs, rainier.spencer@unlv.edu, 702-895-5833.
- Nora Carroll, eleonora.carroll@unlv.edu, 702-895-1888

Congratulations on completing the self-study!