

# **Operating Manual**

## **The Graduate Programs in Radiological Sciences and Medical Health Physics**

**University of Texas Health Science Center  
at San Antonio**

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## **1. Program Goal and Objectives**

The Graduate Program in Radiological Science (GPRS) at the University of Texas Health Science Center in San Antonio (UT Health San Antonio) is a multi-disciplinary program in the Graduate School of Biomedical Science (GSBS) at UT Health San Antonio that prepares students to participate in the development and transmission of scientific knowledge concerning the uses of radiant energy forms in the diagnosis and treatment of human disease. The degrees offered are: (1) PhD degree in Radiological Science or (2) an MS degree in Medical Health Physics. The PhD program is subdivided into four tracks with specialized training in Medical Physics, Radiation Biology, Neuroscience Imaging and Human Imaging. The MS program in Medical Health Physics and the Medical Physics track of the PhD program in Radiological Science are independently accredited by the Commission for the Accreditation of Medical Physics Education Programs (CAMPEP). More information on CAMPEP accreditation can be found at [www.campep.org](http://www.campep.org).

The curricula provide opportunities for students to acquire a core of fundamental knowledge through a transdisciplinary program of formal courses, seminars, teaching opportunities and hands-on research experiences. After completing a qualifying exam, each student, under the supervision of a research advisor and research supervising committee, designs an individual course of study and research project consistent with his/her career goals.

The research programs in the GPRS bridge the biomedical sciences and medical applications. Exceptional facilities are available in the areas of advanced radiation treatment delivery technologies, magnetic resonance imaging, positron emission computed tomography, computer image analysis, nuclear medicine imaging, computed tomography, mammography, other x-ray imaging, radiation dosimetry methodologies, and imaging in pharmaceutical development. Ongoing research programs cover a wide range of topics in modern imaging, irradiation effects, and radiation applications. These programs are supported by grants and contracts from federal, state and private agencies. Extensive facilities and equipment are available to aid in the study of a wide range of translational research programs involving the use of ionizing and non-ionizing radiations. Several core courses are offered in conjunction with the professional Doctorate in Medical Physics (DMP) education program, which was started at UT Health San Antonio in 2014 and is a separate graduate program administered by the Department of Radiation Oncology. The GPRS and DMP programs interact closely, sharing courses and faculty.

The focus of the GPRS is to prepare students for academic careers and to be competitive for career development grants and research positions in university, industrial and government laboratories. In addition, the PhD medical physics track aims for graduates to be competitive for medical physics residency positions in therapeutic medical physics, diagnostic medical physics, and nuclear medical physics.

Beyond the coursework in science and technology, the curriculum includes 2 credit hours of supervised pedagogical training (MS: 1 credit hour) that allows the student to develop the skills of lecture preparation, lecture presentation and student testing. Students are also required to participate in 4 semesters of seminars (MS: 2 semesters) during which they make research-oriented presentations while their peers listen to and critique them. Presentation of papers at national scientific meetings may be substituted for up to two seminar classes (MS: 1 semester).

The Radiology Department also administers a competitive research grant program for students under an endowment established by Julio Palmaz MD, inventor of the coronary stent. In addition, students are trained in procedures and processes of obtaining research funding by preparing research proposals in NIH or similar format after admission to candidacy for the PhD degree. This process gives the student experience to be competitive for other grants administered within the University for the state and federal governments and by national research organizations. Student competition programs at regional, national and international scientific meetings are also used to encourage frequent oral presentation of research results. Publication of results in peer reviewed

journals is also encouraged by offering the opportunity of a dissertation format combining at least three or more published papers as chapters, with a small amount of additional background and a final section drawing the papers together into a recognizable dissertation topic.

## **2. Program Structure and Governance**

The administrative functions of the GPRS are housed in the Department of Radiology at UT Health San Antonio. Although the program is administered through the Department of Radiology in the School of Medicine, the graduate program's academic policy functions and degree awarding authority fall under the purview of the Graduate School of Biomedical Sciences (GSBS).

The first key position is the Chair of the Committee on Graduate Studies (COGS) of the GPRS, currently Jessica Nute, PhD, who reports to the Dean of the Graduate School of Biomedical Sciences (GSBS). The Director of Graduate Education in Radiology, currently Andrew Sampson, PhD, is appointed by the Chair of the Department of Radiology in the School of Medicine (Rajeev Suri, MD), and functions as the Graduate Program's Director, administering the program through the Radiology Department. Faculty and funding come largely through the clinical departments of Radiology and Radiation Oncology in the Medical School and the Research Imaging Institute (RII). The Director of the RII, Peter Fox MD, also currently serves as the Vice-Chair for Research in the Department of Radiology. Faculty from the Departments of Ophthalmology, Neurology, Medicine, Psychiatry and in the Office of Environmental Health and Safety also contribute. Primary funding for the GPRS is awarded by the State of Texas through specifically "earmarked" funding to the Department of Radiology. Access to some coursework is also provided by the Integrated Multidisciplinary Graduate Program of the GSBS, the MS Program in Clinical Investigation and the Physical Therapy program in School of Allied Health Science. Private and government clinical and research facilities, outside the University, may also contract with the GPRS to support its students. Lowell Glassburn currently serves as the Department Administrator for the Radiology Department. Several administrative functions such as grant administration and education administration are shared amongst the Departments of Radiology, Radiation Oncology and the RII. These offices, departments, institutes and institutions provide their research and clinical facilities for student projects in the GPRS.

The Radiological Sciences Committee on Graduate Studies (COGS) sets all of the policy and procedures within the GPRS. The Chair of the Radiological Sciences COGS, currently Jessica Nute, PhD, is elected by the COGS members and sits on the Graduate Faculty Council, chaired by the Vice-Dean of the GSBS, with the COGS Chairs from the other graduate programs in the GSBS. The membership of the Radiological Sciences COGS consists of the COGS Chair, Vice COGS Chair, track chairs and standing committee chairs in the GPRS. The Radiological Sciences COGS meets monthly, typically on the first Thursday of the month, and may include reports from the following:

- The Student Representative to the Radiological Sciences COGS, is elected by the student body and reports on student concerns,
- The COGS Chair reports on the activities of the Graduate Faculty Committee (GFC) and on any issues raised by the Office of the Dean of the Graduate School,
- The Vice COGS Chair is elected annually by the COGS members. The Vice COGS Chair runs the COGS meetings and attends the Graduate Faculty Committee meetings in the COGS Chair's absence,
- The Director of Graduate Education in Radiology is appointed by the Chair of the Department of Radiology. The Chief serves as the Graduate Program's director and reports to the Vice-Chair for Research and Research Education in Radiology. The Chief coordinates with Radiology and Medical School administration on policy and budgetary issues, reports on

student administrative issues and funding issues to the COGS and works closely with the COGS Chair on student issues and implementing policies with the GPRS.

There are six track committees and three standing subcommittees of the COGS, which take care of the business of the GPRS between COGS meetings. Membership of these committees is reviewed on an annual basis with the COGS giving its approval. The following reports are given at each COGS meeting (if applicable):

- The Application Review Committee reports on student application policies and procedures. It receives and performs a preliminary review of applications for admission to the GPRS and forwards them to the appropriate track chair for review.
- The Recruiting Committee responds to inquiries by prospective students and coordinates recruiting events carried out by faculty members and students at a variety of schools.
- The Alumni Committee tracks the whereabouts of former students and faculty members of the GPRS and organizes events for the alumni at national and regional professional and scientific meetings.
- There are six Track Committees of the GPRS (Medical Health Physics, Neuroimaging Science, Human Imaging, Radiation Biology, Imaging Physics and Therapy Physics) corresponding to the 4 Ph.D. tracks and 1 M.S. track available within the GPRS. The Medical Physics track is subdivided into two sub-tracks (Imaging Physics and Therapy Physics), each of which are provided a separate track committee due to the number of students and specialized curriculum. Track Committees are responsible for reviewing curricula and developing courses, reviewing student applications and coordinating qualifying examinations. The membership of the track committees consists of Directors of the Courses associated with the track and/or the faculty who mentor students in the track. If a Track Chair cannot attend the monthly COGS meeting, another designated track committee member may represent the track.

Applications for new faculty members to the GPRS can be considered at any COGS meeting throughout the year. Any active member of the COGS may sponsor a new faculty member by writing a letter to the COGS Chair, explaining the role(s) that the new faculty member would play in the GPRS, providing a CV and other documentation of the candidate's qualifications to fulfill the proposed role. Membership is determined by majority vote of the COGS. The Program Director then submits paperwork to the GSBS for appointment to the GSBS faculty and to the Medical School for adjunct or cross-appointment to the Radiology Department faculty in the Medical School (if appropriate). For those who are not already UT Health San Antonio faculty, the GSBS initiates a background check and an official transcript is requested from the institution that granted the new faculty member her/his most advanced degree.

GSBS policies and special requirements for graduate study in the GPRS are summarized in the UT Health San Antonio catalog, which is available online. This guide is updated every year and includes sections on admissions, application procedures, tuition and fees, program offerings, financial aid, facilities, and support services. The office of the Dean of the GSBS also provides documents to assist students in preparing submissions of dissertations and theses. The Registrar of the University maintains official matriculation records of students. In addition, the GPRS maintains a database on the progress of graduate students through requirements of the program.

### **3. Curriculum**

#### **A. General Degree Requirements**

The Master of Science degree in Medical Health Physics requires a minimum of 48 semester credit hours of graduate work. For the Ph.D. degree in Radiological Science, a minimum of 72 semester credit hours of graduate work is required. Required courses are specific to the student's track and determined by the track committee. Elective courses are determined for each student, in consultation with his/her graduate advisor and supervising committee. MS degree candidates must complete required courses, pass the qualifying examination, formulate an original research proposal, and carry out the research and defense of a thesis. While participating in research is an important component of any graduate studies program, the scope of research for an MS degree candidate is necessarily more focused, compared to students in the PhD program, due the shorter degree plan.

Ph.D. students can become eligible for admission to candidacy after completing the required course work and passing the qualifying examination, traditionally given at the end of the student's first year of study. Following admission to candidacy, PhD students shall complete an original research project and orally defend a dissertation. The Ph.D. degree is awarded when the candidate has demonstrated competence in conducting original and independent research in the general field of Radiological Sciences.

All students must be in good standing in order to graduate, which requires a minimum grade point average of 3.0 in a 0 to 4.0 system. Failure to achieve this benchmark results in the student being placed on academic probation.

#### **B. Medical Physics Curricula**

The Medical Health Physics MS curriculum and the Medical Physics PhD curriculum of the GPRS have been designed to comply with the guidelines put forth by the American Association of Physicists in Medicine (AAPM) in AAPM Report No. 197, "Academic Program Recommendations for Graduate Degrees in Medical Physics" (2009), AAPM Report No. 159, "Recommended Ethics Curriculum for Medical Physics Graduate and Residency Programs," the requirements for certification by CAMPEP, medical physics licensure by the State of Texas and the policies of the Texas Higher Education Coordinating Board. The PhD medical physics curriculum has been divided into two sub-tracks, which facilitate students preparing for careers in imaging physics or therapy physics.

#### **C. Academic Plans by Track**

The Graduate Program in Radiological Sciences (GPRS) is a consolidated program in the Graduate School of Biomedical Sciences (GSBS) at the University of Texas Health Science Center in San Antonio. The consolidation of the program was approved by the Texas Higher Education Coordinating Board in September 2013. The result is an extremely transdisciplinary graduate program with students from diverse educational backgrounds including physics, medicine, biology, neuroscience, computer science, and bioengineering.

Thus, the GPRS is a multi-disciplinary program that prepares students to participate in the development and transmission of scientific knowledge concerning the uses of radiant energy forms in the diagnosis and treatment of human disease.

The degrees offered are:

1. PhD degree in Radiological Sciences, specializing in Radiation Biology (CIP code 26.0209.01)
2. PhD degree in Radiological Sciences, specializing in Neuroscience Imaging (CIP code 26.0209.02)

3. Medical Resident / PhD degree in Radiological Sciences, specializing in Human Imaging (CIP code 26.0209.03)
4. PhD degree in Radiological Sciences, specializing in Medical Physics (CIP code 26.0209.04)

The MS degree program in Medical Health Physics (CIP code 51.2205.00) is highly integrated with the medical physics track of the PhD program in Radiological Sciences, sharing coursework, faculty and accreditation status.

Only the Medical Physics PhD program and Medical Health Physics MS program are accredited by CAMPEP.

While there is a variation between the MS and PhD programs graduate degree requirements, both programs have in common a period of pre-candidacy studies: typically involving intensive coursework and training in the basic skills of research, scholarship and professional practice appropriate to the discipline. This is followed by a period of post-candidacy studies in which research work is applied toward the completion of final degree requirement. Students demonstrate their readiness for advancement to candidacy by successful completion of a qualifying examination.

For PhD students, both degree and track name are printed on the diplomas and transcripts. The GSBS does not award Latin honors or other distinctions, so the line normally devoted towards honors (i.e., Cum Laude) is used by the UT Health San Antonio GSBS to designate the sub-plan. For MS students there is only one track, and the third line is left blank. The following are examples of how the three lines would be utilized:

Doctor of Philosophy  
Radiological Sciences  
Medical Physics

Master of Science  
Medical Health Physics  
(Blank Line)

Examples showing details for course sequences for each track of the GPRS are available to students entering the GPRS on the program's website. The information for the year that the student enters the program lays out the requirements for graduation. Subsequent changes to the program do not affect the curriculum of students going forward unless the students find it to their advantage to adopt the changes. The GPRS offers an extensive list of courses to allow each student to design a personalized study program. Sample academic plans for students are provided on the following pages.

**PhD Medical Physics Track – Imaging Concentration (CIP code 26.0209.04)**  
**Example Training Plan**

**YEAR 1**

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5001 *Basic Radiation Safety	1	RADI 6024 *†Radiological Anatomy & Physiology	3
RADI 5015 *†Physics of Diag. Imaging I	3	RADI 5007 *†Statistics in Radiological Sciences	2
RADI 6049 *Introduction to MRI	2	RADI 5020 †Principles of Health Physics I	3
RADI 5005 †Fund. of Radiation Dosimetry	3	RADI 5090 *Seminars in Radiological Sciences	1
RADI 7077 *Ethics, Leadership, & Vision	2	MEDICAL PHYSICS ELECTIVE	3
RADI 5090 *Semin. Radiological Sci.	1		
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

**YEAR 2**

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5025 †Molec. Oncol. & Radiobiology	3	RADI 6012 *Physics of Nuclear Medicine	3
RADI 6030 †Physics of Radiotherapy	3	MEDICAL PHYSICS ELECTIVE	3
MEDICAL PHYSICS ELECTIVE	3	MEDICAL PHYSICS ELECTIVE	3
MEDICAL PHYSICS ELECTIVE	3	RADI 6097 *Research	3
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

**YEAR 3**

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5090 *Semin. Radiological Sci.	1	RADI 5090 *Seminars in Radiological Sciences	1
RADI 6071 Supervised Teaching	1	RADI 6071 Supervised Teaching	1
RADI 6097 *Research	10	RADI 6097 *Research	10
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

**YEAR 4**

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 7099 *Dissertation	12	RADI 7099 *Dissertation	12
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

**TOTAL 96 CU**

\* Course required for all RADSCI students

† Course required by CAMPEP for all Medical Physics students

‡ Student must be admitted to PhD candidacy to enroll in RADI 7099 - Dissertation

\*\*Students who have completed their qualifying exam and have been accepted into candidacy should take RADI 7099 – Dissertation instead of RADI 6097-Research

Students who are unable to complete their dissertation research within the four-year period may continue to be enrolled and take as many hours of RADI 7099 (Dissertation) as is appropriate to their student enrollment status (full- or part-time).

NOTE: Up to two hours of RADI 5090 can be waived if the student presents research to local and national scientific meeting or equivalent, as approved by COGS.

**Possible Elective Courses** (student shall work with Supervising Professor to determine most appropriate courses, check course syllabus for prerequisites)

RADI 5018 Physics Measurements in Imaging	RADI 6042 Non Ionizing Radiation Biology
RADI 6015 Physics Measurements in Imaging 2	RADI 6050 Magnetic Resonance Imaging
RADI 6016 Physics of Diagnostic Imaging 2	RADI 6051 Statistical Parametric Mapping
RADI 6017 Neuroimaging Methods	RADI 6054 Introduction to Statistical Learning
RADI 6022 Programming for Medical Physics	RADI 6091 Special Topics
RADI 6031 Physics Measurements in Radiotherapy 1	RADI 7005 Treatment Planning Techniques in RT
RADI 6033 Advanced Radiotherapy Physics	RADI 7006 Treatment Planning Techniques in RT 2
RADI 6035 Physics Measurements in Radiotherapy II	RADI 7010 Motor Learning and Brain Imaging



**PhD Medical Physics Track – Therapy Concentration (CIP code 26.0209.04)**  
**Example Training Plan**

YEAR 1

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5001 *Basic Radiation Safety	1	RADI 6024 *†Radiological Anatomy & Physiology	3
RADI 5015 *†Physics of Diag. Imaging I	3	MEDICAL PHYSICS ELECTIVE	3
RADI 7077 *Ethics, Leadership, & Vision	2	RADI 5007 *†Statistics in Radiological Sciences	2
RADI 5005 †Fund. of Radiation Dosimetry	3	RADI 5090 *Seminars in Radiological Sciences	1
RADI 6030 †Physics of Radiotherapy	3	RADI 5020 †Principles of Health Physics I	3
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

YEAR 2

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5025 †Molec. Oncol. & Radiobiology	3	RADI 6012 *Physics of Nuclear Medicine	3
MEDICAL PHYSICS ELECTIVE	3	MEDICAL PHYSICS ELECTIVE	3
MEDICAL PHYSICS ELECTIVE	3	MEDICAL PHYSICS ELECTIVE	3
RADI 5090 *Seminars in Radiol. Sci.	1	RADI 6097 *Research	3
RADI 6049 *Introduction to MRI	2		
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

YEAR 3

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5090 *Semin. Radiological Sci.	1	RADI 5090 *Seminars in Radiological Sciences	1
RADI 6071 Supervised Teaching	1	RADI 6071 Supervised Teaching	1
RADI 6097 *Research	10	RADI 6097 *Research	10
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

YEAR 4

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 7099 *Dissertation	12	RADI 7099 *Dissertation	12
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

**TOTAL 96 CU**

\* Course required for all RADSCI students

† Course required by CAMPEP for all Medical Physics students

‡ Student must be admitted to PhD candidacy to enroll in RADI 7099 - Dissertation

\*\*Students who have completed their qualifying exam and have been accepted into candidacy should take RADI 7099 – Dissertation instead of RADI 6097-Research

Students who are unable to complete their dissertation research within the four-year period may continue to be enrolled and take as many hours of RADI 7099 (Dissertation) as is appropriate to their student enrollment status (full- or part-time).

NOTE: Up to two hours of RADI 5090 can be waived if the student presents research to local and national scientific meeting or equivalent, as approved by COGS.

**Possible Elective Courses** (student shall work with Supervising Professor to determine most appropriate courses, check course syllabus for prerequisites)

RADI 5018 Physics Measurements in Imaging	RADI 6042 Non Ionizing Radiation Biology
RADI 6015 Physics Measurements in Imaging 2	RADI 6050 Magnetic Resonance Imaging
RADI 6016 Physics of Diagnostic Imaging 2	RADI 6051 Statistical Parametric Mapping
RADI 6017 Neuroimaging Methods	RADI 6054 Introduction to Statistical Learning
RADI 6022 Programming for Medical Physics	RADI 6091 Special Topics
RADI 6031 Physics Measurements in Radiotherapy 1	RADI 7005 Treatment Planning Techniques in RT
RADI 6033 Advanced Radiotherapy Physics	RADI 7006 Treatment Planning Techniques in RT 2
RADI 6035 Physics Measurements in Radiotherapy II	RADI 7010 Motor Learning and Brain Imaging

## PhD Neuroscience Imaging Track (CIP code 26.0209.02) Example Training Plan

### YEAR 1

<i>Fall Semester</i>		<i>CU</i>	<i>Spring Semester</i>		<i>CU</i>
RADI 5001	*Basic Radiation Safety	1	RADI 6024	*Radiological Anatomy & Physiology	3
RADI 5015	*Physics of Diag. Imaging I	3	RADI 6012	*Physics of Nuclear Medicine	3
RADI 6049	*Introduction to MRI	2	RADI 5007	*Statistics in Radiological Sciences	2
RADI 7077	*Ethics, Leadership, & Vision	2	RADI 5090	*Seminars in Radiological Sciences	1
RADI 6051	Statistical Parametric Mapping	3	RADI 6017	Neuroimaging Methods	3
NEUROSCIENCE IMAGING ELECTIVE		1			
<b>TOTAL 12</b>			<b>TOTAL 12</b>		

### YEAR 2

<i>Fall Semester</i>		<i>CU</i>	<i>Spring Semester</i>		<i>CU</i>
RADI 5090	*Semin. Radiological Sciences	1	RADI 5090	*Semin. in Radiological Sciences	1
RADI 6071	Supervised Teaching	2	RADI 6097	*Research	8
RADI 6097	*Research	7	NEUROSCIENCE IMAGING ELECTIVE		3
NEUROSCIENCE IMAGING ELECTIVE		2			
<b>TOTAL 12</b>			<b>TOTAL 12</b>		

### YEAR 3

<i>Fall Semester</i>		<i>CU</i>	<i>Spring Semester</i>		<i>CU</i>
RADI 5090	*Semin. Radiological Sci.	1	RADI 6097	**Research	12
RADI 6097	**Research	11			
<b>TOTAL 12</b>			<b>TOTAL 12</b>		

### YEAR 4

<i>Fall Semester</i>		<i>CU</i>	<i>Spring Semester</i>		<i>CU</i>
RADI 7099	* <sup>‡</sup> Dissertation	12	RADI 7099	* <sup>‡</sup> Dissertation	12
<b>TOTAL 12</b>			<b>TOTAL 12</b>		

**TOTAL 96 CU**

\* Course required for all RADSCI students

\*\*Students who have completed their qualifying exam and have been accepted into candidacy should take RADI 7099 – Dissertation instead of RADI 6097-Research

<sup>‡</sup>Student must be admitted to PhD candidacy to enroll in RADI 7099 - Dissertation

NOTE: Up to two hours of RADI 5090 can be waived if the student presents research to local and national scientific meeting or equivalent, as approved by COGS.

Students who are unable to complete their dissertation research within the four-year period may continue to be enrolled and take as many hours of RADI 7099 (Dissertation) as is appropriate to their student enrollment status (full- or part-time).

**Possible Elective Courses** (student shall work with Supervising Professor to determine most appropriate courses)

CSAT 5095 Experimental Design & Data Analysis	PHAR 6027 Fundamentals of Neuroethics
CSAT 6005 Rigor and Reproducibility	PHYL 5041 Excitable Membranes
INTD 5040 Fundamentals of Neuroscience 1	PHYT 7009 Neuroscience
INTD 5043 Fundamentals of Neuroscience 2	RADI 5030 Neuroscience Imaging Laboratory
INTD 5046 Meta-analysis in Cognitive Neuroimaging	RADI 6015 Physics of Diagnostic Imaging 2
INTD 5047 Neuroanatomy	RADI 6018 Foundations of Neuroscience Imaging
INTD 6040 Resident Lecture Series: Psychiatry 1	RADI 6022 Programming in Medical Physics
INTD 6041 Resident Lecture Series: Neurology	RADI 6050 Magnetic Resonance Imaging
INTD 6045 Clinical Practicum in Neuroscience	RADI 6054 Introduction to Statistical Learning

## PhD Human Imaging Track (CIP code 26.0209.03) Example Training Plan

*NOTE: Only students with MD degrees (or equivalent) can be enrolled in this track*

### YEAR 1

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5001 *Basic Radiation Safety	1	RADI 6049 Supervised Teaching	2
RADI 5090 *Semin. Radiological Sci.	1	RADI 6097 *Research	4
RADI 6097 *Research	4		
<b>TOTAL</b>	<b>6</b>	<b>TOTAL</b>	<b>6</b>

### YEAR 2

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 7077 *Ethics, Leadership, & Vision	2	RADI 5090 *Seminars in Radiol. Sciences	1
RADI 6097 *Research	4	RADI 5007 *Statistics in Radiological Sciences	2
		RADI 6097 *Research	3
<b>TOTAL</b>	<b>6</b>	<b>TOTAL</b>	<b>6</b>

### YEAR 3

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5015 *Physics of Diag. Imaging I	3	RADI 6012 *Physics of Nuclear Medicine	3
RADI 6049 *Introduction to MRI	2	HUMAN IMAGING ELECTIVE	3
RADI 5025 Molec Oncol & Radiobiology	3	RADI 6097 *Research	6
RADI 6097 *Research	4		
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

### YEAR 4

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5090 *Semin. Radiological Sci.	1	RADI 5090 *Seminars in Radiol. Sciences	1
RADI 7099 *Dissertation	11	RADI 7099 *Dissertation	11
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

**TOTAL 72 CU**

\* Course required for all RADSCI students

‡ Student must be admitted to PhD candidacy to enroll in RADI 7099 - Dissertation

\*\* Students who have completed their qualifying exam and have been accepted into candidacy should take RADI 7099 – Dissertation instead of RADI 6097-Research

*NOTE: Up to two hours of RADI 5090 can be waived if the student presents research to local and national scientific meeting or equivalent, as approved by COGS.*

Students who are unable to complete their dissertation research within the four-year period may continue to be enrolled and take as many hours of RADI 7099 (Dissertation) as is appropriate to their student enrollment status (full- or part-time).

**Possible Elective Courses** (student shall work with Supervising Professor to determine most appropriate courses)

INTD 5046 Meta-analysis in Cognitive Neuroimaging	TSCI 5071 Patient-Oriented Clinical Research Meth – 1
RADI 6015 Physics of Diagnostic Imaging II	TSCI 5073 Integrating Molecular Biology with Patient-Oriented Clinical Research
RADI 6019 Medical Image Processing	TSCI 5076 Introduction to Informatics
RADI 6050 Magnetic Resonance Imaging	TSCI 5078 Intellectual Property, Technology Transfer, and Commercialization
RADI 6051 Statistical Parametric Mapping	
RADI 6017 Neuroimaging Methods	
RADI 6091 Special Topics	

## PhD Radiation Biology Track (CIP code 26.0209.01) Example Training Plan

### YEAR 1

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5001 *Basic Radiation Safety	1	RADI 6024 *Radiological Anatomy & Physiology	3
INTD 5000 Fund. Biomedical Sciences	8	RADI 6012 *Physics of Nuclear Medicine	3
RADI 5025 Molec. Oncol. & Radiobiology	3	RADI 5020 Principles of Health Physics I	3
		RADI 5007 *Statistics in Radiological Sciences	2
		RADI 5090 *Seminars in Radiological Sciences	1
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

### YEAR 2

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5015 *Physics of Diag. Imaging I	3	RADIATION BIOLOGY ELECTIVE	3
RADI 7077 *Ethics, Leadership, & Vision	2	RADI 5090 *Seminars in Radiological Sciences	1
RADI 5090 *Semin. Radiological Sci.	1	RADI 6097 *Research	5
RADI 6049 *Introduction to MRI	2	RADIATION BIOLOGY ELECTIVE	3
RADI 6097 *Research	4		
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

### YEAR 3

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5090 *Semin. Radiological Sci.	1	RADI 6097 *Research	12
RADI 6071 Supervised Teaching	2		
RADI 6097 *Research	9		
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

### YEAR 4

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 7099 * <sup>‡</sup> Dissertation	12	RADI 7099 * <sup>‡</sup> Dissertation	12
	<b>TOTAL 12</b>		<b>TOTAL 12</b>

**TOTAL 96 CU**

\* Course required for all RADSCI students

<sup>‡</sup>Student must be admitted to PhD candidacy to enroll in RADI 7099 - Dissertation

\*\*Students who have completed their qualifying exam and have been accepted into candidacy should take RADI 7099 – Dissertation instead of RADI 6097-Research

NOTE: Up to two hours of RADI 5090 can be waived if the student presents research to local and national scientific meeting or equivalent, as approved by COGS.

Students who are unable to complete their dissertation research within the four-year period may continue to be enrolled and take as many hours of RADI 7099 (Dissertation) as is appropriate to their student enrollment status (full- or part-time).

**Possible Elective Courses** (student works with Supervising Professor to decide most appropriate courses)

INTD 5007 Adv. Cell and Molecular Biology  
 RADI 6042 Non-Ionizing Radiation Biology and Biophysics  
 RADI 5050 Human Electrophysiology: Brain  
 RADI 6015 Physics of Diagnostic Imaging II  
 RADI 6019 Medical Image Processing  
 RADI 6020 Advanced Topics in Cognitive Neuroscience  
 RADI 6028 Advanced Molecular Biology  
 RADI 6050 Magnetic Resonance Imaging  
 RADI 6091 Special Topics

**MS Medical Health Physics Program (CIP code 51.2205.00) Example Training Plan**

YEAR 1

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5001 *Basic Radiation Safety	1	RADI 6024 *†Radiological Anatomy & Physiology	3
RADI 5015 *†Physics of Diag. Imaging I	3	RADI 6012 *Physics of Nuclear Medicine	3
RADI 7077 *Ethics, Leadership, & Vision	2	RADI 5007 *†Statistics in Radiological Sciences	2
RADI 5005 †Fund. of Radiation Dosimetry	3	RADI 5090 *Seminars in Radiological Sciences	1
RADI 6030 †Physics of Radiotherapy	3	RADI 5020 †Principles of Health Physics I	3
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

YEAR 2

<i>Fall Semester</i>	<i>CU</i>	<i>Spring Semester</i>	<i>CU</i>
RADI 5025 †Molec.Oncol. & Radiobiology	3	RADI 6016 Physics of Diagnostic Imaging II	3
RADI 5090 *Seminars in Radiol. Sci.	1	RADI 5018 *Physics Measurements in Imaging	2
RADI 6049 *Introduction to MRI	2	RADI 6071 *Supervised Teaching	1
RADI 6021 Principles of Health Physics II	3	RADI 6098 *Thesis	6
RADI 6097 *Research	3		
<b>TOTAL</b>	<b>12</b>	<b>TOTAL</b>	<b>12</b>

**TOTAL 48 CU**

\* Course required for all RADSCI students

† Course required by CAMPEP for all Medical Physics students

#### **4. Evaluation of Curriculum**

On a biannual basis the faculty and students of the GPRS go on retreat to identify and solve global problems associated with the structure of the curriculum and/or the matriculation process. Although the format varies from year-to-year, the retreat typically takes up between one-half day to an entire day meeting in even years to review 1) curriculum, 2) textbooks, 3) teaching methods, 4) laboratories, 5) clinical experience, 6) examinations, 7) matriculation procedures, and 8) research opportunities. All faculty, full-time and adjunct, are invited to attend the retreat. An introductory plenary session summarizes the goals of the retreat, which may include one or more presentations and discussions by external guest speakers and members of the UT Health San Antonio administration. Faculty and students are asked to identify which topics are of greatest importance to the graduate program. After the critical topics are identified, the retreat participants are assigned to break-out groups in which they develop strategies for dealing with each of the issues identified previously. If there are student-specific breakout sessions, these may be run by the student representative to the COGS, who raises and discusses the issues that concern the students at the retreat. The entire group then reconvenes to discuss all topics and vote on changes in the policies and/or curriculum in a session that follows Roberts Rules of Order. Proposals from the breakout groups are evaluated in the afternoon in plenary session and recommendations made for implementation in the subsequent biennium. The executive summary of the retreat provides a plan for program structure and curriculum development over the next two years. The strategies adopted at the retreat and official implementation of all curriculum decisions are charged to the COGS and reported to the GSBS as program learning outcomes (PLOs), when appropriate.

Most of the recommendations approved by the combined student and faculty retreat from the last three retreats have been implemented as PLOs unless there were limitations of funding available to support the desired changes.

#### **5. Sequential Procedures for Master's Thesis in Medical Health Physics**

##### **A. Selection of the Supervising Professor**

Within their first semester, the student shall meet with their faculty advisor to complete the Mentor Identification Form and to review and develop a Student-Mentor Compact and Milestones Agreement, as described in Section 11, below. This process should be repeated annually. No later than one month after the student's admission to candidacy, the member of the graduate faculty of the program who will serve as the supervising professor of the thesis research shall be decided upon by mutual agreement among the candidate, the faculty member, and the Committee on Graduate Studies. Normally, the faculty advisor who guided the student's preliminary research activities continues as supervising professor, but this arrangement is not obligatory.

##### **B. Draft of Thesis Research Proposal**

Within three months after admission to candidacy, the candidate shall submit a draft of a proposal for the thesis research to the supervising professor for review and modification. Subsequent drafts of the proposal may then be submitted for review and modification to other faculty members who have knowledge and expertise in the area of the research proposal. After approval of the final proposal draft by the supervising professor, the Research Proposal form is submitted via Impact to the GPRS COGS and GSBS for consideration of approval. Students may change their Supervising Professor, with approval of the GPRS COGS, following resubmission of the Research Proposal form in Impact.

### ***C. Appointment of the Supervising Committee***

As part of the student's Research Proposal form submission, the supervising professor and the candidate shall make recommendations to the Committee on Graduate Studies regarding the composition of the Supervising Committee for the thesis research. The Supervising Committee must consist of at least four persons, as follows:

- The supervising professor, also a member of the program's graduate faculty, designated as supervising professor and chair of the supervising committee.
- Two members must be members of the graduate faculty of the program.
- One member must be a faculty member at UT Health San Antonio in a supporting area outside the program or a person outside the UT Health San Antonio faculty, who is an expert in the field of the proposed thesis.

Each member of the Supervising Committee is required to sign the Research Proposal Form to certify her/his consent to serve on the committee. Any subsequent change in the Composition of the Supervising Committee must be approved by the COGS and approved by the Dean.

The composition of the Supervising Committee should, in principle, provide a group of research scientists who constitute an important resource to the candidate and her or his thesis research. Their functions are, with the Supervising Professor, to guide the candidate through the thesis research. They certify to the Committee on Graduate Studies that the candidate has, in fact, carried out a meritorious research investigation of the caliber appropriate for an M.S. thesis and, in their opinion, defended it satisfactorily.

### ***D. Supervision of the Thesis Research***

Within one month after appointment of the Supervising Committee, the Supervising Professor shall convene the Supervising Committee to discuss with the candidate the progress of the thesis research and the projected future work. At appropriate intervals thereafter, but at least every 6 months, the Supervising Committee shall meet with the candidate for progress reports (written and/or oral) so that current status of the research may be evaluated, and direction of future work planned. It is essential that the Supervising Committee be fully informed of the research progress and be able to provide continued supervision throughout.

### ***E. Submission of the Thesis***

After members of the Supervising Committee agree that the research has progressed sufficiently for submission of the thesis, a draft of the thesis shall be submitted to the Supervising Professor and then to the other members of the Supervising Committee for review and recommendations for modification of content. Additionally, the candidate will be required to upload their thesis into a plagiarism detection software through the learning management system course specifically created by the Graduate School Dean's Office for the purpose of safeguarding the institution's reputation and integrity. After uploading their thesis into the plagiarism detection software, the candidate will receive a similarity report and score that will help to determine the originality of the work. This report should be submitted to the Supervising Professor along with the draft of their thesis. Following discussion of the report with the mentor, recommended changes will be made to the thesis including those intended to lower the similarity report score (if necessary). It is the responsibility of the candidate to follow the guidelines for preparation of the thesis provided by the Graduate School Dean's Office in the Instructions for Preparation and Submission of Electronic Theses, Dissertations and Dissertation Abstracts. If an alternative chapter format is preferable, the candidate must obtain

approval for such format from the Supervising Committee and the Committee on Graduate Studies. The candidate also has the responsibility to ensure their supervising professor and committee have adequate time for review and modification of the thesis.

#### ***F. Final Oral Examination***

The Graduate School requires that the thesis be defended by the candidate in a Final Oral Examination conducted by the Supervising Committee. The thesis shall be defended in formal Final Oral Examination scheduled through the Graduate School Dean's Office and open to all interested persons.

The student's Abstract and the Vita should be submitted with the request and shared with their respective department, the Registrar's Office, and the Graduate School Dean's Office.

The Supervising Committee members vote on the candidate's success or failure on the Examination; more than one vote for failure signifies failure on the Final Oral Examination. The student then submits the Report on Final Oral Examination (GSBS Form 41) via Impact to the Committee on Graduate Studies. In the event of a failing performance by the candidate, the Supervising Committee shall submit to the Committee on Graduate Studies a recommendation regarding remedial action or further examinations; in such cases, the Committee on Graduate Studies shall decide upon the recommendation or other action to be taken. In the event of a successful performance by the candidate, the Committee on Graduate Studies shall vote on whether to approve the recommendation by the Supervising Committee for granting of the degree.

#### ***G. Recommendation for Granting of the Degree***

If the Committee on Graduate Studies approves the favorable recommendation by the Supervising Committee, the Chair of the Committee on Graduate Studies shall so indicate by signature on the Report on Final Oral Examination and submit the Report to the Graduate Faculty Council for consideration. The candidate shall submit to the Graduate School Dean's Office the final approved version of the thesis to ProQuest as well as upload the document to the plagiarism detection software. The thesis Approval Page signed by the Supervising Professor and Committee members must also be submitted to the Graduate School Dean's Office. When the completed Report on Final Oral Examination, the Approval Page and the electronic thesis have all been received in the Graduate School Dean's Office, the Graduate Faculty Council will consider the recommendation for granting the degree. If the Council does not approve the recommendation, it will refer the matter to the Committee on Graduate Studies with a recommendation for remedial action. If the Council does approve the recommendation, the Dean of the Graduate School of Biomedical Sciences will notify the President of The University of Texas Health Science Center at San Antonio that the candidate has fulfilled all requirements for the degree Master of Science. Upon the candidate's certification by the President, the degree is conferred by the Board of Regents of The University of Texas System.



## **6. PhD Radiological Sciences & MS Medical Health Physics Qualifying Examinations**

The qualifying examination committee, with the consent of and approval of the GPRS COGS, determines the content and format for the MS and PhD Qualifying Examinations (referred to as the 'qualifying exam' hereinafter). The committees are also responsible for the development of the examinations, and their administration and evaluation on an annual basis. The following summarizes the rules and procedures for the qualifiers.

### **A. Requirements for all Students:**

- 1- All students in good standing who have completed their required core coursework should take the qualifier on the date scheduled for their track and degree program.
- 2- Students who are on academic probation are not allowed to take the qualifier. These students are given one year in which to improve their GPA above the probationary level before they can sit for the qualifier.
- 3- Students have two chances to pass the qualifying exam. Those who fail on their first attempt must retake the qualifier within one year. Typically, the second attempt is scheduled within 2 months and at an agreed time by the faculty and student. Failure to pass the exam on the second attempt may result in dismissal from the graduate program.
- 4- Students with prior coursework or professional experience adequate to prepare them in their declared track may request permission from the Radiological Sciences COGS to take the qualifier prior to completion of the core coursework. Students taking the exam prior to completion of all required courses must take the course(s) eventually, even if they pass the qualifying exam prior to course completion, unless specifically waived from taking each course by the Radiological Sciences COGS.

### **B. Structure and Content**

The qualifying exam is offered at the end of a student's first year, traditionally in late May. The exam content is based on the first-year curriculum and includes approximately 150 multiple choice questions. The courses included in the evaluation are based on the student's track within the GPRS as follows:

Common courses represented in all track Qualifying Exams:

- RADI 5001 - Basic Radiation Safety
- RADI 5015 - Physics of Diagnostic Imaging I
- TSCI 5070 - Responsible Conduct Research
- RADI 6024 - Radiological Anatomy & Physiology

Track-Specific courses include:

- RADI 5005 - Fundamentals of Radiation Dosimetry (Medical Physics PhD, Masters in Medical Health Physics)
- RADI 6012 – Physics of Nuclear Medicine (Neuroscience Imaging PhD, Human Imaging PhD, Radiation Biology PhD)

### **C. Administering and Grading the Qualifying Examination:**

- 1- The Chair of the Qualifying Exam Committee for each Track is responsible for collating and tabulating the final scores and presenting them to the Track Committee. The Track Committee will prepare formal recommendations for each student at the next Track Committee meeting.

2 - The tabulated results of the qualifying exam and/or the recommendations of the Exam Panel shall be presented by the Chair of the Track Committee, or a designated representative, at the next COGS meeting where a vote shall be taken on acceptance of the results.

3- Within a week after the COGS meeting, each student's results will be communicated to him/her via e-mail.

## **7. Admission to Candidacy**

The Qualifying Exam committee shall be responsible for evaluating each student's research potential and reporting, to COGS, their recommendation regarding the student's admission to candidacy for the M.S. or Ph.D. degree. After approval by the GSBS Dean of the GPRS COGS' recommendation for admission to M.S. or Ph.D. candidacy, the student may register for the GPRS Thesis course (RADI 6098) or GPRS Dissertation course (RADI 7099), respectively.

After successfully completing the Qualifying Examination appropriate to his/her track, each student (with the aid of his/her advisor) shall establish a Supervising Committee. The composition of the Committee must be approved by the COGS. This committee shall provide guidance to the student as the research proposal is developed, and the thesis or dissertation project is undertaken. When the student has completed the Thesis/Dissertation document, the student shall schedule a Thesis/Dissertation Defense at which Supervising Committee shall decide whether the student has completed all of the requirements for earning the degree. The Supervising Committee shall then make a formal recommendation to the COGS.

## **8. Sequential Procedures for PhD Dissertation**

### **A. Selection of the Supervising Professor**

Within their first semester, the student shall meet with their faculty advisor to complete the Mentor Identification Form and to review and develop a Student-Mentor Compact and Milestones Agreement, as described in Section 11, below. This process should be repeated annually. No later than three months after the student's admission to candidacy, the member of the graduate faculty of the program who will serve as the supervising professor of the thesis research shall be decided upon by mutual agreement among the candidate, the faculty member, and the Committee on Graduate Studies. Normally, the faculty advisor who guided the student's preliminary research activities continues as supervising professor, but this arrangement is not obligatory.

### **B. Draft of Dissertation Research Proposal**

By the end of Year 3 Fall semester, the candidate shall identify a research question that will serve as a focus for the dissertation research. The candidate shall prepare a draft of a dissertation proposal that specifies the research to be undertaken, its significance in the scientific field, and the general methods and techniques to be utilized. The proposal shall be submitted to the supervising professor for review and modification. Subsequent drafts of the proposal should then be submitted for review and modification to other faculty members who have knowledge and expertise in the area of the research proposal and who have been selected by mutual agreement among the candidate, the supervising professor, and the Committee on Graduate Studies. The final draft of the dissertation proposal is subject to review and approval by the Committee on Graduate Studies, which may specifically designate a group of faculty members to review the proposal draft(s).

Writing a competitive scientific grant proposal is an important competency for our PhD graduate students. As a requisite milestone to help fulfill this competency, all PhD students are expected to complete their dissertation proposal formatted as an individual fellowship grant to an external funding agency such as the National Institutes of Health (NIH). It is

expected that this proposal will be submitted for consideration to the identified funding agency. Ideally, submission should be by the end of the student's third year in the program, though timing adjustments can be made as determined by the student's mentor to optimize funding potential. While all students are expected to submit their dissertation proposal for funding consideration, the student with mentor approval can apply to the COGS to "opt out" of the submission requirement if an appropriate agency cannot be identified.

### ***C. Composition of the Dissertation Supervising Committee***

As part of the student's Research Proposal form submission, the supervising professor and the candidate shall make recommendations to the Committee on Graduate Studies regarding the composition of the Supervising Committee for the dissertation research. The Supervising Committee must consist of at least five persons, as follows:

1. The supervising professor, who has a primary faculty appointment at UT Health SA and is a member of the program's graduate faculty, designated as Supervising Professor and Chair of the Supervising Committee;
2. Three members must be members of the graduate faculty of the program in which the student is enrolled;
3. One member must be from outside of UT Health SA with no affiliation to the institution and should have expertise in or similar to the field of the proposed dissertation and/or provide a unique perspective or point of view on the proposed dissertation.

The GPRS COGS may nominate additional members in categories (2) and (3) if necessary. Nomination is contingent upon the willingness of the designated person to serve on the Supervising Committee. The composition of the Supervising Committee should, in principle, provide a group of research scientists who constitute an important resource to the candidate and her or his dissertation research. Their functions are, with the Supervising Professor, to guide the candidate through the dissertation research and to certify to the Committee on Graduate Studies that the candidate has, in fact, carried out a meritorious research investigation of the caliber appropriate for a Ph.D. dissertation and, in their opinion, defended it satisfactorily. Upon selection of the supervising committee, the chair of the Committee on Graduate Studies (COGS) will submit to the Graduate School Dean's Office a completed GSBS Form 30 Recommendation for Approval of Dissertation Research Proposal and Supervising Committee. The student must provide the Graduate School Dean's Office an electronic copy of their dissertation proposal to accompany GSBS Form 30.

### ***D. Approval of the Dissertation Proposal and Supervising Committee***

The GSBS Graduate Faculty Council and the GSBS Dean will review the recommendation of the GPRS COGS on the proposal and supervising committee. Any subsequent change in the Composition of the Supervising Committee must be approved by the COGS and then approved by the GSBS Graduate Faculty Council at a regularly scheduled meeting.

### ***E. Supervision of the Dissertation Research***

Approximately one month after formal approval of the Supervising Committee, the Supervising Professor shall convene the Supervising Committee to discuss with the candidate the progress of the dissertation research and the projected future work. At appropriate intervals thereafter, but at least every 6 months, the Supervising Committee shall meet with the candidate for presentation of progress reports (written and/or oral), so that current status of the research may be evaluated, and the direction of future work planned. If the external Committee member is unable to attend these meetings, it is the responsibility of the candidate and the Supervising Professor to provide this member with progress reports for review and recommendations. It is essential that the Supervising Committee be fully informed of the

research progress and be able to provide continued supervision throughout and that the GPRS COGS receive reports of the research progress from the Supervising Committee. The Supervising Committee and/or the Committee on Graduate Studies may approve or direct alterations in the research plans within the general context of the dissertation proposal. Major changes in the candidate's research status (such as selection of a new Supervising Professor, new Supervising Committee members, or a new research question) must be reported to the Graduate Faculty Council and the GSBS Dean for consideration and a Research Addenda form submitted.

#### **F. Submission of the Dissertation**

After agreement by the members of the Supervising Committee that the research has progressed sufficiently for submission of the dissertation, a draft of the dissertation shall be submitted to the Supervising Professor and then to all other members of the Supervising Committee for review and recommendations for modification of content. Additionally, the candidate will be required to upload their dissertation draft into a plagiarism detection software through the learning management system course specifically created by the Graduate School Dean's Office for the purpose of safeguarding the institution's reputation and integrity. After uploading their dissertation into the plagiarism detection software, the candidate will receive a similarity report and score that will help to determine the originality of the work. This report should be submitted to the Supervising Professor along with the draft of their dissertation. Following discussion of the report with the mentor, recommended changes will be made to the dissertation including those intended to lower the similarity report score (if necessary). It is the responsibility of the candidate to follow the guidelines of preparation of the dissertation provided by the Graduate School Dean's Office in the "*Instructions for Preparation and Submission of Electronic Theses, Dissertations and Dissertation Abstracts*", which can be downloaded from the GSBS website. The candidate also has the responsibility to ensure adequate time for the supervising professor and committee review and modification of the dissertation in accordance with the schedule of deadlines provided each term by the Graduate School Dean's Office.

#### **G. Final Oral Examination**

When the Supervising Committee judges the dissertation to be suitable for defense, the student shall be responsible for submitting a signed Request for Final Oral Examination Form (GSBS Form 40, available in Impact) through the Committee on Graduate Studies to the Dean and request scheduling of the Final Oral Examination. The Final Oral Examination must be scheduled at least 2 weeks before the date of the Final Oral Examination. The student's Abstract and Vitae should accompany the Request for Final Oral Examination Form at the time it is submitted to the GSBS Dean's Office. Public announcement of the Final Oral Examination is made by the GSBS Dean's Office. This examination is conducted by the Supervising Committee with the Supervising Professor as chair. Interested persons may attend the public defense and have the right to question the candidate. After the public defense, the Final Oral Examination continues with an intensive oral examination by the Supervising Committee that is not customarily open to the public. The Supervising Committee members vote on the candidate's success or failure on the Final Oral Examination; more than one vote for failure signifies failure on the examination. The Supervising Committee signs the Report on Final Oral Examination Form (GSBS Form 43, available in Impact) which the student then submits to the GPRS COGS. In the event of a failing performance by the candidate, the Supervising Committee shall submit to the GPRS COGS a recommendation regarding remedial action; in such case, the GPRS COGS shall decide on the recommendation or other action to be taken. In the event of a successful performance by the candidate, the GPRS COGS shall vote on whether to approve the recommendation by the Supervising Committee for granting of the degree.

## **H. Recommendation for Granting of the Degree**

If the GPRS COGS approves the favorable recommendation by the Supervising Committee, the Chair of the GPRS COGS shall so indicate by signature on the Report on Final Oral Examination and submit the Report to the Graduate Faculty Council for consideration. The candidate shall submit to the GSBS Dean's Office the final approved version of the dissertation to ProQuest as well as upload the document to the plagiarism detection software. The dissertation Approval Page signed by the Supervising Professor and Committee members must also be submitted to the GSBS Dean's Office. When the completed Report on Final Oral Examination, the Approval Page and the electronic dissertation in final form have been received in the GSBS Dean's Office, the Graduate Faculty Council will consider the recommendation for granting of the degree. If the Council does not approve the recommendation, it will refer the matter to the GPRS COGS with a recommendation for remedial action. If the Council does approve the recommendation, the GSBS Dean the President of UT Health San Antonio that the candidate has fulfilled all requirements of the Graduate School of Biomedical Sciences for the degree of Doctor of Philosophy. Upon the candidate's certification by the President, the degree is conferred by the Board of Regents of the University of Texas System.

## **9. Students**

### **A. Admissions**

Upon receiving inquiries from prospective students, the Chair of the Admissions Committee sends a reply, typically by e-mail that informs the prospective student of application deadlines, admission requirements, academic backgrounds expected and the competitive nature of the admission process. The message also directs the potential applicant to visit [the GPRS website](#) for more detailed information.

Students may apply for admission to the GPRS to begin the Fall or, on a case by case basis in the Spring semester, of each academic year. Due to course progression constraints, applicants are strongly encouraged to apply for the Fall semester. The priority deadline is December 1st and the final deadline is January 1st. To be considered for the Fall semester, application materials must be received no later than two weeks after the respective application deadline. If all application materials are not received by the specified deadlines, an Admission Recommendation form is sent to the GSBS Associate Dean indicating rejection because of an incomplete application file, noting those items that are lacking. An applicant can reapply for the following year once all pending materials have been received.

GSBS admission requires a Bachelor's Degree and a cumulative undergraduate grade point average (GPA) of at least a 3.0 on a 4.0 scale. Foreign students who have not completed previous collegiate studies in an English-speaking country or university are required to have one of the following minimum test scores within the past two years: TOEFL academic version (7), ILETS (84), or Duolingo (115). Although applicants to the GPRS are required to submit GRE scores from exams taken within the past five years, there is no specific GRE score required for admission.

For all tracks within the GPRS, a bachelor's degree in a natural science or engineering is highly recommended. Degrees in other disciplines are considered providing that the applicant has received sufficient science and mathematics course credits to give the applicant the equivalent of a minor in a natural science or engineering discipline. Specifically, applicants must have undergraduate credit for the following courses: (1) Chemistry: One semester of general chemistry; (2) Physics: at least two semesters of general physics; (3) Mathematics: Through calculus and ordinary differential equations; (4) Computer Science or Programming:

One semester. Waivers may be requested by the COGS from the Graduate Faculty Council of the GSBS if an applicant does not meet one of the above requirements.

Students accepted into the UT Health San Antonio MS Medical Health Physics or PhD Radiological Science (Medical Physics track) programs shall have acquired a strong foundation in basic physics. This should be documented by either an undergraduate degree in physics or a degree in a related engineering or physical science with coursework that is equivalent to a minor in physics (includes at least three upper level undergraduate courses such as modern physics, classical mechanics, introductory quantum mechanics or thermodynamics.). If applicants with deficiencies in their physics background are conditionally admitted to the program, they will have to correct their deficiency by completing the required advanced undergraduate physics courses at an accredited university.

Students accepted into the UT Health San Antonio PhD Radiological Science (Human Imaging track) program shall have been awarded a Doctor of Medicine (MD) degree or equivalent (i.e. Doctor of Osteopathic Medicine, DO; etc.). USMLE scores can be substituted for GRE for Human Imaging applicants only.

The Application Review Committee has established three criteria to allow acceptance of an Applicant.

- i. First, the Application Review Committee determines that the applicant has an adequate academic background, based on the above criteria. The Application Review Committee uses a wholistic approach to determine academic acceptability of an application including: cumulative undergraduate GPA, GRE scores, TOEFL/ILETS/DUOLINGO scores (if applicable), GPA for any graduate studies completed, three letters of recommendation and appropriateness of undergraduate courses taken. Typically, 20-30 applications are received each year, of which at least ~15 are deemed academically acceptable.
- ii. The second condition is that the Application Review Committee must identify a mentor for the applicant in the appropriate track of the GPRS.
- iii. The third task of the Application Review Committee is to establish that there is funding available, either through the GPRS, through an outside program or that the student can be self-funded. Funding within the GPRS for entering students is subject to availability, but typically three to four new students can be funded each year.

After establishing these three criteria the Application Review Committee presents its recommendations to the GPRS COGS for acceptance or rejection of each applicant reviewed. The GPRS COGS makes final decisions via a majority vote.

The Chair of COGS forwards recommendations for approval or rejection to the Dean of the Graduate School of Biomedical Sciences. Applicants are informed by the Dean in writing of the action taken on their application and any contingencies imposed upon their acceptance.

## **10. Recruitment Activities**

Colleges and Universities visited by faculty of the GPRS in recent years include the University of Texas at Arlington, Trinity University, University of Texas El Paso, Texas A&M Commerce and Texas A&M College Station. The Faculty have also mentored several undergraduate physics students and pre-medical students as summer research fellows. The Chair of the Recruitment Committee responds to numerous e-mails per year from prospective students.

## **11. Evaluation of Student Progress**

### **A. Master of Science Degree**

In order to obtain their master's degree, students must complete required courses, pass a Qualifying Examination and demonstrate ability as an independent worker by completing a Master's thesis.

By the end of Year 1 Fall semester, the student is expected to initiate the Mentor Identification Form within IMPACT. While the student is free to change mentors after the filing the Mentor Identification Form, submission of this form early will facilitate successful completion of the early milestones.

By the end of the Year 1 Fall semester and annually thereafter, a formal meeting between a student and his/her Thesis Mentor is expected. This discussion is intended to help ensure the integrity of the guiding principles and milestones that promote and support a positive mentoring relationship. This meeting will be documented by the signing and official filing of the Student-Mentor Compact in IMPACT. Although the Compact is not a legally binding contract, with their signatures, both the student and the mentor confirm that all topics listed in the Compact have been discussed and that they are committed to uphold the principles agreed upon. The signed form is to be reviewed by the GPRS COGS and then filed in the office of the GPRS Program Coordinator.

In addition to the Student-Mentor Compact, and also by the end of the student's Year 1 Fall semester and annually thereafter, a student is expected to review/discuss with the Thesis Mentor the GPRS Student Review form and official GSBS Milestones Agreement (in IMPACT). These two documents are provided for the purpose of confirming that the student and the student's supervising professor have been clearly informed that certain programmatic milestones are expected prior to receiving the master's degree and that there is an expected timeline to complete these milestones. That is, the student is expected to reach particular milestones within a specified time period in order to demonstrate satisfactory academic progress through the Program. Failure to demonstrate satisfactory academic progress may result in the student being placed on academic probation, or dismissal from the program.

### **B. Doctor of Philosophy Degree**

There are many steps along the path that students must complete in order to obtain their doctoral degree: complete required courses, pass a track specific Qualifying Examination, complete a dissertation proposal including an oral presentation, submit the proposal to an external funding agency for consideration, complete an independent research project, prepare a written dissertation, and orally defend their dissertation in a public forum.

By the end of Year 1 Fall semester, the student is expected to initiate the Mentor Identification Form within IMPACT. While the student is free to change mentors after the filing the Mentor Identification Form, submission of this form early will facilitate successful completion of the early milestones.

By the end of Year 1 Fall Semester, a formal meeting between a student and his/her dissertation mentor is expected. This discussion is intended to help ensure the integrity of the guiding principles and milestones that promote and support a positive mentoring relationship. This meeting will be documented by the signing and official filing of the Student-Mentor Compact Form within IMPACT. Although the Compact is not a legally binding contract, with their signatures, both the student and the mentor confirm that all topics listed in the Compact have been discussed and that they are committed to uphold the principles agreed upon. The signed form is to be reviewed by the GPRS COGS and then filed in the office of the GPRS Program Coordinator.

In addition to the Student-Mentor Compact, by the end of the student's Year 1 Fall semester, a student is expected to review/discuss with their supervising professor the official GSBS Milestones Agreement within IMPACT. This document is provided for the purpose of confirming that the student and the student's supervising professor (research advisor) have been clearly informed that certain programmatic milestones are expected prior to receiving the Ph.D. degree and that there is an expected timeline to complete these milestones. That is, the student is expected to reach particular milestones within a specified time period in order to demonstrate satisfactory academic progress through the Program. Failure to demonstrate satisfactory academic progress may result in the student losing funding, being placed on academic probation, or dismissal from the program.

The progress of all students enrolled in the program is evaluated annually to ensure timely and consistent progress through the study plan prepared by the student and his/her research advisor. This evaluation is based on course grades, timely and successful completion of components of the Qualifying Examination and acceptable demonstration of the student's progress in undertaking independent research. Failure to maintain a 3.0 GPA results in a notation of "Academic Probation" on the student's transcript until the GPA is satisfactory. Students on academic probation are not allowed to sit for the Qualifying Examination. Faculty members give their judgments concerning the research potential of their students but with specific examples of performance to substantiate their evaluation.

The annual student evaluation process is undertaken late in the calendar year. The advisor and student meet to review the student's progress, filling out and signing the standard Radiological Sciences Student Review form, which includes the advisor's assessment of the student's academic performance as either acceptable or unacceptable. Traditionally, this process is completed at the same time as the GSBS Milestone document in IMPACT. The student then submits the form to the Academic Program Coordinator for review at the next COGS meeting. The information on this form is maintained in a database in the GPRS office. If progress is unacceptable for any reason, corrective action is proposed, and the student is informed concerning the COG's decision. The first negative evaluation is cautionary while two such annual evaluations in sequence may be taken as grounds for dismissal from the program. The following list of factors have caused decisions of unacceptable progress in recent years: (1) inadequate GPA, (2) failure to pass written portions of the Qualifying Examination, (3) failure to take the Qualifying Examination in a timely manner, (4) failure to make progress in pursuing a research topic, and (5) failure to take sufficient course work to qualify for progress in part-time status (minimum of 3 credits per semester). Inadequate research performance is reviewed with great care to avoid the possibility of faculty bias or personality conflict, involving contributions of multiple faculty members who have worked with the student in question. A majority of the COGS must agree before an inadequate progress decision is made.

## **12. *New Student Orientation***

New student orientation is integrated with the orientation program conducted by the Office of Student Life. This program takes three half-days in the week before classes start. The program consists of lectures and presentations on the policies, facilities and services at the University.

One day in this program is devoted to a specific introduction of new students to the GPRS with a luncheon sponsored by the Radiology Department's Education Division at which all faculty and students in the program may meet for the first time. All new students tour the various research and clinical facilities used by the GPRS. At the end of this week the GSBS holds convocation, at which a guest speaker gives them some words of encouragement as the students begin their adventures in graduate school. After the convocation, the Graduate



Student Association sponsors a graduate school picnic at which the new students can continue to develop relationships with faculty and student peers.

Typically, the Director of Radiological Sciences schedules an appointment with each new student within the first semester to go over their specific study plans and research goals. The student is advised of policies regarding ID badges, e-mail usage, mailboxes, keys to labs and offices, required forms, computer usage and lockers.

An annual GPRS Fall Gathering is also held on a weekend during the school year, open to students, faculty members and their families so that all can get to know each other better and to continue to build a sense of community.

### **13. Safety**

In addition to the safety topics covered in orientation sessions, students may also be required to complete training in a number of safety topics, as appropriate to the research laboratory or clinical setting in which they are working. Training offered by the Department of Environmental Health and Safety includes basic radiation safety orientation, radioisotope user's safety course, laser safety course, x-ray safety, weekly wipe test refresher course, laboratory safety and hazardous waste generators, chemical waste: monitoring and disposal, basic biological safety and basic training on blood-borne pathogens.

### **14. Policy for Vacation and Sick Leave for Graduate Students**

Because of the unique relationship between a graduate student's status as a full-time student and as a half-time employee of the University of Texas, **Graduate Research Assistants do not accrue official vacation or sick leave.** The policy of the Graduate School of Biomedical Sciences (GSBS) is that each student will be allowed to take only official GSBS holidays. However, students of the Graduate Program for Radiological Sciences (GPRS) may be given permission by their supervising professor to take time off for up to 7 additional days during the year. Additional time off may be allowed on a case-by-case basis for extended sick leave, personal leave, or time for international travel to visit family. Such additional leave must be approved by a student's supervising professor and GPRS leadership along with an understanding that there will be no lapse in satisfying academic and research related requirements. The GPRS leadership should be informed of any leave that extends beyond three days through the submission of the GPRS Leave Request Form that includes the signatures of both the student and the student's supervising professor.

### **15. Policy for Withdrawal from Graduate Program**

#### **A. Withdrawal or Leave of Absence from the Graduate Program**

In the case of a withdrawal or requesting a leave of absence, the student shall notify the GPRS by submitting a letter to the Program Director or COGS Chair describing her/his intentions to clear campus. This letter will be submitted to the GPRS COGS for approval and a letter detailing the COGS recommendation for withdrawal or leave of absence will then be sent directly to the GSBS Dean.

Once approved by the GSBS Dean, the student will be informed and should follow the clearance checklist described below as well as initiate the "Student Clearance Form" in My Student Center.

#### **B. Graduation from the Graduate Program**

Once the student has been approved for graduation by the GSBS Dean, the clearance checklist below should be completed. Failure to complete all areas will result in a "Hold" on

the student's official transcript. Note that this clearance process cannot be completed in a single day and the student should plan accordingly.

### **C. Clearance Checklist for GSBS and GPRS**

1. It is the student's responsibility to obtain clearance in appropriate areas listed on the form such as the library, laboratories, university police, financial aid, bursar's office, etc.
2. If the student is receiving financial aid or has student financial aid debt, an exit interview must be scheduled with the Financial Aid Office to work out repayment schedules, etc.
3. If the student is international, they must notify the Office of International Students.
4. Return any books or materials to the Radiology Library Center
5. Turn in any lab coat(s) issued for your use by Linen Services
6. Drop off any University lab or office keys, parking permit and ID to the University Police.
7. Complete the GPRS Exit Interview Form online.

Please leave name, address and phone number of your new employer with the Program Coordinator and, if you have not cleared through the University, proceed to the Dean of the Graduate School of Biomedical Sciences for further instructions.

## **16. Faculty**

### **A. Faculty Assignments**

The Program assigns faculty into two categories: Core faculty and faculty-at-large. Core faculty are defined as faculty who direct courses or are authorized to advise graduate students and chair Supervising Committees. Those members listed as *Faculty-at-Large* have at least two contact lecture hours per year or participate on Supervising Committees. The faculty assignments are reviewed each August by the Program Director. Recommendations for removals are discussed at the Committee on Graduate Studies (COGS).

### **B. Advisors\***

Core faculty members are authorized to advise the research theses and/or dissertations of students in radiological sciences. Students are notified of their advisor and are asked to schedule to meet with them. The student is asked to discuss study plans with their advisor at least once a year but preferably twice a year. Each student has the option at any time of changing faculty advisor simply by submitting a new Mentor Identification Form in Impact for approval by GPRS COGS.

Advisors report on their students at the end of each calendar year to the Track Chair, who then reports to the GPRS COGS at its monthly meeting. If a student's progress is not acceptable, the advisor documents this and develops an action plan with the student. The student is given a year to improve and is then re-evaluated. For more information, please refer to Section 11 of this document.