

# SPECIAL IMAGING – CERTIFICATES

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The Division of Special Imaging oversees the following certificate programs.

## Overview of programs

### Cardiac and vascular imaging (CVI)

Cardiac interventional and vascular interventional technologists work in a highly specialized field operating sophisticated imaging equipment. This technology provides detailed fluoroscopic images of the human body, assisting physicians with quality patient diagnosis and treatment.

The Cardiac and Vascular Imaging Program is a full-time, 12-month certificate that requires four quarters beginning in autumn. During the program, students receive structured coursework along with clinical instruction. There are no arrangements for part-time or evening status. Clinical sites are available in a variety of regions in Southern California. The University cannot guarantee that the student will be assigned close to their residence.

The program's load requires 40 hours per week, which includes didactic and clinical experience—the latter involving up to four 8-hour days per week. Didactic courses are 100 percent online. Clinical affiliation courses require the student to be at the affiliated hospitals.

### Computed tomography (CT) and magnetic resonance imaging (MRI)

Computed tomography (CT) and magnetic resonance imaging (MRI) technologists work in a highly specialized field operating sophisticated computerized tomography equipment. This technology provides detailed cross-sectional images of the human body—assisting physicians with quality patient diagnosis and treatment. These full-time programs are scheduled as follow:

CT—the six-month certificate program is completed in two quarters (Autumn and Winter). An additional quarter of clinic may be available to students who have not met program requirements, at the discretion of the program director in collaboration with the student.

MRI—the six-month certificate program requires two quarters beginning Spring Quarter or Autumn Quarter. An additional quarter of clinic may be available to students who have not met program requirements, at the discretion of the program director in collaboration with the student. A nine-month, part-time option is available for qualified students. This three-quarter option begins in the Autumn Quarter.

CT/MRI—this twelve-month certificate program is completed in four academic quarters (Autumn through Summer). An additional quarter of clinic may be available to students who have not met program requirements, at the discretion of the program director in collaboration with the student.

During the program, students take formal coursework along with clinical instruction. There are no arrangements for part-time or evening status.

Clinical sites are available in a variety of regions in Southern California. However, the University cannot guarantee that the student will be placed close to their residence.

The program's load requires 40 hours per week, which includes didactic education and clinical experience. Clinical experience includes four, eight-hour days per week. Classes are scheduled for one day per week and may require the student to be on campus.

Students will be required to submit current immunization records and undergo a background check during the registration process. Further details regarding these two requirements can be found in the Admission Policies and Information (<http://llucatalog.llu.edu/about-university/admission-policies-information/#admissionrequirements>) section of this CATALOG. Students will be responsible for paying fees associated with immunizations and background checks. Loma Linda University and the Department of Radiation Technology cannot guarantee employment.

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## Program learning outcomes

Upon completion of the program, the graduate should be able to:

1. Model the ethics, values, and attitudes of special imaging professionals in communication, interactions, and professional behaviors.
2. Demonstrate clinical competency, professional skills, and life-long learning in the chosen special imaging modality.

## The imaging student profile

- Enthusiastic and interested in maintaining high standards of academics, clinical performance, and patient care.
- Possesses a broad knowledge of human anatomy and computer skills.
- Demonstrates strong academic performance in science and related courses.
- Detail-oriented and able to work under pressure, while demonstrating critical-thinking and problem-solving skills.

## Admissions

Admission is based on a selective process. In addition to Loma Linda University (<http://llucatalog.llu.edu/about-university/admission-policies-information/#admissionrequirements>) and School of Allied Health Professions admissions requirements (<http://llucatalog.llu.edu/allied-health-professions/#generalregulationstext>), the applicant must also complete the following requirements:

- Current ARRT registry in Radiography (R)\*
- Current California (CRT) license\*
- Current BLS card with the American Heart Association
- A minimum G.P.A. of 2.5 maintained in all didactic and clinical course work
- A minimum of twelve hours of observation in each modality. The career observation form is available as a download from the forms page on the website.
- Venipuncture is highly recommended

\* An applicant who is completing a program in radiologic technology prior to the start of the program may apply as long as they have completed ARRT, CRT, and CPR requirements by the program start date.

Applicants who are eligible to take the ARRT examination for certification but who have not had opportunity to do so are given provisional status for one quarter. Eligibility to continue is subject to student's obtaining certification. It should be understood that the University will not sign or validate registry documents of students who obtained their training in another program.

Students interested in using one of these certificates as part of their Bachelor of Science degree should review the Radiation Sciences, BS program.

## Application dates

1. Applications are accepted starting January 1st of each year.
2. Deadlines for applications are
  - a. May 1 for CT-only applicants, MRI-only fall-start applicants, and CT/MRI combined applicants
  - b. December 1 for MRI-only spring-start applicants
  - c. June 30 for CVI applicants
3. Applicants should submit applications early since interview slots are limited.

## Interviews

CVI interviews are conducted in June or July. CT and MRI interviews are conducted in July for fall-start applicants and January for MRI-only spring-start applicants. Qualified applicants will be interviewed by the program director and representatives of the School of Allied Health Professions. Applicants residing in Southern California should plan for personal interviews on campus at Loma Linda. Applicants will be notified by telephone and/or email of their interview schedules. Due to the limited number of interview dates/times, you will be assigned an interview slot, and you should plan around your interview as alternate dates/times are not available. Applicants are rated in the following four areas:

- Work experience or training background
- Recommendations
- Academic record
- Communication skills, knowledge, and motivation.

## Selection

After applicants have been interviewed, the selection committee for the CVI, CT, and MRI programs meet to make final selections. Selections are usually decided by the mid-July for fall-start applicants and early February for spring-start applicants, and confirmation of each decision is mailed to the respective applicant from the Office of Admissions for the School of Allied Health Professions.

## Program requirements

Cardiac and Vascular Imaging (CVI) – Certificate (<http://llucatalog.llu.edu/allied-health-professions/special-imaging-cvi-certificate/>)

Computed Tomography (CT) – Certificate (<http://llucatalog.llu.edu/allied-health-professions/special-imaging-ct-certificate/>)

Magnetic Resonance Imaging (MRI) – Certificate (<http://llucatalog.llu.edu/allied-health-professions/special-imaging-mri-certificate/>)

CT/MRI – Certificate (<http://llucatalog.llu.edu/allied-health-professions/special-imaging-ctmri-certificate/>), Comparison (<http://llucatalog.llu.edu/allied-health-professions/special-imaging-comparison-ct-mri-certificate/>)

## Courses

### RTSI 307. Introduction to Computed Tomography. 2 Units.

Provides an overview of patient care in CT imaging, general aspects of patient care, pharmacology and drug administration, and radiation safety as a final requirement of the CT certificate. Examines some areas of radiology management. Prepares students for the additional areas required in the National Registry for the specialty area of CT. Prerequisite: Completion of the LLU Medical Radiography Program. Prerequisite: RTMR 305, RTMR 306.

### RTSI 344. Pharmacology for Imaging Professionals. 4 Units.

Examines various pharmacological agents currently used in diagnosis and treatment during various imaging studies. Emphasizes laboratory values relevant to interventional studies.

### RTSI 345. Cardiac/Interventional Procedures. 3 Units.

Examines the principles of cardiac interventional imaging to students who wish to become registered CI technologists. Includes the concepts of cardiac interventional procedures and how to operate safely in an operating room environment.

### RTSI 351. Angio/Interventional Procedures I. 3 Units.

Analyzes the principles of vascular radiology, including proper patient care, the fundamentals of properly setting up a sterile table, and evaluation of the equipment most commonly used in the interventional suite. Examines the functions of a pressure injector and explores the procedures performed in vascular intervention.

### RTSI 352. Angio/Interventional Procedures II. 3 Units.

Continues RTSI 351. Focuses on the procedures performed in the interventional laboratory. Analyzes the different types of pathologies observed in patients in order to determine the appropriate diagnostic and interventional examinations to be performed.

### RTSI 356. Vascular Anatomy and Physiology. 3 Units.

Explores normal and pathological vascular anatomy and physiology. Emphasizes intracranial, extracranial, spinal, aorta, pulmonary, abdominal, pelvic, and extremity vascular structures; as well as abnormalities of the vascular system.

### RTSI 359. Vascular Imaging Review. 1 Unit.

A comprehensive review for the ARRT examination in vascular interventional radiography (VI). Prerequisite: RTSI 351, RTSI 356.

### RTSI 360. Cardiac Imaging Review. 1 Unit.

A comprehensive review for the ARRT examination in cardiac interventional radiography (CI). Prerequisite: RTSI 345.

### RTSI 361. MRI Physics I. 2 Units.

Two-part course dealing with basic principles, physics, imaging parameters, biological effects, management, and patient protocol of magnetic resonance imaging (MRI).

### RTSI 362. MRI Physics II. 2 Units.

Basic principles, physics, imaging parameters, biological effects, management, and patient protocol of magnetic resonance imaging (MRI). Prerequisite: RTSI 361.

**RTSI 364. CT Patient Care and Procedures. 2 Units.**

Overview of patient care in CT imaging. General aspects of patient care, pharmacology and drug administration, radiation safety. Examines some areas of radiology management. Prepares students for the additional areas required in the national registry for the specialty areas of CT.

**RTSI 365. MRI Patient Care and Procedures. 2 Units.**

Includes patient care, safety, pharmacology, quality control, and procedures involved with magnetic resonance imaging (MRI) for MRI technologists.

**RTSI 367. Cross-sectional Radiographic Anatomy. 2 Units.**

Overview of gross anatomy. Identifies normal anatomy in two-dimensional as well as three-dimensional planes. Relation of the structural as well as the physiological functions of the different body systems.

**RTSI 369. CT Physics. 2 Units.**

Basic principles, physics, imaging parameters, radiological effects, management, and patient protocol of computed tomography (CT).

**RTSI 384. Topics in Special Imaging. 1-3 Units.**

Lecture and discussion of a current topic in special imaging bearing on the theory or practice of one aspect of the discipline. Specific content varies from quarter to quarter.

**RTSI 455. Directed Study in Special Imaging. 1 Unit.**

Each student will be assigned three specialized imaging topics for the quarter. Requires submission of an Independent Study Proposal (ISP) and weekly meeting with instructor to review progress toward meeting the commitments within the ISP.

**RTSI 456. MRI Certification Review. 1 Unit.**

Provides a comprehensive review for the ARRT examination in magnetic resonance imaging (MRI).

**RTSI 457. CT Certification Review. 1 Unit.**

Provides a comprehensive review for the ARRT examination in computed tomography (CT).

**RTSI 970. Special Imaging (CT/MRI) Affiliation. 2,3 Units.**

A two- or four-days/week clinical rotation totaling 160-240 hours of clinical experience in CT (computerized tomography) and/or MRI (magnetic resonance imaging) covering a wide variety of technical procedures.

**RTSI 975. Cardiac/Interventional (CVI) Affiliation. 3 Units.**

Provides a four-day-per-week clinical rotation totaling 320 hours of clinical experience in cardiac and/or interventional radiology. Covers a wide variety of technical procedures.