

# RADIATION THERAPY TECHNOLOGY – BS

## Program director

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## Clinical coordinator

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Radiation therapy, or radiation oncology, is the medical use of ionizing radiation to treat cancer and control malignant cell growth. Radiation therapy is commonly combined with other modes of treatment for cancer, such as surgery, chemotherapy, and hormone therapy. Radiation therapists should be able to think critically, be proficient with computers, and able to work with a treatment team. Patient care and empathy are also important assets. The program is intended for radiographers or other allied health, patient-centered professionals who seek additional specialization, or for non-ARRT (American Registry of Radiologic Technologists) students who meet the prerequisites and would like to complete a bachelor's degree in radiation therapy.

## Mission

The mission of the Bachelor of Science degree in radiation therapy is to prepare professionals in the field of radiation therapy who have received broad education and training in all aspects of the profession. This will include critical thinking, clinical competence, effective communication, and professionalism as they apply to the field of radiation therapy. The program encourages intellectual, physical, social, and spiritual development by emphasizing these in its curriculum—all of which reflect the motto of Loma Linda University Health, "To Make Man Whole."

## Program goals

By the end of this program, the graduate should be able to:

1. Demonstrate critical thinking.
2. Be clinically competent.
3. Demonstrate effective verbal communication skills.
4. Demonstrate effective written communication skills.
5. Demonstrate professionalism.
6. Demonstrate ability to perform quantitative reasoning.

## Program learning outcomes

By the end of this program, the graduate should be able to:

1. Optimize daily treatment images to ensure their congruence with the treatment-planning CT.
2. Apply oncology theory to understanding patient case histories and treatment plans.
3. Complete morning quality assurance tests and recognize when results are out of tolerance.
4. Educate patients, and maximize their comfort and safety.
5. Perform treatment sequences accurately.
6. Verify treatment console data and track all variables on the screen.
7. Treat all persons with respect as well as accept responsibility and accountability for actions.

8. Demonstrate knowledge of the Health Insurance Portability and Accountability Act (HIPAA) of 1996.
9. Accept responsibility and accountability for actions.

## CPR certification

Students are required to have current health-care provider adult, child, and infant cardiopulmonary resuscitation (CPR) certification for all scheduled clinical experience. CPR certification must be completed at the American Heart Association health-care provider level and must be completed prior to beginning the program of study. Classes are available on campus at Life Support Education, University Arts building, 24887 Taylor Street, Suite 102.

## Accreditation

The Radiation Therapy Technology Program is accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT), 20 North Wacker Drive, Suite 900, Chicago, IL 60606-2901; telephone: 312/704-5300; website: [www.jrcert.org](http://www.jrcert.org) (<http://www.jrcert.org>).

## Admissions

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

- Prerequisite courses as listed below.
- Complete the prerequisite requirements, or be a graduate of an accredited radiologic technology program who has completed the prerequisite requirements in conjunction with that program.
- 24 hours of career observation in a radiation oncology department.
- G.P.A. of 3.0 or better, higher is more competitive.
- Admissions essay.
- Interview.

## Prerequisite courses

Prerequisites are listed as they relate to general education domains. All courses must be completed at an accredited college or university prior to entering the program. Please note: C- grades are not transferable for credit.

### Domain 1: Religion (8 quarter units)

(Completed during enrollment at LLU)

### Domain 2: Arts and humanities (minimum 16 quarter units)

Units must be selected from at least three of the following content areas: civilization/history, art, literature, language, philosophy, religion, or general humanities electives. A minimum of 3 quarter units in an area is required to meet a "content area."

### Domain 3: Scientific inquiry and quantitative reasoning (minimum 12 quarter units)

- College algebra (completed within five years with a minimum grade of B).
- Human anatomy and physiology with laboratory, complete sequence (two course minimum)
- Introductory physics at the college level (one quarter/semester)

**Domain 4: Social sciences (minimum 12 quarter units)**

- General psychology or developmental psychology.
- Select addition units from two of the following content areas: anthropology, economics, geography, political sciences, psychology, and sociology.
- The human diversity requirement is fulfilled in the portfolio core courses: RTCH 491 Portfolio I and RTCH 492 Portfolio II (approved by the University GE Committee).

**Domain 5: Written and oral communication (minimum 9 quarter units)**

- English composition, complete sequence that meets the baccalaureate degree requirements of a four-year college or university
- Other areas of study in communication may include courses in computer information systems, critical thinking, and public speaking.

**Domain 6: Health and wellness (minimum 2 quarter units)**

- A didactic course in health or nutrition (e.g., personal health, personal nutrition, population health, global health, and community nutrition) minimum of 2 units
- Physical education. Must include at least two separate physical activity courses totaling a minimum of one quarter units.

**Other**

- Medical terminology
- Radiation physics, radiation protection, principles of radiography, and patient care methods - available, as part of the program, for non-ARRT students the first Summer Quarter (ARRT students start Autumn Quarter).

**Electives**

Electives may be needed to meet the minimum requirements of 192 quarter units. A maximum of 105 quarter units may be transferred from a community/junior college.

- ARRT-certified students will earn 89 units in the program. (prerequisite units required: 102 quarter/68 semester)
- non-ARRT-certified students will earn 103 units in the program. (prerequisite units required: 90 quarter/60 semester)

Electives may be selected from the GE domains listed above. For more information regarding GE requirements for graduation, see LLU general education requirements (<http://llucatalog.llu.edu/about-university/division-general-studies/>).

## Program requirements

### ARRT certified students

**First Year****Autumn Quarter**

RTCH 491	Portfolio I	3
RTTH 344	Radiation Therapy Procedures	2
RTTH 355	Physical Principles of Radiation Therapy I	3
RTTH 364	Radiation Oncology I	2
RTTH 371	Radiation Therapy Affiliation I	2

**Winter Quarter**

RTCH 387	Writing for Health-Care Professionals	3
RTTH 342	Patient-Care Practices in Radiation Therapy	2
RTTH 356	Physical Principles of Radiation Therapy II	3

RTTH 365	Radiation Oncology II	2
RTTH 372	Radiation Therapy Affiliation II	3

**Spring Quarter**

AHCJ 403	Pathology II	3
AHRM 475	Health-Care Research and Statistics	4
RTTH 357	Applied Dosimetry	2
RTTH 366	Radiation Oncology III	2
RTTH 373	Radiation Therapy Affiliation III	3

**Second Year****Summer Quarter**

RELT 406	Adventist Beliefs and Life	3
RTTH 354	Quality Assurance in Radiation Therapy	2
RTTH 474	Radiation Therapy Affiliation IV	5
AHCJ 318	Emotional Intelligence and Leadership Skills for Health-Care Professionals	3

**Autumn Quarter**

RELR 409	Christian Perspectives on Death and Dying	3
RTSI 367 <sup>1</sup>	Cross-sectional Radiographic Anatomy	2
RTSI 369 <sup>1</sup>	CT Physics	2
RTTH 332	Radiation Biology	2
RTTH 475	Radiation Therapy Affiliation V	5

**Winter Quarter**

RELT 415	Christian Theology and Popular Culture	2
RTCH 464	Moral Leadership	3
RTSI 364 <sup>1</sup>	CT Patient Care and Procedures	2
RTTH 476	Radiation Therapy Affiliation VI	4
RTCH 467	Management of a Radiologic Service	3

**Spring Quarter**

RTCH 492 <sup>2</sup>	Portfolio II	3
RTTH 348	Radiation Therapy Review	2
RTTH 477	Radiation Therapy Affiliation VII	4

**Total Units:** **89**

<sup>1</sup> The CT sequence (RTSI 364, RTSI 367, RTSI 369) may be substituted with the CT sequence (RTMR 305 Introduction to Computed Tomography I, RTMR 306 Introduction to Computed Tomography II, and RTSI 307 Introduction to Computed Tomography Completion Course) completed by LLU's ASMR students.

<sup>2</sup> Fulfills service learning requirement.

### Non-ARRT certified students

**First Year****Summer Quarter**

AHCJ 326	Fundamentals of Health Care	2
RTCH 284	Basic Imaging	3
RTCH 284L	Radiation Clinical Basics Laboratory	1
RTCH 285	The Principles and Physics of Radiation	4
RTMR 224	Legal Issues in Medical Radiography	1
RTMR 284	Radiation Protection and Biology	2
RTCH 305	CT Fundamentals	2

**Autumn Quarter**

RTCH 491	Portfolio I	3
RTTH 344	Radiation Therapy Procedures	2

RTTH 355	Physical Principles of Radiation Therapy I	3
RTTH 364	Radiation Oncology I	2
RTTH 371	Radiation Therapy Affiliation I	2
<b>Winter Quarter</b>		
RTCH 387	Writing for Health-Care Professionals	3
RTTH 342	Patient-Care Practices in Radiation Therapy	2
RTTH 356	Physical Principles of Radiation Therapy II	3
RTTH 365	Radiation Oncology II	2
RTTH 372	Radiation Therapy Affiliation II	3
<b>Spring Quarter</b>		
AHCJ 403	Pathology II	3
AHRM 475	Health-Care Research and Statistics	4
RTTH 357	Applied Dosimetry	2
RTTH 366	Radiation Oncology III	2
RTTH 373	Radiation Therapy Affiliation III	3
<b>Second Year</b>		
<b>Summer Quarter</b>		
AHCJ 318	Emotional Intelligence and Leadership Skills for Health-Care Professionals	3
RELT 406	Adventist Beliefs and Life	3
RTTH 474	Radiation Therapy Affiliation IV	5
RTTH 354	Quality Assurance in Radiation Therapy	2
<b>Autumn Quarter</b>		
RELR 409	Christian Perspectives on Death and Dying	3
RTSI 367	Cross-sectional Radiographic Anatomy	2
RTSI 369	CT Physics	2
RTTH 332	Radiation Biology	2
RTTH 475	Radiation Therapy Affiliation V	5
<b>Winter Quarter</b>		
RELT 415	Christian Theology and Popular Culture	2
RTCH 464	Moral Leadership	3
RTCH 467	Management of a Radiologic Service	3
RTSI 364	CT Patient Care and Procedures	2
RTTH 476	Radiation Therapy Affiliation VI	4
<b>Spring Quarter</b>		
RTCH 492 <sup>2</sup>	Portfolio II	3
RTTH 348	Radiation Therapy Review	2
RTTH 477	Radiation Therapy Affiliation VII	4
<b>Total Units:</b>		<b>104</b>

<sup>1</sup> May be substituted with another RELR course.

<sup>2</sup> Fulfills service learning requirement.

A minimum grade of C (2.0) is required for all courses in this program.

## Normal time to complete the program

Four (4) years – Based on full-time enrollment, a student who is a radiologic technologist (ARRT) completes the LLU portion of the program in seven (7) quarters. A student who is not a radiologic technologist (Non-ARRT) starts one quarter earlier and will complete in eight (8) quarters.

## Courses

### RTTH 332. Radiation Biology. 2 Units.

2 The effects of radiation on living systems.

### RTTH 342. Patient-Care Practices in Radiation Therapy. 2 Units.

3 Aspects of radiation therapy patient care. Emphasizes equipment, treatment, and psychological support of the patient. Transmission and prevention of AIDS and other communicable diseases, with specific application to radiation therapy.

### RTTH 344. Radiation Therapy Procedures. 2 Units.

3 Study and/or practical applications of patient support and immobilization devices. Principles of choosing patient-treatment modalities. Methods of tumor localization. Purposes and utilization of beam direction and modification equipment.

### RTTH 348. Radiation Therapy Review. 2 Units.

2 Comprehensively reviews radiation physics, protection, and dosimetry.  
3 Applies radioactive materials. Radiobiology. Technical aspects of radiation oncology.

### RTTH 354. Quality Assurance in Radiation Therapy. 2 Units.

3 Focuses on quality improvement in radiation oncology. Emphasizes development of a culture of safety through continuous quality improvement (CQI) for clinical and technical aspects of patient care, including treatment delivery and localization equipment, treatment planning equipment, and electronic medical records. Discusses the role of various radiation therapy team members in CQI, and legal and regulatory implications for provision of services.

### RTTH 355. Physical Principles of Radiation Therapy I. 3 Units.

2 Nature and description of the structure of matter and energy. Radioactive decay schemes and interaction of photons and gamma radiation.  
2 Instrumentation involved in measurement of ionizing radiation, beam quality, and dose. Laboratory.

### RTTH 356. Physical Principles of Radiation Therapy II. 3 Units.

2 Discusses the following areas: calibration techniques of photon, particulate, and electron beams; percentage depth dose, tissue-air ratios, treatment planning, scatter functions, field flatness, and symmetry; field shaping, arc therapy, and tissue inhomogeneities; clinical dosimetric considerations. Includes laboratory.

### RTTH 357. Applied Dosimetry. 2 Units.

4 Brachytherapy sources, isotope calibration, protection, and implantation techniques. Teletherapy equipment and protection. Quality assurance for external and brachytherapy procedures. Laboratory.

### RTTH 364. Radiation Oncology I. 2 Units.

4 A three-term course covering pathology, etiology, epidemiology, histopathology, metastasis, staging, and treatment of major types of malignant neoplasms. Includes technique/simulation laboratory.

### RTTH 365. Radiation Oncology II. 2 Units.

4 A three-term course covering pathology, etiology, epidemiology, histopathology, metastasis staging, and treatment of major types of malignant neoplasms. Prerequisite: RTTH 364.

### RTTH 366. Radiation Oncology III. 2 Units.

4 The third in a three-quarter course covering pathology, etiology, epidemiology, histopathology, metastasis, staging, and treatment of major types of malignant neoplasms.

### RTTH 371. Radiation Therapy Affiliation I. 2 Units.

4 First of seven clinical affiliations.

### RTTH 372. Radiation Therapy Affiliation II. 3 Units.

4 Continues RTTH 371.

**RTTH 373. Radiation Therapy Affiliation III. 3 Units.**

Continues RTTH 371, 372.

**RTTH 474. Radiation Therapy Affiliation IV. 5 Units.**

Continues RTTH 371-373.

**RTTH 475. Radiation Therapy Affiliation V. 5 Units.**

Continues RTTH 371-373, 474.

**RTTH 476. Radiation Therapy Affiliation VI. 4 Units.**

Continues RTTH 371-373, 474-475.

**RTTH 477. Radiation Therapy Affiliation VII. 4 Units.**

Continues RTTH 371-373, 474-476.