

# 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 students with an A.S. degree in a science-based subject who meet the prerequisites.

## Mission

The mission of the Bachelor of Science degree in radiation therapy program 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 learning outcomes

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

1. Monitor changes in patient condition;
2. Interpret the isocenter shift from CT simulation data to treatment-planning data;
3. Apply critical thinking skills to analyze complex issues;
4. Perform daily QA;
5. Check that dosimetry data are accurately transferred to the electronic chart;
6. Recognize treatment changes;
7. Demonstrate effective verbal communications skills;
8. Demonstrate effective written communication skills;
9. Treat all persons with respect;
10. Demonstrate knowledge of HIPAA;
11. Accept responsibility and accountability for actions;
12. Demonstrates quantitative reasoning.

## 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 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/#admissionrequirements>) and School of Allied Health Professions admissions requirements (<http://llucatalog.llu.edu/allied-health-professions/#generalregulation>), the applicant must also complete the following requirements:

- Prerequisite courses as listed below.
- Must be either an ARRT registered radiographer (two-year minimum degree), a graduate of an accredited Allied Health Program with patient care experience (two-year minimum degree), or an associate degree (science area preferred), or the equivalent, and complete the following subjects at an accredited college or university prior to entering the program.
- 24 hours of career observation in a radiation oncology department.
- GPA of 3.0 or better, higher is more competitive.
- Admissions essay.
- Interview.

## Prerequisite courses

Applicants must complete the following subjects at an accredited college or university prior to entering the program. C- grades are not transferable for credit.

**Humanities** – 20 units minimum are needed prior to program entry. Choose a minimum of three areas from the following subjects: history, literature, philosophy, foreign language, art/music appreciation/history. Included in this minimum are four units of religion per year of attendance at a Seventh-day Adventist college or university. Eight units of religion are included in the B.S. degree core as a co-requisite. A total of 28 quarter units are required.

**Natural Sciences** – The study of natural sciences must include a minimum of 12 units.

- Human anatomy and physiology with laboratory, complete sequence (required).
- College algebra (within three years with a minimum grade of B) (required).
- Introduction to physics (required).
- Select from the following content areas: biology, chemistry, geology, mathematics, physics, and statistics.

**Social Science** – must have a total of 12 quarter units of social science.

- General psychology (required)
- Select additional units from: economics, geography, political science, psychology, sociology, or anthropology.

**Communication** – A minimum of nine units are needed to complete this area.

- English composition, complete sequence.
- Speech

**Health and Wellness** – Personal health or nutrition and two physical activity courses are required to meet the minimum of three quarter units.

**Other required courses:**

- 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** – may be needed to meet the minimum requirements of 192 quarter units. A minimum of 68 quarter units must be taken from general education areas listed above (i.e., humanities, natural sciences, social sciences, communication, and health and wellness). 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)

For total unit requirements for graduation, see LLU General Education Requirements (<http://llucatalog.llu.edu/about-university/division-general-studies/#courserequirementstext>).

## Program requirements

### ARRT certified students

#### First Year

##### Autumn Quarter

AHCJ 493	Senior 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 332	Radiation Biology	2
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
RTCH 467	Management of a Radiologic Service	3

RTTH 354	Quality Assurance in Radiation Therapy	2
RTTH 474	Radiation Therapy Affiliation IV	5

##### 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 475	Radiation Therapy Affiliation V	5

##### Winter Quarter

AHCJ 318	Emotional Intelligence and Leadership Skills for Health-Care Professionals	3
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

##### Spring Quarter

AHCJ 494 <sup>2</sup>	Senior 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

		Units
AHCJ 326	Fundamentals of Health Care	2
RTCH 283	Basic Imaging	2
RTCH 283L	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

AHCJ 493	Senior 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 332	Radiation Biology	2

RTTH 357	Applied Dosimetry	2	<b>RTTH 354. Quality Assurance in Radiation Therapy. 2 Units.</b>
RTTH 366	Radiation Oncology III	2	Focuses on quality improvement in radiation oncology. Emphasizes
RTTH 373	Radiation Therapy Affiliation III	3	development of a culture of safety through continuous quality
<b>Second Year</b>			improvement (CQI) for clinical and technical aspects of patient care,
<b>Summer Quarter</b>			including treatment delivery and localization equipment, treatment
AHCJ 318	Emotional Intelligence and Leadership Skills for	3	planning equipment, and electronic medical records. Discusses the
	Health-Care Professionals		role of various radiation therapy team members in CQI, and legal and
RELT 406	Adventist Beliefs and Life	3	regulatory implications for provision of services.
RTTH 474	Radiation Therapy Affiliation IV	5	<b>RTTH 355. Physical Principles of Radiation Therapy I. 3 Units.</b>
RTTH 354	Quality Assurance in Radiation Therapy	2	Nature and description of the structure of matter and energy. Radioactive
<b>Autumn Quarter</b>			decay schemes and interaction of photons and gamma radiation.
RELR 409	Christian Perspectives on Death and Dying	3	Instrumentation involved in measurement of ionizing radiation, beam
RTSI 367	Cross-sectional Radiographic Anatomy	2	quality, and dose. Laboratory. Cross-listing: RTMD 355.
RTSI 369	CT Physics	2	<b>RTTH 356. Physical Principles of Radiation Therapy II. 3 Units.</b>
RTTH 475	Radiation Therapy Affiliation V	5	Discusses the following areas: calibration techniques of photon,
<b>Winter Quarter</b>			particulate, and electron beams; percentage depth dose, tissue-air ratios,
RELT 415	Christian Theology and Popular Culture	2	treatment planning, scatter functions, field flatness, and symmetry; field
RTCH 464	Moral Leadership	3	shaping, arc therapy, and tissue inhomogeneities; and clinical dosimetric
RTCH 467	Management of a Radiologic Service	3	considerations. Includes laboratory. Prerequisite: RTTH 364, RTTH 365.
RTSI 364	CT Patient Care and Procedures	2	Cross-listing: RTMD 356.
RTTH 476	Radiation Therapy Affiliation VI	4	<b>RTTH 357. Applied Dosimetry. 2 Units.</b>
<b>Spring Quarter</b>			Brachytherapy sources, isotope calibration, protection, and implantation
AHCJ 494	Senior Portfolio II	3	techniques. Teletherapy equipment and protection. Quality assurance for
RTTH 348	Radiation Therapy Review	2	external and brachytherapy procedures. Laboratory.
RTTH 477	Radiation Therapy Affiliation VII	4	<b>RTTH 364. Radiation Oncology I. 2 Units.</b>
<b>Total Units:</b>		<b>103</b>	A three-term course covering pathology, etiology, epidemiology,

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

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.

The effects of radiation on living systems.

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

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.

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.

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

- RTTH 354. Quality Assurance in Radiation Therapy. 2 Units.**  
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.**  
Nature and description of the structure of matter and energy. Radioactive decay schemes and interaction of photons and gamma radiation. Instrumentation involved in measurement of ionizing radiation, beam quality, and dose. Laboratory. Cross-listing: RTMD 355.
- RTTH 356. Physical Principles of Radiation Therapy II. 3 Units.**  
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; and clinical dosimetric considerations. Includes laboratory. Prerequisite: RTTH 364, RTTH 365. Cross-listing: RTMD 356.
- RTTH 357. Applied Dosimetry. 2 Units.**  
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.**  
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.**  
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.**  
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.**  
First of seven clinical affiliations.
- RTTH 372. Radiation Therapy Affiliation II. 3 Units.**  
Continues RTTH 371.
- RTTH 373. Radiation Therapy Affiliation III. 3 Units.**  
Continues RTTH 371, 372.
- RTTH 374. Radiation Therapy Affiliation IV. 5 Units.**  
Continues RTTH 371-373.
- RTTH 375. Radiation Therapy Affiliation V. 5 Units.**  
Continues RTTH 371-373, 374.
- RTTH 376. Radiation Therapy Affiliation VI. 4 Units.**  
Continues RTTH 371-373, 374-375.
- RTTH 377. Radiation Therapy Affiliation VII. 4 Units.**  
Continues RTTH 371-373, 374-376.