RADIATION THERAPY TECHNOLOGY — BS

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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, work with computers, and be able to work with a treatment team. Patient care and empathy are also important assets. It is intended for radiographers or any other allied health, patient-centered professional who seeks additional specialization.

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 goals in its curriculum, which is reflected in 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 isocenter shift from CT sim 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 HIPPA.
11. Accept responsibility and accountability for actions.
12. Pass the ARRT examination.
13. Secure job placement within six months of graduation.

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)>.

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.
• 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 five 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.
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 90 units in the program.
- (prerequisite units required: 102 quarter/60 semester)
- non-ARRT-certified students will earn 102 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**
- AHJC 493 Senior Portfolio I
- RTTH 344 Radiation Therapy Procedures
- RTTH 355 Physical Principles of Radiation Therapy I
- RTTH 364 Radiation Oncology I
- RTTH 371 Radiation Therapy Affiliation I

**Winter Quarter**
- RTCH 387 Writing for Health-Care Professionals
- RTTH 342 Patient-Care Practices in Radiation Therapy
- RTTH 356 Physical Principles of Radiation Therapy II
- RTTH 365 Radiation Oncology II
- RTTH 372 Radiation Therapy Affiliation II

**Spring Quarter**
- AHJC 403 Pathology II
- AHRM 475 Health-Care Research and Statistics
- RTTH 332 Radiation Biology
- RTTH 357 Applied Dosimetry
- RTTH 366 Radiation Oncology III
- RTTH 373 Radiation Therapy Affiliation III

#### Second Year

**Summer Quarter**
- AHJC 318 Emotional Intelligence and Leadership Skills for Health-Care Professionals
- RELT 415 Christian Theology and Popular Culture
- RTTH 354 Quality Assurance in Radiation Therapy
- RTTH 474 Radiation Therapy Affiliation IV

**Autumn Quarter**
- RTSI 367 Cross-sectional Radiographic Anatomy
- RTSI 369 CT Physics
- RELT 423 or 436 Loma Linda Perspectives
- RTTH 475 Radiation Therapy Affiliation V

#### Winter Quarter
- RELT 425 Upper-division religion elective
- RTCH 464 Radiation Clinical Basics Laboratory
- RTCH 467 The Principles and Physics of Radiation
- RTSI 364 CT Patient Care and Procedures
- RTTH 476 Radiation Therapy Affiliation VI

#### Spring Quarter
- AHJC 494 Senior Portfolio II
- RELT 425 Upper-division religion elective
- RTTH 348 Radiation Therapy Review
- RTTH 477 Radiation Therapy Affiliation VII

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1. 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.

### Non-ARRT certified students

#### First Year

**Summer Quarter**
- AHJC 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**
- AHJC 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**
- AHJC 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
AHCJ 318  Emotional Intelligence and Leadership Skills for Health-Care Professionals
REL 415  Christian Theology and Popular Culture
RTTH 474  Radiation Therapy Affiliation IV
RTTH 354  Quality Assurance in Radiation Therapy

Autumn Quarter
REL 423 or  Loma Linda Perspectives
RTSI 367  Cross-sectional Radiographic Anatomy
RTSI 369  CT Physics
RTTH 475  Radiation Therapy Affiliation V

Winter Quarter
REL__ 4__ Upper-division religion elective
RTCH 464  Moral Leadership
RTCH 467  Management of a Radiologic Service
RTSI 364  CT Patient Care and Procedures
RTTH 476  Radiation Therapy Affiliation VI

Spring Quarter
AHCJ 494  Senior Portfolio II
REL__ 4__ Upper-division religion
RTTH 348  Radiation Therapy Review
RTTH 477  Radiation Therapy Affiliation VII

Total Units: 103

1 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.

RTTH 348. Radiation Therapy Review. 1,2 Unit.
Comprehensively reviews radiation physics, protection, and dosimetry. Applies radioactive materials. Radiobiology. Technical aspects of radiation oncology. Students beginning in Autumn of 2016 are required to take this course for two units.

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.

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 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.