

# RADIATION ONCOLOGY

---

In addition to fulfilling a diverse educational mission in training radiation oncologists, radiation biologists, and medical physicists, the Miller School of Medicine Department of Radiation Oncology is among the first academic radiation oncology departments in the country to host a degree-granting program in medical radiation dosimetry.

Medical radiation dosimetrists are highly skilled workers crucial to the practice of contemporary clinical radiation oncology. Their principal role is to create computerized treatment plans for the delivery of radiation by therapeutic radiation machines or by techniques using radionuclides, essentially creating instructions a treatment machine follows or a treatment procedure implements to deliver a prescribed radiation dose distribution to a patient. Success in this role requires that medical dosimetrists integrate several strands of theoretical and practical knowledge, including knowledge of rudiments of clinical oncology, radiation physics, radiation biology, human anatomy, and medical imaging, as well as the multiple and various technologies and techniques of the radiation oncology clinic.

Until recently, the education of medical dosimetrists had primarily been on the job, with trainees often being self-selected radiation therapy technologists already enjoying some of the knowledge dosimetrists must acquire. Since 2017, however, eligibility requirements for examination by the Medical Dosimetrist Certification Board (by passing which dosimetrists become Certified Medical Dosimetrists) have included graduation from a year-long medical dosimetry program accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT). The University of Miami Graduate Program in Medical Radiation Dosimetry, inaugurated in 2022, successfully received JRCERT accreditation in 2023.

For more information regarding the program and admissions, please visit: <https://med.miami.edu/graduate-studies/master-programs/ms-in-medical-radiation-dosimetry> (<https://med.miami.edu/graduate-studies/master-programs/ms-in-medical-radiation-dosimetry/>)

Program Contacts:

Joseph Both, PhD  
Graduate Program Director  
Assistant Professor, Radiation Oncology  
[jboth@med.miami.edu](mailto:jboth@med.miami.edu)  
305-243-8630

Alecia Chapin, M.A.  
Graduate Program Manager  
[amc911@med.miami.edu](mailto:amc911@med.miami.edu)  
305-243-4255

## Master's Programs in Radiation Oncology

- M.S. in Medical Radiation Dosimetry (<http://bulletin.miami.edu/graduate-academic-programs/medicine/radiation-oncology/medical-radiation-dosimetry-ms/>)

## Certificate Programs in Radiation Oncology

- Certificate in Medical Radiation Dosimetry (<http://bulletin.miami.edu/graduate-academic-programs/medicine/radiation-oncology/medical-radiation-dosimetry-certificate/>)

### RON 601. Clinical Oncology and Anatomy for Medical Dosimetry. 2 Credit Hours.

An introduction to the multidisciplinary practice and science of oncology including a site based description of disease and treatment strategy with a parallel introduction to human anatomy. CT and MR imaging anatomy for radiotherapy treatment planning.

**Components:** LEC.

**Grading:** GRD.

**Typically Offered:** Fall.

### RON 603. Radiation Biology for Medical Dosimetry. 2 Credit Hours.

An introduction to radiation biology with attention to clinically used concepts: fractionated survival models, oxygenation and radiation quality effects, cell and tissue kinetics, acute effects, normal tissue response, effective and equivalent dose, and therapeutic ratio.

**Components:** LEC.

**Grading:** GRD.

**Typically Offered:** Spring.

**RON 605. Quality and Safety in Radiotherapy. 2 Credit Hours.**

A general introduction to quality, its dimensions, management, and improvement followed by topics specific to radiotherapy: patient safety and error management, quality improvement, quality assurance, and equipment and patient-specific quality control.

**Components:** LEC.

**Grading:** GRD.

**Typically Offered:** Summer.

**RON 610. Radiation Oncology Physics I. 3 Credit Hours.**

The first of a sequence of two courses. The physics and technology of radiotherapy taught at a level appropriate for radiation oncology residents: topics in elementary physics, nuclear physics, interactions of photons, principles of dosimetry and dosimetric measurement, dosimetry and calibration of photon and electron beams, dose calculation, and brachytherapy.

**Components:** LEC.

**Grading:** GRD.

**Typically Offered:** Fall.

**RON 611. Radiation Oncology Physics II. 3 Credit Hours.**

The second of a sequence of two courses. The physics and technology of radiotherapy taught at a level appropriate for radiation oncology residents: topics in modulated external beam radiotherapy, stereotactic radiotherapy and radiosurgery, patient motion management, image guided radiotherapy, proton therapy, special radiation procedures, quality assurance and radiation safety, and medical imaging.

**Components:** LEC.

**Grading:** GRD.

**Typically Offered:** Spring.

**RON 620. Seminar in Medical Dosimetry I. 3 Credit Hours.**

The first of a sequence of three courses with a capstone requirement of an original research effort to be completed during the summer term. A review of contemporary medical dosimetry and related medical physics and radiation oncology research in seminar format. (MS degree only).

**Components:** SEM.

**Grading:** GRD.

**Typically Offered:** Fall.

**RON 621. Seminar in Medical Dosimetry II. 3 Credit Hours.**

The second of a sequence of two courses. The physics and technology of radiotherapy taught at a level appropriate for radiation oncology residents: topics in modulated external beam radiotherapy, stereotactic radiotherapy and radiosurgery, patient motion management, image guided radiotherapy, proton therapy, special radiation procedures, quality assurance and radiation safety, and medical imaging.

**Components:** SEM.

**Grading:** GRD.

**Typically Offered:** Spring.

**RON 622. Seminar in Medical Radiation Dosimetry III. 2 Credit Hours.**

The third of a sequence of three courses with a capstone requirement of an original research effort to be completed during the summer term. A review of contemporary medical dosimetry and related medical physics and radiation oncology research in seminar format. (MS degree only).

**Components:** SEM.

**Grading:** GRD.

**Typically Offered:** Summer.

**RON 810. Medical Dosimetry Practicum I. 6 Credit Hours.**

The first of sequence of three courses. Clinical rotations under the supervision of a medical dosimetrist or medical physicist through seven services: radiotherapy treatment, radiotherapy simulation, three-dimensional external beam planning, intensity modulated external beam planning, brachytherapy planning, stereotactic radiotherapy planning, and special procedures. All rotations must be completed during the three-term sequence in an order to be scheduled by the participating clinics.

**Components:** PRA.

**Grading:** GRD.

**Typically Offered:** Fall.

**RON 811. Medical Dosimetry Practicum II. 6 Credit Hours.**

The second of sequence of three courses. Clinical rotations under the direct supervision of a medical dosimetrist or medical physicist through seven services. Radiotherapy treatment, radiotherapy simulation, three-dimensional external beam planning, intensity modulated external beam planning, brachytherapy, stereotactic radiotherapy, and special procedures. All rotations must be completed during the three term sequence in an order to be scheduled by the participating clinics.

**Components:** PRA.

**Grading:** GRD.

**Typically Offered:** Spring.

**RON 812. Medical Dosimetry Practicum III. 6 Credit Hours.**

The third of sequence of three courses. Clinical rotations under the direct supervision of a medical dosimetrist or medical physicist through seven services: radiotherapy treatment, radiotherapy simulation, three-dimensional external beam planning, intensity modulated external beam planning, brachytherapy, stereotactic radiotherapy, and special procedures. All rotations must be completed during the three-term sequence in an order to be scheduled by the participating clinics

**Components:** PRA.

**Grading:** GRD.

**Typically Offered:** Summer.