WASHBURN UNIVERSITY

RADIATION THERAPY
CLINICAL PRECEPTOR'S MANUAL

2026-2027

WU Radiation Therapy Program
Student Fact Sheet

The student is to complete this form and submit it to the clinical site by **August 1.** At that same time, provide this hard copy of the Clinical Preceptor's Manual to the designated Clinical Preceptor.

PERSONAL INFORMATION

Full Name:

SSN: **DOB:**

**For radiation detection badge ordering.*

Address:

Preferred Phone Number:

EMERGENCY CONTACT

Name:

Relationship:

Phone Number:

Alternate Phone:

HEALTH INSURANCE

Health Insurance Carrier:

Member / Policy ID:

EDUCATION & PROFESSIONAL BACKGROUND

Current Employer (if any):

Educational Background (previous degrees, certifications, etc.):

Relevant Work Experience (including healthcare):

ADDITIONAL INFORMATION

Feel free to share anything that would be helpful for your Preceptor to know:

Washburn University
Radiation Therapy Program

Dear Clinical Preceptors,

In preparation for the new class of 2026-2027, I am writing to provide some details about Washburn University's Radiation Therapy program and the Clinical Preceptor's manual. The manual contains an overview of the program, program schedule, clinical education plan, clinical objectives for each rotation, clinical forms, and helpful tips for Clinical Preceptors and staff. Please take time to review the manual prior to the **August 18th clinical start date.**

Before August 18, 2026 – Please Note

- We ask that the site have a radiation detection badge ready for the student on the first day of clinical.
- Students have been instructed to report at **8:00am on August 18, 2026.**

On the first day of clinical, please take time to discuss your department's policies, dress code, expectations, and rotation schedule with the student. This information is extremely valuable for both the student and the department.

Clinical consists of unpaid experience. The clinical hour requirement for the fall and spring semester is Tuesday – Thursday, 8:00am to 4:00pm, and Friday, 8:00am to 12:00 pm. The length of the lunch period does not alter this schedule - Students should have a similar lunch period as the staff radiation therapists. No compensation time will be given to students for missed lunch periods. Summer clinical hours are Monday – Thursday, 8:00 am to 4:00 pm, and Friday, 8:00 am to 12:00 pm.

Please note that students cannot be used as staff or to fill staffing shortages. Students must always remain in a student role and under the **direct supervision** of a registered radiation therapist or an appropriately credentialed professional.

Since most sites require documentation, including background check, drug screen, physical, immunizations, TB, BLS Certification, and ARRT credential, students have been instructed to provide copies of all documents to the clinical site in addition to providing them to Washburn University. Students will also provide a Student Fact Sheet containing contact information, health insurance information, and data needed to order a radiation detection badge (SSN and DOB).

Clinical Preceptor Requirements:

- A minimum of two years of professional work experience as a radiation therapist
- Proficiency in supervision, instruction, and evaluation of students
- Holds current ARRT registration in radiation therapy

Clinical Preceptor Expectations:

- Knowledgeable of program goals, policies, procedures, and student progress
- Understands the clinical objectives and clinical evaluation system
- Understands the sequencing of didactic instruction and clinical education
- Provides students with clinical instruction and supervision
- Evaluates students' clinical competence

- Maintains competency through continuing professional development

I appreciate your willingness to participate in the training of future radiation therapists. If you have any concerns about a student, please share those with the student and me early and often so that we can work together to improve the student's performance. Communication between Washburn University and the clinical site is vital to the success of our students.

If you are not the individual serving as Clinical Preceptor, please let me know who will serve in that capacity and provide their contact information. The program must maintain a copy of the Clinical Preceptor's resume and ARRT registration on file.

Sincerely,

Sean Conrad, BA, RT(R)(T)

Clinical Coordinator, Radiation Therapy Program

Sean.Conrad@washburn.edu

785-670-1448

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Clinical Preceptor & Staff Tips

Clinical Education

Clinical Education

The clinical portion of the program is a very important part of a student's radiation therapy education. It is in the clinical setting that students apply their knowledge to develop the skills and attitudes necessary to become a competent Radiation Therapist.

Suggestions for What to Discuss on Day 1 of Clinical:

- Confirm clinical hours - Students report to clinical at 8:00 am unless a different time is preferred by your facility.
- Discuss the lunch break protocol – Students must be given a lunch break, and no compensation time will be given for missed lunch periods.
- Outline the rotation schedule for the semester
- Discuss appropriate communication in the treatment room – Students need guidance on language and interaction with patients diagnosed with cancer
- Discuss how you prefer questions to be handled in the treatment room. For instance, do you prefer the student to write down questions and ask them at the end of the day, ask questions as they come up while in the treatment room, or ask questions outside the treatment room?
- Remind the student that there will be no homework, taking of quizzes/exams, or emails at clinical.
- Remind the student that there should not be any personal phone calls unless it is an emergency.
- Remind the student that if he or she is more than 3 minutes late, it will be recorded as tardy, and the time must be made up. Students are allowed 1 tardy per semester without penalty. After the first tardy in a given semester, percentage points will be deducted from the student's clinical course grade (see pg. 32).
- Discuss who is in charge if the Clinical Preceptor is not in the department.
- Commit to meeting with the student weekly or every two weeks to check in, answer concerns, offer support, and review the clinical schedule.

Clinical Environment

The clinical setting should be a positive environment in which the student receives instruction, guidance,
and feedback regarding their clinical performance. The environment should promote a positive attitude toward the profession, the patients, and the healthcare organization.

Clinical Preceptor

The Clinical Preceptor has a significant influence on the student. The program depends on the Clinical Preceptor's feedback and expertise, and the students will always associate their training with the Clinical Preceptor and other therapists who mentored them.

The Clinical Preceptor has many different roles: Director of Learning, Support Structure, Role Model, Builder of the Profession, and Liaison.

Director of Learning

The Clinical Preceptor organizes learning opportunities in alignment with the program's clinical plan and objectives. The Clinical Preceptor should guide the student through the required rotations and provide opportunities for the student to learn, demonstrate, and discuss clinical skills. Students have a strong desire to learn and to meet the expectations of their clinical site mentors; however, they need guidance.

Support Structure

Learning is a difficult and messy process. Having high expectations is important, but being open to supporting students through the process helps build confidence where it is deserved.

Role Model

Students learn by imitation, which is why it is so important that Clinical Preceptors and all other personnel serve as professional and ethical role models. Refrain from involving students in any inter-departmental issues or conflicts. If students involve themselves in such issues or conflicts, remind them of their role as students.

Builder of the Profession

The Clinical Preceptor is a representative of the radiation therapy profession. All Clinical Preceptors must hold a current designation of RT(T) and participate in continuing education activities. Modeling this behavior encourages students to engage in lifelong learning activities.

Liaison

The Clinical Preceptor is a liaison between the clinical setting and Washburn University. Any information (positive or corrective) regarding the student's attitude, performance, or knowledge should be communicated to the Clinical Coordinator directly as neither the student nor the Clinical Coordinator can make changes or improvements without explicitly being informed about areas of needed growth.

Motivating Students

Most radiation therapy students are highly motivated individuals. The following are ways Clinical Preceptors can help foster and maintain that motivation:

Achievement

Help students establish realistic/achievable goals aligned with the clinical objectives. While students reviewed the Program and Clinical manual at the mandatory orientation session in July, the program recommends discussing all expectations about student performance on the first day of clinical.

Recognition

Tell students when they have performed well. Positive feedback should not be reserved only for monthly professional development evaluations. Students need opportunities to build confidence, and recognition is an important part of that process. The Clinical Coordinator also welcomes

feedback from Clinical Preceptors when a student exceeds site expectations. The program maintains positive feedback in the student's record, just as it maintains constructive feedback.

Advancement

As the student demonstrates competency in skills, provide them with increasingly challenging tasks. This gives students the opportunity to develop confidence, independence, and problem-solving skills. This does not mean the student may treat patients independently. Students must always remain
under direct supervision by a registered radiation therapist or other appropriately credentialed professional.

However, a therapist may allow a student to take the lead in the treatment room, cut blocks independently with therapist verification before patient use, or answer patient questions once the student has demonstrated the ability to do so under practice conditions. These opportunities offer meaningful challenges and help prepare students for entry-level employment upon graduation.

Growth:

Provide students with tasks that help them develop professionally. Students may naturally gravitate toward tasks they are confident or comfortable performing. It is important to help students identify areas of discomfort, as these are often the areas where professional growth is most needed. Clinical Preceptors can help the student avoid stalling in their clinical development by identifying areas for improvement and setting realistic goals.

Responsibility:

Allow students the opportunity to take responsibility for their own clinical progression. Discuss the goals the student has set for clinical development on a regular basis. Let students know you are available to discuss, review, and evaluate competency performance, but remind them that it is ultimately their responsibility to keep up with all program requirements.

Discipline

In an ideal world, the student would not display disciplinary problems; however, that is not always the case. When concerns arise, corrective action may be necessary. However, corrective action or discipline does not have to be negative, harsh, or abusive. In fact, when discipline is given through punishment, harsh words, or the silent treatment, students are less likely to accept the feedback and make meaningful improvements. Positive discipline is much more effective. Below are important principles for addressing student performance concerns and promoting professional growth.

Establishing Performance Standards:

The program has established expectations and policies regarding clinical performance. These standards are provided to students in the Program and Clinical Manual and to Clinical Preceptors in the Clinical Preceptor's manual. Clinical Preceptors and clinical site staff should become familiar with the program's standards of performance and discuss them with the student. This helps ensure the student understands that the Clinical Preceptor is aware of the program requirements and will hold the student accountable to those standards.

Provide Feedback to Students

Students thrive on feedback. Try to remember what it was like to be a student. Students are often unsure when to step in and when to move out of the way. Take time to let students know whether their actions are acceptable or need improvement. Students cannot correct their performance unless they understand there is a problem.

During the first semester of clinical, it may be beneficial to provide the student with very explicit instructions, such as “Today you are responsible for preparing the treatment room for the next patient,” or “Today you should take control of the pendant for every setup” or “This morning you take the lead on all breast setups.” This approach often relieves students of the feeling that they are responsible for everything at once and allows them to focus on developing specific skills until they are able to put it all the pieces together.

Prompt Correction

If a student’s performance or attitude is poor, it is important for the Clinical Preceptor to address the issue promptly. This does not have to be harsh. It should involve discussing the concern with the student and clearly defining the expected or acceptable behavior. Prompt action helps prevent negative behaviors from becoming habitual and provides the student with an opportunity to improve. Students can only correct issues that have been brought to their attention and to the attention of the Clinical Coordinator.

It is strongly encouraged that Clinical Preceptors be firm about policies and expectations from the beginning, as it is much more difficult to correct habitual negative behaviors later. On the first day of clinical, the Clinical Preceptor should discuss expectations regarding attendance, promptness, quality of performance, facility policies, and chain of command. Establishing these expectations early helps reduce misunderstandings between the Clinical Preceptor and student.

As always, if there are concerns regarding a student’s performance, attitude, or behavior, the Clinical Preceptor should communicate directly with the Clinical Coordinator.

Benefits of Questioning

Questioning helps students recall information, solve problems, and develop critical thinking skills. Effective questioning also helps Clinical Preceptors assess students' understanding and identify areas that need additional instruction.

When questioning students, consider the following:

- Pause and allow the student time to think before answering.
- Encourage responses beyond “yes” or “no.”
- Reinforce correct responses with feedback such as “Correct” or “Great job.”
- Ask follow-up questions to further develop student understanding.

Different types of questions can promote learning and critical thinking.

Question Type	Purpose	Example
Knowledge	Recall facts or definitions	What is the definition of source to skin distance (SSD)?
Comprehension	Demonstrate understanding	What is the SSD reading for this field?
Application:	Applies knowledge to a clinical situation	If a patient’s AP/PA separation measures 22cm, what is the SSD if the isocenter is placed at midplane?

Question Type	Purpose	Example
Analysis	Compare concepts or describe processes	What are the differences between SSD and SAD setups?
Synthesis	Develop a plan or a solution to a problem	What actions should the therapist take if the lateral SSDs do not match the treatment plan?
Evaluation	Make judgments or evaluate information	What are the strengths and weaknesses of different prostate treatment techniques?

Example Clinical Situation

A radiation therapy student is preparing to simulate a lung cancer patient. Prior to the procedure, the Clinical Preceptor or supervising registered radiation therapist may ask:

- In what position will the patient be placed? (Knowledge)
- How will you achieve this patient positioning? (Comprehension)
- Would the patient's positioning change if the patient were suffering from Superior Vena Cava (SVC) syndrome? (Application)
- What emotional factors should be recognized during the simulation process? (Analysis)

After the simulation procedure, the Clinical Preceptor may ask:

- What were your strengths and weaknesses during the procedure? (Evaluation)
- What would you change to improve your performance during future lung simulations? (Synthesis)

Development of Problem-Solving Skills

Critical thinking and problem-solving are important skills for a radiation therapist. Students must be given opportunities to develop these skills in the clinical setting. Clinical Preceptors and supervising therapists can help students strengthen problem-solving skills through case studies, role-playing, image critiques, and discussion.

For example, to help a student become more effective in providing patient education, the therapist may role-play as a patient experiencing a treatment side effect or asking a common question. The student can then practice providing an appropriate response within the radiation therapist's scope of practice. Another example is having the student complete an image critique without computer-assisted matching tools to evaluate positioning accuracy, alignment, anatomy, and potential setup corrections.

The key steps in problem-solving include:

- Identifying the problem and the relevant facts
- Examining possible solutions
- Selecting the most appropriate solution
- Implementing the determined solution

Evaluation of Student Performance

Clinical evaluation of student performance can be challenging due to variables within the clinical setting. These variables may include, but are not limited to, the condition of the patient, differences in treatment equipment, and the inherent subjectivity involved in the evaluation process. When completing a clinical evaluation, the following should be considered:

- Evaluate the student based on their current level in the program and the amount of clinical experience they have completed.
- Minimize subjectivity and biases.
- Be fair and consistent.
- Consider the impact that variables such as patient condition, age, and treatment complexity may have on student performance.
- Ensure the student has received adequate guidance, instruction, and feedback.
- Do not compare the progress of one student to another.
- Evaluate professionalism, communication, critical thinking, and patient interaction in addition to technical skills.
- If a student makes an error, but recognizes it and corrects it before completing the procedure, consider the student's ability to problem-solve and achieve the desired outcome.
- During a treatment machine or simulation competency, students are not required to perform the procedure independently. The student should take the lead, but another therapist may assist on the "other side of the table" with positioning, as this reflects real-world radiation therapy practice

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Program Information

Requirements for Certificate of Completion

Summer Semester

AL 309 Introduction to Radiation Therapy	2 cr. hrs.

Fall Semester

AL 301 Clinical Radiation Therapy I	4 cr. hrs.
AL 302 Radiation Therapy Principles I	3 cr. hrs.
AL 303 Radiation Therapy Physics I	3 cr. hrs.
AL 311 Imaging in Radiation Therapy	3 cr. hrs.
AL 307 Simulation & Treatment Procedures I	3 cr. hrs.

Spring Semester

AL 304 Therapeutic Radiobiology	3 cr. hrs.
AL 305 Radiation Therapy Physics II	3 cr. hrs.
AL 310 Radiation Therapy Principles II	3 cr. hrs.
AL 340 Clinical Radiation Therapy II	4 cr. hrs.
AL 370 Simulation & Treatment Procedures II	3 cr. hrs.

Summer Semester

AL 380 Clinical Radiation Therapy III	3 cr. hrs.
AL 381 Radiation Therapy Seminar	3 cr. hrs.

40 Credit Hours Total

*Clinical course credit hours are based on the formula of 100-115 clinical clock hours equaling one credit hour.

**See the Washburn University's Catalog for a description of courses offered.*

ASRT Curriculum Guide Subjects

Subject	Course
Clinical Practice	AL301, AL340, AL380
Ethics in Radiation Therapy Practice	AL302
Imaging and Processing in Radiation Oncology	RT(R), AL302, AL311
Introductory Law in Radiation Therapy	AL302
Orientation to Radiation Therapy	RT(R), AL309, AL302, AL310
Pathophysiology	AL307
Principles & Practice of Radiation Therapy I	AL302, AL307, AL311, AL305, AL340, AL310, AL380
Principles & Practice of Radiation Therapy II	AL302, AL307, AL370
Radiation Therapy Quality Management, Quality Assurance, Safety, & Operations	AL310
Radiation Biology	RT(R), AL302, AL304, AL311
Radiation Physics	RT(R), AL303, AL304
Radiation Therapy Physics	RT(R), AL303, AL305
Radiation Protection	RT(R), AL303, AL304, AL305
Magnetic Resonance Imaging	AL309, AL311
Radiation Therapy Patient Care	RT(R), AL301, AL302, AL340, AL370, AL380
Research Methods, Evidence-Based Practice, and Information Literacy	AL370
Sectional Anatomy	RT(R), AL311, AL340
Treatment Planning	AL302, AL303, AL307, AL304, AL305, AL340, AL370

Program Mission Statement

The Radiation Therapy Program is focused on developing qualified radiation therapists who provide optimal patient care through technical competency and professional conduct.

Program Goals & Outcomes

Program Effectiveness: THE PROGRAM GRADUATES WILL BE PREPARED FOR ENTRY-LEVEL EMPLOYMENT AS A RADIATION THERAPIST.

Outcome 1: Students will complete the program.
Outcome 2: Graduates will pass the national certification exam on the first attempt within 6 months of graduation.
Outcome 3: Graduates will be gainfully employed in radiologic sciences within 12 months of graduation.
Outcome 4: Graduates will be satisfied with the overall quality of the program.
Outcome 5: Employers will be satisfied with the overall competency of program graduates.

*Program completion rates, first-time test-taker rates, and employment rates are posted on the program's website (Radiation Therapy Program) under the Quality Indicator menu option.

Learning Goal 1: STUDENTS WILL DEMONSTRATE CLINICAL COMPETENCE.

Outcome 1: Students will analyze pertinent data from treatment planning documents.
Outcome 2: Students will accurately position patients for treatment delivery.
Outcome 3: Students will evaluate images using various imaging technologies (MV, kV, CBCT) to ensure proper patient alignment.

Learning Goal 2: STUDENTS WILL DEMONSTRATE WRITTEN AND ORAL COMMUNICATION SKILLS.

Outcome 1: Students will demonstrate written communication skills.
Outcome 2: Students will provide patient education within the scope of practice.

Learning Goal 3: STUDENTS WILL DEMONSTRATE CRITICAL THINKING.

Outcome 1: Students will solve challenges related to non-routine clinical situations.
Outcome 2: Students will demonstrate the ability to perform specialized procedures in the clinical setting.

Learning Goal 4: STUDENTS WILL DEMONSTRATE PROFESSIONAL WORK STANDARDS

Outcome 1: Students will exhibit professional standards and behaviors.
Outcome 2: Students will assess the importance of professional development.
Outcome 3: Students will demonstrate adherence to ethical standards.

The Program

The Radiation Therapy curriculum at Washburn University is a JRCERT-accredited 40-credit-hour, 13-month certificate of completion program. This program will provide the knowledge and cognitive skills underlying the intelligent performance of major tasks typically required for an entry-level staff therapist. Graduates are registry eligible with the American Registry of Radiologic Technologists (ARRT).

Accreditation

The Washburn University Radiation Therapy Program is accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT).

Joint Review Committee on Education in Radiologic Technology (JRCERT)
20 N. Wacker Drive, Suite 2850
Chicago, IL 60606-3182
Phone: (312) 704-5300
Fax: (312) 704-5304

Standards of an Accredited Education Program in Radiation Therapy

The Joint Review Committee on Education in Radiologic Technology (JRCERT) promotes academic excellence, patient safety, and quality healthcare through the assessment of six program standards: Integrity, Resources, Curriculum and Academic Practices, Health and Safety, Assessment & Institutional/Programmatic Data.

A copy of the JRCERT'S Standards of an Accredited Educational Program in Radiation Therapy may be found by accessing the following link: Access the Standards Here!

Students have the right to submit allegations against a JRCERT-accredited program if there is reason to believe that the program has acted contrary to JRCERT accreditation standards or that conditions at the program appear to jeopardize the quality of instruction or the general welfare of its students.

Contact of the JRCERT should not be a step in the formal institutional/program grievance procedure. The individual must first attempt to resolve the complaint directly with the institution/program officials by following the grievance procedures provided by the institution/program. If the individual is unable to resolve the complaint with institution/program officials or believes that the concerns have not been properly addressed, they may submit allegations of non-compliance directly to the JRCERT.

Students can contact the JRCERT:

By Email: mail@jrcert.org

By Phone: (312) 704-5300

By Mail: JRCERT
20 N. Wacker Drive, Suite 2850
Chicago, IL 60606-3182

Program Faculty

Faculty for the Radiation Therapy Program is as follows:

Kristina Collins, Program Director/Lecturer, 2015
RT(R) Washburn University Radiography Program 2008;
RT(R)(T) Washburn University Radiation Therapy Program 2009;
Bachelor of Health Science (BHS) Washburn University 2009;
Master of Health Science in Health Care Education (MHS) Washburn University 2019

Sean Conrad, Clinical Coordinator/Lecturer, 2019
Bachelor of Arts in Economics (B.A.) University of Kansas 2007;
RT(R) Washburn University Radiography Program 2011;
RT(R)(T) Washburn University Radiation Therapy Program 2012

Course Sequence

The Radiation Therapy Program is 13 months in length. In addition to the didactic coursework, this program includes a comprehensive clinical component. Because of the didactic and clinical components, these courses may be out of sequence with other University course offerings. A program/clinical schedule is provided within this manual and on the program website.

Advisory Committee

A representative committee has been appointed to assist in the evaluation and coordination of the program. The advisory committee is representative of the stakeholders involved in or affected by the educational program; this includes one currently enrolled student.

Reasonable Accommodation

The Student Accessibility Services Office (SASO) is responsible for coordinating accommodations and connecting students with disabilities to appropriate campus resources. To receive accommodations, qualified students must complete the intake process and provide current documentation verifying their disability. Documentation should come from a qualified professional and include a diagnosis, how the disability substantially limits a major life activity, and how it impacts academic or clinical performance. Services are identified to meet the needs of individuals based on their specific disabilities (e.g., depression, physical or learning disability) and may include note-taking assistance, extended test time, alternative formats for materials, assistive technology, or other reasonable accommodations. Requests for accommodations should be submitted at least TWO MONTHS before services should begin; however, if you have a current accommodation need, please contact the Student Accessibility Services staff immediately.

*Students may voluntarily identify themselves to the instructor for a referral to the Student Accessibility Services Office.

Location: Student Accessibility Services Office, Plass Learning Resources Center, Room 317.
Phone: 785-670-1622
E-Mail: accommodations@washburn.edu.

ARRT Examination/Certification

National certification requirements state that an individual must successfully complete an accredited educational program in Radiation Therapy and meet all degree requirements established by the sponsoring institution and the American Registry of Radiologic Technologists (ARRT). Any incomplete coursework or unmet degree requirements will delay eligibility for the national examination.

The ARRT certification examination is computer-based and is scheduled by the student at an approved Pearson VUE testing center after the program has verified eligibility with the ARRT. Candidates are provided an examination window in which to complete the examination.

Candidates must comply with ARRT Standards of Ethics, including the Rules of Ethics, which outline standards of minimally acceptable professional conduct for all registered Radiation Therapists and candidates seeking certification. The Rules of Ethics are intended to promote the safety, comfort, and protection of patients. Registered Radiation Therapists or candidates engaging in conduct identified within the Rules of Ethics, or permitting such conduct to occur, may be subject to sanctions by the ARRT.

One issue addressed by the Rules of Ethics involves criminal charges and/or convictions, including felonies and misdemeanors, with the exception of minor traffic violations that do not involve drugs or alcohol, such as standard speeding or parking tickets. All alcohol- and/or drug-related violations must be reported. Offenses that occurred before the age of 18 and were processed through the juvenile court system generally do not need to be reported.

For ARRT reporting purposes, convictions include situations in which adjudication was withheld, deferred, stayed, or suspended, as well as pleas of guilty or nolo contendere (no contest), probation, court supervision, or pretrial diversion programs.

Additional violations addressed by the Rules of Ethics include regulatory violations and honor code violations. Regulatory violations involve actions taken by a licensing board or certification agency, such as denial, suspension, revocation, probation, or other disciplinary action against a professional license, registration, or certification. Honor code violations include suspension, dismissal, or expulsion from an educational program used to meet ARRT certification requirements.

All potential ethics violations are reviewed by the ARRT to determine eligibility for certification. Registered technologists and applicants for certification are required to report potential ethics violations to the ARRT **within 30 days of the occurrence** or at the time of application or annual renewal, whichever comes first. Failure to disclose a potential ethics violation may be considered more serious than the violation itself.

If a candidate experiences a potential ethics violation after applying for the examination but before taking the examination, it is the candidate's responsibility to notify the ARRT immediately so the review process may begin.

More information about the ARRT Rules of Ethics reporting requirements can be found online at the ARRT official website or by calling the Ethics Requirements Department at (651-687-0048 x 8580).

Undergraduate University Catalog

Individuals enrolled in the program should familiarize themselves with the following sections and policies in the Undergraduate University Catalog, which is available online in the MyWashburn portal.

1. Academic Probation, Suspension, and Reinstatement
2. Academic Policies and Regulations
    a. Grading System
    b. Admission and Attendance
3. Academic Impropriety Policy
4. Course Withdrawal
5. Non-Discrimination Regulation and Procedure
6. Programs, Degrees and Graduation Requirements
7. Registration and Enrollment
8. Sexual Harassment
9. Student Conduct
10. Student Support Services
11. Tuition Refunds
12. University Accreditation

Additional Fees

In addition to the University tuition and cost of books, a radiation therapy student is expected to provide:

1. Uniforms (scrubs or suitable work clothing)
2. Transportation to and from clinical site(s)
3. BLS certification and recertification fee(s)
4. Physical exam
5. Flu shot and other possible immunizations/tests (Hep B, Tdap, TB, etc.)
6. Health insurance
7. Background check and drug screen ($105)
8. Name tag ($5-$10)
9. Trajecsys clinical management system ($100)
10. Scientific calculator; graphing calculators will not be available on the board's exam, so it is best to have a standard calculator that can do scientific functions.
11. Graduation pin ($15, optional)

*Some clinical sites may have special requirements for students, such as a student processing fee, attendance at the organization's orientation training, or special background checks. Any additional expenses are the responsibility of the student. Students are notified of special requirements prior to the start of the program.

*Students are encouraged to become members of their state and national radiologic societies. Resources listed below:

- American Society of Radiologic Technologists ; National Professional Society
- Listing of State Societies

SECTION

3

Clinical Guidlines & Policies

The Patient

A patient is the most important person in the department.

A patient is not dependent on us – We are privileged to care for them.

A patient is not an interruption of our work – They are the reason for it.

A patient facing a cancer diagnosis deserves our full attention and compassion.

A patient is not a cold statistic – They are a person with fears, homes, and a life that matters.

A patient is not someone to rush or dismiss – They deserve our patience and our presence.

A patient trusts us with their care at one of the most vulnerable moments of their lives.

A patient is deserving of the most courteous, compassionate, and attentive treatment we can give.

A patient reminds us of every day why this work matters.

Clinical Guidelines

Clinical Education Description

Radiation therapy students rotate through various treatment areas and clinical assignments within the radiation oncology department. Because radiation therapists are expected to demonstrate competency in all aspects of patient care and treatment delivery, both didactic instruction and clinical education are essential components of the student's professional development.

To evaluate clinical performance and reinforce the relationship between classroom instruction and patient care, the program utilizes a competency-based clinical evaluation system.

Students begin their clinical education by **observing** general departmental workflow, procedures, patient interactions, and professional responsibilities. As knowledge and confidence develop, students will progress to assisting staff radiation therapists with clinical duties under direct supervision **(passive mode**).

Students then move to a more **active role**, assisting staff radiation therapists with radiation therapy treatments, including treatment delivery, simulation, treatment planning, imaging procedures, beam-modification device fabrication, and other clinical responsibilities appropriate to the rotation.

Prior to the competency evaluation, students must successfully complete the required pre-competency activities or checklists to demonstrate adequate preparation and readiness for the evaluation. Upon successful completion of these requirements, students may request formal competency testing within the applicable procedure category.

Students must successfully complete all required competency evaluations to satisfy the program completion requirements. In addition, continued competency evaluations may be conducted periodically throughout the program to reassess and reinforce clinical knowledge, technical skills, patient care, and procedural performance (see Semester by Semester Competency Requirements, section 3, pg. 7-8).

Clinical Terminology

Competency
The ability to demonstrate the knowledge, technical skills, critical thinking, professionalism, and patient care behaviors necessary to safely and effectively perform assigned clinical procedures and responsibilities.

Competency Evaluation
The formal process by which a student's performance, knowledge, technical skills, critical thinking, and professional behaviors related to a specific clinical procedure are assessed.

Radiation therapy students are required to complete 16 treatment delivery procedures, 3 imaging, 6 treatment simulation, 3 treatment accessory device fabrication, 6 dosimetry, 5 quality control, 2 data interpretation, 8 general patient care, and 7 participatory procedures.

Competency Evaluation Under "Simulated Conditions"
Students will complete certain competency evaluations under simulated conditions using a phantom or a live subject (not a patient) while demonstrating the same cognitive, psychomotor, and affective skills required for actual patient care. Radiation exposure is simulated without activation of the treatment beam. Up to three treatment machine competencies may be completed under simulated conditions during the summer semester. Dosimetry, treatment accessory devices, general patient care, and participatory procedures may also be completed under simulated conditions when appropriate. However, competency evaluations involving actual patient care are preferred whenever possible.

Continued Competency Evaluation
A series of secondary competency evaluations designed to demonstrate maintenance of clinical competency over time. These evaluations are completed during the Winter Intersession and Summer Semester.

Direct Supervision
Students are directly supervised **at all times** during clinical education experiences. Successful completion of competency evaluations **does not** alter direct supervision requirements.

During nursing or dosimetry rotations, direct supervision is provided by appropriately credentialed personnel. During treatment delivery or simulation rotations, direct supervision is provided by a registered radiation therapist.

Evaluation of Clinical Site Experience
The process by which the student evaluates the Clinical Preceptor and clinical site staff regarding their effectiveness in mentoring, supervising, and supporting student learning within the clinical environment.

Pre-Competency Checklist
The process by which students and clinical site staff assess readiness for formal competency evaluation. Prior to performing any primary treatment delivery competency or imaging competency evaluation, students must successfully complete the required pre-competency checklist.

Professional Development Evaluation
The process by which the Clinical Preceptor or other staff registered radiation therapist(s) evaluates student growth, professionalism, participation, communication, and overall participation within the clinical setting.

Clinical Education Duties

Staff Radiation Therapists

Qualifications:

- Hold ARRT certification or equivalent and active registration in the pertinent discipline.

Duties:

- Assist and supervise students
- Complete competency evaluations
- Complete continued competency evaluations
- Complete professional development evaluations

Clinical Preceptors

Qualifications:

- Proficient in supervision, instruction, and evaluation
- Minimum of two years of full-time experience in the professional discipline
- Hold ARRT certification or equivalent and active registration in the pertinent discipline
- Knowledgeable of program goals, curriculum, clinical objectives, and evaluation system.

Duties:

- Approve schedule changes
- Complete and review professional development evaluations with the student
- Perform competency and continued competency evaluations
- Inform students of hospital procedures and policies
- Provide clinical orientation for new students
- Communicate program goals and requirements to staff
- Participate in clinical education planning
- Provide clinical demonstrations
- Participate in student counseling when appropriate
- Assist and supervise students
- Approve student time, tardy, and absence records

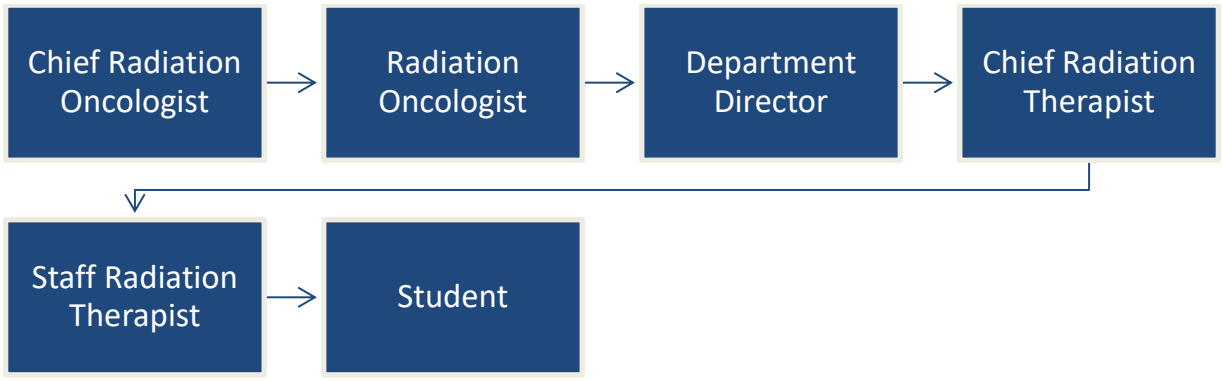
Washburn University Faculty

Duties:

- Review and maintain student time sheet records
- Review tardy, absence, and compensation records
- Review professional development evaluations and provide summary feedback
- Prepare course syllabi
- Develop rotation objectives and general program/clinical schedules
- Review competency evaluations, case study grading, and clinical record-keeping
- Participate in clinical education planning
- Provide student counseling and support when appropriate

Chain of Command

The chain of command in radiation oncology, from highest to lowest authority, is as follows:



Radiation therapists play an important role in both patient care and student education within the clinical setting. Responsibilities include:

- **Patient treatment delivery or treatment planning** – Includes providing proper patient care, completion of the treatment, maintaining accurate treatment records, maintaining patient flow, and adhering to departmental procedures.
- **Clinical instruction of students and supervision of students** - Includes providing instruction in patient care, treatment delivery/planning, patient positioning skills, professional behaviors, and clinical skill development.

Students should recognize that multiple acceptable methods may exist for patient positioning, treatment setup, imaging evaluation, and treatment planning. Clinical site protocols and physician preferences may vary between facilities. Students are expected to observe, adapt to, and learn the procedures and workflows utilized at their assigned clinical site.

The supervising radiation therapist is responsible for overseeing the clinical room or assigned rotation area and providing guidance, instruction, and feedback to students. As students gain knowledge and experience, they are expected to gradually assume greater participation and responsibility in clinical procedures while remaining under direct supervision. Clinical education should progressively provide students with increased opportunities for active participation and hands-on learning.

Radiation therapists in each assigned clinical area will also (on a daily basis):

- Determine the time for the lunch break
- Check for proper room cleanliness and supplies
- Approve the student's arrival and departure times
- Approve practice time
- Allow time for questions to be asked
- Purposefully provide feedback to the student to include positive comments and recommendations for improvement.
- Discuss clinical goals such as competencies to be completed, etc.

If the radiation therapist is not available, the student should contact the Clinical Preceptor in the radiation oncology department or the program Clinical Coordinator.

Students will remain under direct supervision at all times. Observation of student performance through closed-circuit monitors is **not** considered direct supervision.

Clinical Education Plan

A plan for the clinical education segment of the program follows. The plan is flexible in design and may be altered to fit the needs of the student and/or department with approval from the Clinical Coordinator. The plan allows faculty to provide guidance on clinical education site scheduling for clinical experiences and on computing the credit-hour value for each semester

Note: Some didactic courses include a clinical experience as a part of a course project, report, or presentation. These experiences may require an alteration in clinical education hours and may be completed outside of regular clinical hours. Students will either adjust their clinical hours or earn compensation time. The combination of didactic and clinical hours cannot exceed 40 hours weekly.

Total Program Clinical Hours = Approximately 1,196 Hours

AL301: Fall Semester Clinical

Clinical hours are Tuesday – Thursday 8:00 am – 4:00 pm & Friday 8:00 am – 12:00 pm CST
Approximately 420 clock hours (16 hours of personal time) = 4 credit hours

Week 1

Orientation to Department- Meet with the Clinical Preceptor to discuss performance expectations, hours, and schedule. An orientation checklist is to be completed by the Clinical Preceptor or other supervising registered radiation therapist within Trajecsys.

Clerical Rotation - Approximately 2-4 hours to learn about department flow, scheduling, phone system, location, and contents of patient charts. A clerical checklist is to be completed by appropriate staff within Trajecsys.

Weeks 2 – 16

Nursing Experience - Approximately 1 week involving participation in consultations, follow-ups, and status check appointments. Students should also observe patient interactions with the social worker and nutritionist/dietician. Students will follow at least 1 patient from consultation to treatment delivery to see the entire process.

Custom Bolus Experience – Students should observe and participate in the clinical use and fabrication of bolus materials when available. Bolus competencies may be completed at any point in the program.

Simulation/Dosimetry Experience - Approximately 1 week of observation and participation in the treatment planning process. This is an introductory experience in the fall semester; students will focus more intensively on simulation and dosimetry skills in the spring semester. Custom immobilization device competencies may not be completed until the spring semester.

Treatment Delivery Experience - Approximately 12 weeks involving room preparation, patient alignment, patient communication, and treatment record verification. By the end of the fall semester, students will successfully complete 7 treatment-delivery competency evaluations. A maximum of 10 treatment competency evaluations may be completed in the fall semester.

AL340: Spring Semester – Consists of a Winter Intersession Period & Remaining Spring Semester

Clinical hours are Tuesday – Thursday, 8:00 am – 4:00 pm & Friday 8:00 am – 12:00 pm CST**, except**

during the winter intersession, during which clinical time is scheduled Monday-Friday 8:00 – 4:00 pm CST.
Approximately 472 clock hours (24 hours of personal time) = 4 credit hours

Winter Intersession - A component of the Spring Semester

The winter intersession is a 2-3 week period in December and January during which students attend clinical full-time, Monday-Friday. Students will focus on treatment delivery and the completion of 4 continued competencies (retesting 4 of the treatment delivery categories completed in the fall semester).

Students may begin rotating into simulation as cases are available. Because each week of winter intersession consists of 40 hours, students are not permitted to earn compensation time during this period (see Compensation Time Policy, section 2, pg. 14).

Remainder of Spring Semester (16 weeks)

Simulation Experience - Approximately 8 weeks, culminating in the completion of the 6 ARRT simulation competency categories, the Special Treatment Simulation Procedure, and the 2 Treatment Accessory Device competencies for mask and abdomen/pelvis or thorax immobilization. Students will follow simulation image data to the workstation or treatment planning computer and participate in the virtual simulation process. A Patient Tattoo checklist is to be completed by the Clinical Preceptor or other supervising registered radiation therapist within Trajecsys.

Custom Bolus Experience – Students should observe and participate in the clinical use and fabrication of bolus materials when available. Bolus competencies may be completed at any point in the program.

Dosimetry Experience - Approximately 3 weeks with a focus on treatment planning processes, monitor unit calculations, and plan evaluation approaches culminating in the completion of the 6 ARRT dosimetry competency categories. Upon completion of all dosimetry rotation requirements, students and Clinical Preceptors may elect to end the rotation early, and the student will return to the treatment room.

Treatment Delivery Experience - Approximately 4 weeks, continuing to focus on gaining skills and applying judgment during patient alignment and treatment delivery processes and special procedures. Students will complete 3 imaging competencies in MV, KV, and Cone Beam CT (CBCT).

AL380: Summer Semester Clinical (Total of 9 Weeks)

Clinical hours are Monday – Thursday 8:00 am – 4:00 pm & Friday 8:00 am – 12:00 pm CST
Approximately 304 clock hours (8 hours of personal time) = 3 credit hours.

Nursing Experience - Approximately 1-2 weeks involving participation in consultations, follow-up, and status check appointments to review knowledge of radiation therapy side effects, recommend interventions for common side effects, and vital signs.

Custom Bolus Experience – Students should observe and participate in the clinical use and fabrication of bolus materials when available. Bolus competencies may be completed at any point in the program.

Quality Control - Knowledge validation by completion of the 5 ARRT quality control procedures. Students will also complete 2 data interpretation competencies, including reviewing treatment data to ensure completeness and accuracy.

Treatment Delivery Experience - Approximately 7-8 weeks, continuing to focus on gaining

skills and applying judgment during patient alignment and treatment delivery processes and special procedures. Students will complete 4 continued competencies (retesting on categories completed in the fall or spring semester). By the conclusion of the summer semester, students will successfully complete **all ARRT and program-defined competencies.**

PARTICIPATORY PROCEDURES

These experiences can and should occur throughout the program year, anytime the opportunity arises. Students must complete competency testing in all of the following:

- Total Body Irradiation (TBI) Treatment
- Craniospinal Treatment
- Brachytherapy Treatment
- Stereotactic Treatment (e.g., SBRT, SRT/SRS)
- Motion Management (e.g., Surface Guidance, Respiratory Gating, Fiducial Tracking, Breath Hold, Abdominal Compression)
- Special Treatment Simulation Procedure (e.g. , 4DCT, SBRT, Gating, or Brachytherapy)
- Custom Block Process (Photon or Electron) *

**Custom Block Process may or may not include actual block fabrication (e.g., third-party outsourcing)*

Note: Some participatory procedures may need to be completed under simulated conditions because not all radiation oncology departments perform these procedures.

2026 - 2027 Program Schedule

Date(s)	Activity
August 17	1st Day of Fall Semester; Live Monday Sessions Begin (8:30 am–3:50 pm CST)
August 18	1st Day of Clinical (T/W/Th 8:00am – 4:00pm CST + Fri 8:00am–12:00pm CST)
August 28	*Last Day to Receive 100% Tuition Refund
September 7	Labor Day Holiday (No Class)
October 3 – 6	Fall Break (No Class/No Clinical)
October 24	Open Registration for Spring & Summer Begins
November 25 – 27	Thanksgiving Break (No Clinical)
December 4	Last Official Day of Fall Classes
December 5 - 9	Finals Period (No Clinical)
December 14 – 18	Winter Intersession (Part 1) - Clinical is Monday–Friday, 8:00am–4:00pm CST; No Comp Time May Be Earned
Dec 21 – Jan 1	Winter Break (No Clinical)
January 4 – 15	Winter Intersession Part 2 - Clinical Monday–Friday, 8:00am – 4:00pm CST; No Comp Time May Be Earned
January 18	Spring Semester Begins; Martin Luther King Holiday (No Class)
January 19 - 22	No Clinical
January 25	Live Monday Sessions Begin (8:30am–3:50pm CST)
January 26	Clinical Resumes (T/W/Th 8:00am – 4:00pm CST + Fri 8:00am–12:00pm CST)
January 29	*Last Day to Receive 100% Tuition Refund
March 15 - 19	Spring Break (No Class/No Clinical)
March 25 - 26	No Clinical
May 4 – 7	No Clinical
May 7	Last Official Day of Spring Semester
May 8 – 12	Finals Period (No Clinical)
May 17	Summer Clinical Begins (Mon – Thurs 8:00am – 4:00pm CST + Fri 8:00am–12:00pm CST)
May 31	Memorial Holiday (No Clinical)
June 1	AL381 Course Begins, No Live Sessions
June 18	Juneteenth Holiday (No Clinical)
July 5	Recognized 4th of July Holiday (No Clinical)
July 22	Last Day of AL381
July 23	Last Day of Summer Clinical - End of Program

Clinical Policies

Activation of the Treatment Unit ("Beaming On")

Students are NOT to activate the treatment unit during the fall semester (AL301). However, students will become familiar with patient treatment charts (paper or electronic), reading the physician's prescription, verifying accurate dose records, knowing when images are needed, and locating treatment set-up instructions and photographs. Students will also monitor the patient undistracted while treatment is being delivered.

Starting in the winter intersession, which is a component of the spring semester, students may be allowed to activate the treatment unit if **all** the following elements are met:

1. Facility agrees to students activating the machine.
2. Student demonstrates emergency procedures & location of emergency off switches.
3. Student receives verbal approval from the supervising registered radiation therapist prior to each time the beam is activated.
4. A registered radiation therapist directly supervises the procedure. Failure of a student to obtain approval and direct supervision of a registered radiation therapist prior to activating the treatment machine may result in dismissal from the program.

Background Check

A criminal background check will be required of all accepted Radiation Therapy students prior to the program start date. Successful completion of the Radiation Therapy program requires participation in clinical practicum courses. Students can only be placed in clinical practicum courses after a background check (at their expense) has been completed, which discloses they do not present a criminal history of:

a) convictions of laws regulating controlled substances*;
b) convictions, at the felony level of crimes, as defined under the Kansas Criminal Code
    i. (K.S.A. 21-3101 et seq.) and amendments thereto, which are crimes against persons, crimes against property, or sex offenses;
c) conviction of an offense requiring registry as a sex offender under the Kansas Offender Registry Act or any federal, military, or other state law requiring registry;
d) conviction, at the felony level of crimes, involving moral turpitude, which include but are not limited to: perjury, bribery, embezzlement, theft, and misuse of public funds.

***Exception:** Persons who have been convicted of a misdemeanor drug or alcohol offense may be permitted to participate in the clinical practicum pursuant to the process for Management of Misdemeanor Illegal Drug or Alcohol Exception set out below.

All other discrepancies or offenses not listed in items (a-d) will be evaluated by the Program Director and Clinical Coordinator in consultation with the university background check contact and applicable clinical partners. Final decisions regarding eligibility for clinical placement and program participation will be based on the nature of the offense, the date of occurrence, the resolution (e.g., completion of probation), and the potential impact on patient safety, public trust, or access to clinical facilities.

Management of Misdemeanor, Illegal Drug, or Alcohol Exception

1. If a background check report demonstrates a discrepancy, the Clinical Coordinator will contact the university contact who has access to the details of the background check reports.
2. The university contact will determine the cause of the discrepancy and communicate it to the Clinical Coordinator.
3. The Clinical Coordinator will report the findings from the university contact to the Program Director.
4. The university background check policy will be applied as follows:
    i. If offense is related to items (a-d) of the background check policy, the student will not be permitted to start/continue the program.

ii. If offense is a misdemeanor illegal drug or alcohol offense and the student is currently on probation for the offense, the student will not be permitted to start/continue the program.
iii. If offense is a misdemeanor illegal drug or alcohol offense and the student is NOT currently on probation for the offense, the student will be provided the following option.
    a) Student will disclose the misdemeanor illegal drug or alcohol offense to the Clinical Preceptor at the assigned clinical site.
    b) Clinical Coordinator will follow-up with the Clinical Preceptor at the assigned clinical site about the student's disclosure.
    c) If the disclosure prohibits student placement at the clinical site, the student will not be permitted to start/continue the program.
    d) If the disclosure does NOT prohibit student placement at the clinical site, the student will be permitted to start/continue the program, and the student will be advised to complete the **ARRT Pre-Application Ethics Review Process**.

Any offense occurring during the program must be self-reported to the Clinical Coordinator within 30 days. *If an offense is discovered after the initial background check has been completed, whether through self-disclosure or other means, it will be reviewed in accordance with university and program policy to determine program eligibility and clinical placement or continued enrollment in the program. Offenses involving illegal drugs or alcohol will follow the same process outlined above. Failure to report an offense within the required timeframe may result in disciplinary action, up to and including programmatic dismissal.*

Cell Phone Use

Cellular phones are NOT permitted to be turned on or used within the clinical setting. Please give family members the clinical education site's phone number in case of emergency situations.

Clinical Attendance – Part I (Clinical Presence)

Students are required to clock into Trajecsys at the designated clinical start time. Upon clock-in, the student must remain on the clinical site premises for the entire scheduled shift. Leaving the clinical site during scheduled hours while remaining clocked into Trajecsys is strictly prohibited and will be considered falsification of clinical records. This may result in dismissal from the clinical education site and the Radiation Therapy Program.

If unforeseen circumstances or emergencies require the student to leave the clinical site during scheduled hours, the student must clock out and immediately inform the Clinical Preceptor and Clinical Coordinator.

Please refer to the Trajecsys Guidelines (see section 2, pp 40 -45) for policies on submitting time exceptions for partial-day absences.

Clinical Attendance – Part II (Absence & Personal Time)

A strong attendance record for the clinical portion of the program is extremely important. Clinical rotations provide the varied experiences necessary for developing clinical skills and problem-solving ability. Absence from clinical results in missed experiences that cannot be fully replicated through other methods. Clinical absences also reduce the number of days available to complete required clinical education requirements. In addition, attendance records are often considered by future employers, and clinical rotations provide facilities with an opportunity to observe future employees.

If a clinical absence is unavoidable, the student will contact the assigned clinical affiliate and the Clinical Coordinator **prior to** the scheduled clinical education hours. Failure to notify the clinical site prior to the scheduled clinical start time will result in a deduction of two (2) percentage points from the final clinical grade per occurrence.

Unexcused Absence Grade Deductions

Unexcused Hours	Grade Deduction
1-8 hours	2%
9-16 hours	4%
17-24 hours	6%
25-32 hours	8%
33-40 hours	11%
41-48 hours	13%
49-56 hours	15%

Two unexcused absences or failure to complete required clinical hours during any semester will result in disciplinary action per the Student Counseling policy (see section 2, pg. 35).

Personal Time

Each student will be allotted up to sixteen (16) hours of personal time during the fall semester, twenty-four (24) hours during the spring semester, and eight (8) hours during the summer semester. Approved personal time will not affect the student's clinical course grade.

Students planning to use the personal time will notify the Clinical Preceptor immediately. The student will notify the Clinical Coordinator of any approved personal time prior to the absence.

Note: Unused personal time may not be carried over from the fall semester to the spring semester. However, up to eight (8) unused hours can be carried over from the spring to the summer semester.

Students who attend clinical education but do not actively participate or who are dismissed from the clinical site for the day may receive an unexcused absence. Missed clinical hours may be made up, and attendance penalties may be applied per the Clinical Attendance Policy outlined above.

Clinical hours missed during a given semester, beyond the allotted personal time, must be made up prior to the completion of the semester with approval from the Clinical Preceptor and Clinical Coordinator. Make-up time must be arranged to ensure the combined didactic and clinical schedule does not exceed 40 hours per week and does not occur on university-observed holidays.

Please refer to the Trajecsys Guidelines (see section 2, pg. 40-44) for policies about submitting time exceptions for any full-day absence.

Excused Absences

Excused absences will not result in a grade penalty; however, all missed clinical time must be made up. The following circumstances qualify as excused absences:

1. **Under Physician Care –** The student or the student's child is under physician care. Notification of absence must be provided to the Clinical Preceptor and Clinical Coordinator, and submission of a physician's note must be sent to the Clinical Coordinator within 7 days of the absence.
2. **Communicable Illness, Isolation, or Quarantine –** The student or the student's child is required to follow a physician-directed or public-health-directed isolation, quarantine, or exclusion period due to a communicable illness or exposure. Notification of absence must be provided to the Clinical Preceptor and Clinical Coordinator, and submission of a physician's note or local health department's note must be sent to the Clinical Coordinator within 7 days of the absence. The program will follow applicable public health and clinical site recommendations regarding return-to-clinical expectations.

3. **Court Appearance –** Notification of absence must be provided to the Clinical Preceptor and Clinical Coordinator, and submission of court documents requiring appearance within 7 days of the court date.
4. **Funeral Leave –** Notification of absence must be provided to the Clinical Preceptor and Clinical Coordinator. Upon notification, up to three (3) days of leave will be permitted for the death of an immediate family member. Immediate family members include parents, grandparents, spouse, siblings, or children. These absences will not be counted as personal days. Requests for additional time off may be considered on a case-by-case basis for extenuating circumstances. Leave requests related to the death of individuals other than immediate family members may be granted with special permissions.
5. **Severe Weather –** Absences are handled as follows:
    - In the rare event that the University is closed due to weather, local students may use personal judgment regarding attendance at clinical. Students may use personal hours to cover the absence(s) or make up the missed time. Students in other areas of the country who are not impacted by local weather conditions will not be excused from clinical.
    - In cases of severe weather local to the student or clinical site, students may use personal judgment regarding attendance at clinical. Students may use personal time to cover the absence(s) or make up the missed time.
    - If the clinical education site closes or dismisses early due to severe weather, the Clinical Preceptor will communicate directly with the Clinical Coordinator to confirm the closure or early dismissal.
    - Students citing severe weather as the reason for excessive absences may be subject to disciplinary action per the Student Counseling policy (see section 2, pg. 35).

A maximum of 16 hours of missed clinical time may be waived in the event of a clinical site closure/early dismissal or required isolation/quarantine related to a communicable illness.

Clinical Attendance – Part III (Excessive Absences)

Regular attendance during clinical education is essential for the development and maintenance of clinical skills, professional behavior, and continuity of patient care. Clinical education provides hand-on learning experiences that cannot be fully replicated through other instructional methods. Excessive absences may negatively impact clinical competency, skill retention, and patient care continuity.

The Clinical Attendance policy (Part II) outlines allowable personal time, excused absences, and grade reductions related to unexcused absences and tardiness.

Students requiring accommodations related to a medical condition or disability should contact the Student Accessibility Services Office (SASO). Reasonable accommodations may be approved when appropriate; however, accommodations may not fundamentally alter the essential requirements of the program.

A student will be withdrawn from any enrolled clinical course and assigned a failing grade (F) if excessive absence occurs. **Excessive absence is defined as missing 20% of the required clinical hours beyond the allotted personal time provided each semester.** The excessive absence policy applies regardless of the reason for the absence. A failing grade in a clinical course will prevent progression in the program due to unmet course prerequisites.

Clinical Education Focus

The primary focus of clinical education is patient care, professional behavior, and clinical skill development. Students are expected to maintain professional relationships within the clinical environment and avoid involvement in workplace conflicts or departmental matters unrelated to their educational responsibilities.

If situations arise that may affect patient care, student learning, safety, or the clinical environment,

students should notify program faculty or the Clinical Coordinator.

Compensation Time

Students may earn compensation time by remaining at the clinical site beyond scheduled clinical hours for patient care or approved clinical education activities. Compensation time is intended to recognize additional clinical participation beyond the regularly scheduled clinical day and may later be used as approved time away from clinical.

The primary responsibilities of radiation therapy personnel and students in the clinical setting are patient care and the completion of assigned clinical procedures. As a result, breaks, lunches, and scheduled departure times may occasionally be delayed due to patient care responsibilities. Students are expected to participate in patient procedures through observation, assistance, or performance, as appropriate to their level of competency.

Breaks and lunches should be taken as the patient schedule permits. If a student is unable to take a lunch break due to patient care responsibilities, the student should notify the Clinical Preceptor and Clinical Coordinator. **Compensation will not be given for a missed lunch break**.

When approved by the Clinical Preceptor, compensation time may be earned and documented through Trajecsys.

Guidelines for compensation time are as follows:

a. Compensation time will not begin accumulating until the student remains at the clinical site at least 15 minutes beyond the scheduled departure time. The student must have arrived on time and completed the full scheduled clinical day.
b. Students remaining at the clinical site for reasons unrelated to patient care or clinical education activities (e.g., waiting for transportation, completing homework) should clock out at the scheduled departure time.
c. Students wishing to use compensation time must notify the Clinical Preceptor prior to usage and email the Clinical Coordinator within 48 hours.
d. No more than two (2) hours of compensation time may be earned within a given month. Students are strongly encouraged to use the compensation time within the month it is earned.
e. Carryover of comp time from month to month or into another semester requires approval from the Clinical Coordinator. A maximum of 8 hours can be carried over to the following semester.

Confidentiality

Students in the Radiation Therapy program work with medical records and patient information in both clinical and classroom settings. Students may receive direct or indirect information regarding current or former patients from employees, faculty, or other students. Any patient-related information, whether written, verbal, or electronic, or otherwise communicated, is confidential and must be handled securely and professionally.

State and national organizations governing licensure, certification, and professional practice have established standards regarding patient privacy and confidentiality. Failure to protect confidential information is considered an ethics violation and may negatively impact future professional practice. Students are expected to maintain patient confidentiality at all times, including avoiding disclosure of whether a patient is receiving treatment.

Pertaining to Student Confidentiality:

- Student files may be maintained in the Clinical Coordinator’s office for reference purposes and emergency contact information. Student records and personal information will be kept confidential by program faculty. Information will be released to outside parties only with the student's written authorization, unless required by law or university policy. All clinical evaluation forms shared internally will be kept in strict confidence by the program's faculty.

- Clinical evaluations and other student assessment documents shared internally will be maintained confidentially by program faculty.

Pertaining to Classroom and Clinical Patient Information:

- Students must maintain confidentiality of all patient health information encountered during clinical education experiences, both during and after enrollment in the program.
- Students may not use or disclose patient health information except as authorized by the clinical site and applicable privacy regulations.
- Students may not record patient-identifiable information on personal documents, personal devices, or unauthorized materials.
- Students must comply with all applicable HIPAA privacy and confidentiality regulations.
- Entering any Protected Health Information (PHI) or Personally Identifiable Information (PII) into artificial intelligence (AI) platforms, chatbots, transcription services, wearable smart devices, or unauthorized third-party software applications is prohibited and may constitute a HIPAA violation. This includes AI-enabled applications or devices capable of recording, transmitting, analyzing, or storing patient information, including but not limited to ChatGPT, Google Gemini, smart glasses, AI-assisted transcription tools, and similar technologies.
- Students who breach patient confidentiality, where sufficient evidence exists, may be dismissed from the Radiation Therapy program.

Consensual and Familial Relationships

The University prohibits any amorous relationship between students and educators, advisors, Clinical Preceptors, or any other individuals in the clinical setting who hold positions of authority involving instruction, supervision, advising, mentoring, or evaluation of the student.

Any individual aware of such a relationship is expected to report it to the Clinical Coordinator or Program Director.

Familial relationship between a student and any individual within the program or clinical setting must also be disclosed to the Clinical Coordinator or Program Director so that appropriate measures can be implemented to reduce potential conflicts of interest, favoritism, exploitation, or the appearance of impropriety.

Course Grade Computation

When computing radiation therapy course grades, all grading components (exams, quizzes, homework, projects, evaluations, etc.) will be calculated to the nearest tenth of a point. (Example: 94.5, 89.3, or 86.8) Individual grading components will then be weighted according to the course syllabus, combined, and rounded to the nearest whole number to determine the final course grade. (Example: 84.5 = 85; 84.3 = 84)

Each program course syllabus will outline the specific grading criteria and grade computation methods for that course. Additional grade deductions may apply for absences beyond allotted personal time, excessive tardiness, and late submission of required clinical documentation.

Course Grade Requirements

Enrollment and progression in Radiation Therapy courses are contingent upon admission to the program and maintenance of minimum academic standards. Because radiation therapy is a profession in which inadequate performance may negatively impact patient care and safety, the program maintains rigorous academic and clinical expectations to support the competency of program graduates.

The Radiation Therapy Program grading system may differ from grading practices used in other Washburn University courses. A minimum final course grade of 75% is required to successfully pass

all Radiation Therapy courses and progress within the program.

The program uses the following grading scale:

- A = 93 – 100
- B = 85 – 92
- C = 75 – 84
- F = Under 75

A student who receives a final grade of F or withdraws from a Radiation Therapy course will be removed from the program course sequence

Students wishing to appeal a course grade should refer to the Grade Appeal Policy located in the University Catalog, available in the online MyWashburn portal.

Dress Code

Professional appearance and appropriate attire are important components of patient care, safety, infection control, and professional behavior. Students are expected to present themselves in a clean, professional, and clinically appropriate manner during all clinical education experiences. Clinical dress code expectations may vary slightly between affiliated sites; therefore, students must comply with both program and clinical facility dress code requirements. Failure to comply with dress code requirements may result in disciplinary action. The Program Director maintains final authority regarding dress code interpretation.

General Guidelines:

- Students will follow the clinical facility's dress code policy regarding the appropriate work attire to wear.
- All clothing must be clean, wrinkle-free, properly fitted, and in good condition.
- Jewelry may be worn in moderation. Earrings must be limited to the earlobe and dangling earrings are prohibited for safety reasons. Visible body piercings other than ear piercings are not permitted during clinical education experiences. Necklaces should remain inside the shirt or blouse to reduce safety and patient care concerns.
- Hair, including facial hair, must be clean, neatly groomed, and maintained in a manner that does not interfere with patient care, safety, or clinical responsibilities. Hair that extends beyond shoulder length must be secured appropriately.
- Excessive fragrances or scented products should be avoided.
- Students are expected to maintain appropriate personal hygiene and cleanliness.
- A name tag should be worn at all times. Acceptable name tags include:
    - Washburn University student identification card.
    - Navy blue ID badge with white lettering with the student's name and identification of the individual as a Washburn University Radiation Therapy student.
    - Hospital-issued badge with identifying the individual as a Radiation Therapy student.
- A radiation monitoring badge will be provided and will be worn at all times while in clinical.
- Nails must be short, clean, and well-maintained. Artificial nails are prohibited.
- Appropriate undergarments must be worn at all times.
- Shoes must be clean and appropriate for the clinical setting. Clogs and sandals are prohibited.
- Students must comply with the clinical site's policy regarding face coverings or other required personal protective equipment (PPE).

Note: Clinical Preceptors may dismiss a student from the clinical site for failure to comply with the dress code. Any missed time will constitute an unexcused absence and must be completed during finals week. Failure to comply with the dress code will result in counseling, as described in the Student Counseling policy (see section 2, pg. 35).

Students must comply with the clinical facility dress code if it is more restrictive than the program policy.

Food and Drink

Food and drink are not permitted at the treatment console unless approved by the Clinical Preceptor.

Students may not receive food or drink deliveries during scheduled clinical hours. This includes, but is not limited to, deliveries from online food delivery services such as Grubhub, DoorDash, Uber Eats, or personal deliveries.

The student may request permission from the Clinical Preceptor for a delivery to occur during the designated lunch period. If approved, students are responsible for arranging pickup and payment in a manner that does not disrupt clinical workflow or patient care.

Grievance/Due Process

In any educational or work setting, concerns or complaints may occasionally arise. Students are encouraged to attempt informal resolution whenever appropriate before initiating a formal grievance or appeal process. University policies regarding Student Conduct, Academic Impropriety, and Grade Appeal are available in the University Catalog, accessible via the online MyWashburn portal.

Didactic Course Concerns

- The student should first attempt to resolve the matter with the course instructor involved.
- If satisfactory resolution is not obtained, the student should contact the Radiation Therapy faculty member (Program Director or Clinical Coordinator) who is not the assigned course instructor within 21 days after the occurrence. The Radiation Therapy faculty member will investigate the concern and communicate a decision to the student within 21 days.
- If satisfactory resolution is still not obtained, the student has 7 days to submit a written appeal to the Allied Health Department Chairperson. Contact information for the Allied Health Department Chairperson can be obtained by calling the Allied Health Department secretary at 785.670.2176. The Chairperson has 14 days to respond.
- If satisfactory resolution is still not obtained, the student may submit a written appeal within 7 days to the Associate Dean of the School of Applied Studies (SAS). The Associate Dean has 14 days to respond.

Clinical Concerns

- If a concern occurs within the clinical setting and is unrelated to an unsatisfactory clinical evaluation, the student should first attempt to resolve the matter with the involved individual(s)
- If the student fears retaliation, multiple students are affected, or the concern persists, the Clinical Coordinator or Program Director may intervene.
- If satisfactory resolution is still not obtained, the student has 7 days to submit a written appeal to the Allied Health Department Chairperson. Contact information for the Allied Health Department Chairperson can be obtained by calling the Allied Health Department secretary at 785.670.2176. The Chairperson has 14 days to respond.
- If satisfactory resolution is still not obtained, the student may submit a written appeal within 7 days to the Associate Dean of the School of Applied Studies (SAS). The Associate Dean has 14 days to respond.

Clinical Evaluation Appeals

Program faculty and Clinical Preceptors recognize that students may occasionally disagree with clinical evaluations. Due to variations in clinical procedures, evaluator expectations, and student performance, concerns related to clinical evaluations will be reviewed individually.

Professional Development Evaluations: Due on the 15th of each month (except December, May,

and July).

- Once submitted, the evaluation will remain temporarily hidden from both the Clinical Preceptor and student for 7 days while the Clinical Coordinator reviews the evaluation.
- Following the review period, evaluations will automatically become visible to the student and Clinical Preceptor in Trajecsys.
- Students must acknowledge review of the evaluation within 7 days of release.

If the student disagrees with the evaluation result:

- The student should contact the Clinical Coordinator within 7 days of the evaluation release date.
- The Clinical Coordinator will review the concern and provide a determination.
- If disagreement with the evaluation result persists, the student may contact the Program Director within 7 days.
- The Program Director will review the concern and provide a determination.
- If the student remains dissatisfied following the Program Director review, a written appeal may be submitted to the Allied Health Department Chairperson within 14 days. Contact information for the Allied Health Department Chairperson can be obtained by calling the Allied Health Department secretary at 785.670.2176.

Competency Evaluations: Competency evaluations should be reviewed with the student upon completion.

If a student disagrees with the evaluation result:

- The student should contact the Clinical Coordinator within 7 days of the evaluation completion date.
- The Clinical Coordinator will review the concern and provide a determination.
- If disagreement with the evaluation result persists, the student may contact the Program Director within 7 days.
- The Program Director will review the concern and provide a determination.
- If the student remains dissatisfied following the Program Director review, a written appeal may be submitted to the Allied Health Department Chairperson within 14 days. Contact information for the Allied Health Department Chairperson can be obtained by calling the Allied Health Department secretary at 785.670.2176.

Program Status Appeals

Students appealing a decision related to admission, progression, probation, suspension, or dismissal from the program should follow the procedures outlined below.

- A student must first attempt to resolve their dispute concerning program status through consultation with the Program Director or Clinical Coordinator.
- Written notification of intent to begin the appeal process must be submitted within 10 working days of the student receiving notification of the decision.
- If satisfactory resolution is not obtained, the student may submit a written appeal to the Allied Health Department Chairperson within 10 working days of notification of the Program Director or Clinical Coordinator's decision. The Department Chairperson will review the matter and communicate a decision.
- If the student remains dissatisfied with the outcome, the student may appeal to the *Student Program Status Appeals Committee (SPSA).* Written notification to the Associate Dean of the School of Applied Studies must be provided by the student within 10 working days of notification of the Department Chairperson's decision to continue the appeal process. Please refer to the Final Stage of the Appeal Process below for additional information regarding SPSA procedures.

University Representatives at each level of appeal (Program Director, Department Chairperson, or Associate Dean) will communicate decisions as promptly as possible, generally within 30 working days unless exceptional circumstances occur and are communicated to the student. Meetings may be

conducted remotely when appropriate.

Students should understand the following:

- The burden of proof rests with the student to support the appeal.
- Decisions of the SPSA committee are final.

Program Status Appeals Committee Composition (SPSA)

The SPSA committee will be composed of faculty members from the School of Applied Studies (SAS), with the Associate Dean serving as Chairperson. Committee members are appointed by the Dean of SAS. The Dean will seek to appoint members who do not have a conflict of interest with the petitioner. All appointments are final and cannot be challenged.

The committee will include at least four faculty members representing at least two departments within SAS. The Associate Dean will not be a voting member of this committee.

Final Stage of Appeal Process

To initiate the final stage of the appeal process, the student must submit a written appeal letter to the Associate Dean of the School of Applied Studies for review by the SPSA committee. The appeal letter must:

a. Specifically detail what program policy is being challenged
b. State clearly how that policy was applied to the student
c. Articulate all arguments that support the student's appeal

The SPSA committee will review the student's written appeal, along with relevant documentation submitted by the Program Director, Allied Health Department Chairperson, and other involved parties as appropriate. The committee will then schedule a meeting for the student and program representatives to present information related to the appeal. Equal presentation will be provided to all parties at the discretion of the committee.

Students may bring one support person to the hearing. The support person may not address the committee directly but may provide support to the student during the hearing. If the student decides to bring another person to the hearing, the student must sign a consent form in compliance with FERPA and the privacy of student records.

Following the hearing, the SPSA committee will deliberate privately. A committee vote of greater than 50% is required to support the student's appeal.

The Chair of the SPSA committee will notify the student and Allied Health Department Chairperson of the committee's decision in writing. Decisions of the SPSA committee are final.

Health

Students must maintain health and clinical compliance requirements necessary for participation in the Radiation Therapy Program and affiliated clinical education sites. Requirements may include a physical examination, immunizations, laboratory titers, background checks, and drug screening.

All required documentation must be completed and submitted prior to the program start date. Students are responsible for associated expenses, including laboratory testing and drug screening fees.

Failure to complete clinical compliance requirements by established deadlines may prevent participation in clinical education experiences and progression within the program.

A failed drug screen will follow established retesting and review procedures. Confirmation of a failed drug screen will result in dismissal from the program.

Any illness or leave of absence requiring physician documentation may be maintained in the student's

program file.

Injuries sustained during assigned clinical education experiences will be treated at the student's expense.

Incident Report

Students will submit an incident report for any incident for which a staff therapist would need to complete an incident report. Completion of the Incident Form in the Trajecsys system and direct communication with the Clinical Coordinator will be done within 24 hours of the incident. The Trajecsys form is located under the "Evaluations" tab on the main menu. The form requires the following information:

- Date of report;
- Date and time of incident;
- Brief explanation of incident;
- Confirmation that a copy of the organization's incident report form will be mailed within 7 days to the Clinical Coordinator.

Infectious Disease

Any student diagnosed with, exposed to, or suspected of having a communicable or infectious disease must immediately contact the Clinical Coordinator and Clinical Preceptor. Upon notification, the Clinical Coordinator will contact the infection control nurse at the appropriate clinical site to determine any necessary follow-up or site-specific protocols. Communicable diseases may include, but are not limited to, influenza, COVID-19, pneumonia, meningitis, hepatitis, MRSA, measles, chickenpox, shingles, strep throat, impetigo, or other conditions determined to pose a potential risk to patients, staff, or fellow students.

Because many patients within the clinical environment are immunocompromised or medically vulnerable, students are expected to prioritize patient and public safety and avoid reporting to clinical when ill or potentially contagious.

Students who are exposed to or diagnosed with an infectious disease must:

- Immediately report the exposure to the Clinical Preceptor and the program Clinical Coordinator.
- Follow applicable clinical site, healthcare provider, and/or public health guidance regarding isolation, quarantine, masking, testing, or return-to-work recommendations.
- Refrain from attending clinical education experiences if symptoms, exposure status, or medical guidance indicate a potential risk to others.
- Obtain medical evaluation and/or written medical clearance if requested by the Clinical Coordinator or clinical site prior to returning to clinical education experiences.

Students may not return to clinical education experiences until:

- Fever-free for at least 24 hours without fever-reducing medication (if applicable),
- Symptoms are improving
- They are physically able to safely participate in clinical and classroom responsibilities
- Any additional clinical site or program requirements have been satisfied

Students traveling from areas with public health restrictions or outbreaks should communicate with the Clinical Coordinator prior to returning to clinical education experiences if travel-related restrictions, symptoms, testing, or exposure concerns may affect clinical participation.

Liability Insurance

Washburn University provides liability insurance to all enrolled students in the Radiation Therapy program and other allied health programs. Additional coverage may be obtained by the individual if

desired.

MRI Environment – Student Screening

Magnetic Resonance Imaging (MRI) utilizes a powerful magnet and radio waves to generate images of the body. MRI imaging may be used during the radiation therapy treatment planning process or in the treatment room as a form of image-guided radiation therapy (IGRT).

Because the MRI magnet is always active, the MR environment may pose serious safety risks to individuals with certain metallic, magnetic, mechanical, or electronic implants, devices, or foreign bodies. Students with certain implanted devices, such as pacemakers, cochlear implants, defibrillators, neurostimulators, aneurysm clips, and some infusion pumps, may be restricted from entering the MR environment.

Prior to participating in clinical education experiences, students will undergo MRI safety screening for implants, devices, metallic foreign bodies, or prior injuries involving metal fragments (e.g., bullets, shrapnel, or intraocular metallic foreign bodies). Metallic objects may move, malfunction, heat, or become hazardous within the magnetic field.

Loose metallic objects are strictly prohibited within the MR environment because they may become dangerous projectiles and cause serious injury, death, or equipment damage. Prior to entering the MR environment, students must remove all metallic and electronic items, including but not limited to:

- Clothing with metallic zippers, buttons, snaps, hooks, or underwires
- Cell phones and electronic devices
- Eyeglasses
- Hairpins or barrettes
- Hearing aids
- Jewelry (including body piercings) or watches
- Keys
- Money clips, credit cards, bank cards, magnetic strip cards, coins
- Pens, safety pins, or paper clips
- Pocket knife, nail clipper, or tools
- Steel-toed footwear

Questions or concerns regarding implants, devices, or metallic objects must be discussed with supervising staff **before** entering the MR environment.

Students participating in MRI-related clinical experiences must remain under direct supervision by a registered radiation therapist or other appropriately credentialed staff and must comply with all assigned clinical site MRI safety policies and procedures. Failure to comply with MRI safety requirements may result in removal from the clinical area, disciplinary counseling, or other action as outlined in the Student Counseling policy (see section 2, pg. 35).

The MRI screening questionnaire will be distributed electronically following orientation and faculty review of the MRI safety policy. Students must complete and submit the questionnaire through the designated electronic process prior to the start of clinical education experiences.

The questionnaire will be reviewed by the Clinical Coordinator and, as needed, shared with the Clinical Preceptor to help ensure MRI safety requirements are met. A copy will also be maintained within the student's program file. If screening responses identify a potential safety concern, additional review or screening may be required to determine eligibility for participation within the MR environment.

If at any point in the program the status of the student's screening questionnaire responses should change, the student must notify the Clinical Coordinator immediately to re-evaluate the student's continued eligibility to enter the MR environment.

Example MRI Student Screening Questionnaire

Name _____

Please indicate whether you currently have, or have a history of, any of the following:

Yes	No	Potential MRI Safety Concerns or Contraindications
		Aneurysm clip(s)
		Artificial heart valve, vascular coil, filter, shunt, or stent
		Body piercing jewelry (excluding earrings)
		Cardiac pacemaker, implanted defibrillator, or internal electrodes
		Cochlear implant, middle ear implant, or hearing aids
		Electronic implant or device
		External or internal medication/insulin pump
		Eye injury from a metallic foreign body (e.g., welding fragments, metal shavings, metal slivers)
		History of metallic foreign body or fragment in the eye or other soft tissue
		Implanted post-surgical hardware (e.g., surgical clips, pins, rods, mesh, staples)
		IV access port
		Medication patch containing metallic components
		Neurostimulator or spinal cord stimulator
		Prior injury involving shrapnel, bullet fragments, BBs, or other metallic objects
		Prosthesis (e.g., shoulder, joint replacement)
		Removable metallic dental work, braces, or retainers
		Spinal fixation device or spinal fusion
		Surgical clips, staples, or surgical mesh
		Swan-Ganz or thermodilution catheter
		Tissue expander (breast)
		Other implant, device, injury, or metallic object not listed above

Please explain in further detail if you answered “yes” to any of the above questions:

_____

_____

_____

I attest that the above information is correct to the best of my knowledge. I have read and understand the entire contents of this form and have had the opportunity to ask questions regarding the information on this form.

Student Signature: _____ **Date :** _____

Clinical Coordinator Signature: _____ **Date :** _____

Pregnancy Policy

The National Council on Radiation Protection (NCRP) advises that appropriate control measures should be taken to avoid or reduce the risk of ionizing radiation exposure to the human embryo or fetus. The Nuclear Regulatory Commission (NRC) currently states that the dose equivalent to the embryo/fetus during the entire pregnancy, due to the occupational exposure of a declared pregnant individual, cannot exceed **0.5 rem**. The NCRP recommends restricting fetal exposure to an equivalent dose of **0.05 rem per month.**

All pregnant students in the Washburn University Radiation Therapy program retain the right to make an informed decision regarding the acceptance or refusal of this risk. Students are encouraged to review the following document: **NRC Regulatory Guide 8.13 – Instruction Concerning Prenatal Radiation Exposure (Revision 3, June 1999)**, for comprehensive information on prenatal radiation exposure guidelines. Based on the guidance above, the following policy will be followed:

1. **Declaration of Pregnancy:** Upon confirmation of pregnancy, a student may voluntarily declare pregnancy in writing by submitting the **Notification of Pregnancy Form** to the Clinical Coordinator (see section 2, pg. 26).
    a. Without a written declaration, the student will not be considered a declared pregnant student under this policy.
    b. **Pregnancy declarations must be made directly to the Clinical Coordinator;** students may not disclose their pregnancy to the clinical site only. The program and clinical site are considered a single unit for the purposes of declaration and documentation.
    c. Once a written declaration is submitted, the Clinical Coordinator will meet with the student to review program policies, options, and considerations related to completing the program during pregnancy or following a pregnancy leave.
    d. If a student elects to continue in the program (with or without modifications), the student must also submit the **Physician's Awareness of Pregnancy Form** (see section 2, pg. 28).
    e. A declared pregnancy may be withdrawn at any time by submitting written notice to the Clinical Coordinator.

2. **Post-Declaration Counseling and Review:** Upon receipt of a written declaration of pregnancy:
    a. The student will be advised to consult with the Radiation Safety Officer (RSO) or Medical Physicist at the clinical site to discuss:
        i. Recent exposure history
        ii. Acceptable fetal dose limits
        iii. Radiation protection procedures
    b. Documents concerning fetal exposure limits will be provided.
    c. The student is also encouraged to seek guidance from their attending physician

3. **Student Options after Declaration:** The student must submit a written notice to the Clinical Coordinator identifying one of the following options:
    a. Withdraw from the program,
    b. Continue in the program without pregnancy modifications,
    c. Continue in the program with pregnancy modifications,
    d. Take a leave of absence from clinical only
    e. Take a leave of absence from the entire program.

4. **Continuation Without Pregnancy Modifications:** If the pregnancy is declared and the student elects to continue in the program **without pregnancy modifications**, the following must be completed:

a) Submit the **Physician's Awareness of Pregnancy Form** (see section 2, pg. 28) and a completed **Pregnancy Release Form** (see section 2, pg. 27), accepting full responsibility for their own actions and the health of their baby. This form also relieves Washburn University, its faculty, and the clinical site of liability in the event of adverse effects.
b) Review **NRC Regulatory Guide 8.13 – Instruction Concerning Prenatal Radiation Exposure** (Rev. 3, June 1999) on prenatal radiation exposure.
c) Review the clinical facility's radiation protection guidelines with the Radiation Safety Officer or appropriate designee of the facility.
d) Fulfill all standard clinical and academic program requirements without exemption.
e) Take a minimum of six weeks of maternity leave following childbirth, with the actual length of leave to be determined by the student's attending physician.
f) Submit the **Physician Release Form** to the Clinical Coordinator before returning from maternity leave (see section 2, pg. 29).

5. **Continuation With Pregnancy Modifications**: If the student elects to continue in the program **with pregnancy modifications**, the following must be completed:
    a. Submit the **Physician's Awareness of Pregnancy Form** (see section 2, pg. 28) and a completed **Pregnancy Release Form** (see section 2, pg. 27), accepting full responsibility for their own actions and the health of their baby.
    b. Review **NRC Regulatory Guide 8.13 – Instruction Concerning Prenatal Radiation Exposure** (Rev. 3, June 1999) on prenatal radiation exposure.
    c. Review the clinical facility's radiation protection guidelines with the Radiation Safety Officer or appropriate designee of the facility.
    d. Collaborate with the Clinical Coordinator to identify acceptable pregnancy-related modifications for the clinical assignments.
    e. Fulfill all modified clinical and academic program requirements, as outlined.
    f. Take a minimum of six weeks of maternity leave following childbirth, with the actual length of leave to be determined by the student's attending physician.
    g. Submit the **Physician Release Form** to the Clinical Coordinator before returning from maternity leave (see section 2, pg. 29).

6. **Radiation Monitoring Requirements**: All students who have declared pregnancy in writing, regardless of their decision about modifications, will comply with the following: The declared pregnant student will sign clinical facility forms as necessary.
    a. Sign all required radiation safety documentation at the clinical facility.
    b. Follow all program and clinical facility radiation safety guidelines.
    c. Wear a second personnel radiation monitor at waist level and under the protective apron (if utilized) to monitor fetal exposure.
    d. Submit radiation monitor report data within Trajecsys for the first and second radiation monitoring devices. The fetal badge should be clearly identified as such.
    e. If the fetal badge indicates exposure approaching recommended limits, the student should be removed from radiation areas in accordance with the NCRP recommendations (0.05 rem/month fetal limit).

7. **Leave of Absence from Clinical Education**: If the student elects to take a leave of absence from clinical only, the following will apply:
    a. The Clinical Coordinator will determine if an incomplete grade may be issued for the course or if the student should withdraw from the clinical course.
    b. A clinical leave of absence could result in a delay of graduation and/or sitting for the national ARRT certification examination.
    c. Prior to returning from a clinical leave of absence, the student must communicate their desire to return to the Clinical Coordinator, and the student will be reinstated. Reassignment to the same clinical site cannot be guaranteed

d. Prior to returning from a clinical leave of absence, the student must submit the **Physician Release Form** to the Clinical Coordinator (see section 2, pg. 29).

8. **Leave of Absence from the Program:** If the student elects to take a leave of absence from the program, the following will apply:
    a. The Program Director will work with faculty to determine if incomplete grades may be issued for currently enrolled courses or if the student should withdraw from courses.
    b. A program leave of absence could result in a delay of graduation and/or sitting for the national ARRT certification examination.
    c. Prior to returning from a program leave of absence, the student must communicate their desire to return to the Program Director, and the student will be reinstated. Depending on the timing and length of the leave, reinstatement will occur at the appropriate semester of the next academic year.
    d. Reassignment to the same clinical site cannot be guaranteed following a program leave of absence.
    e. Prior to returning to clinical, the student must submit the **Physician Release Form** to the Clinical Coordinator (see section 2, pg. 29).

9. **Program Documentation and Communication**:
    a. All forms related to the declaration of pregnancy will be maintained in the student's confidential program file.
    b. Copies of all applicable forms related to the declaration of pregnancy will be shared with the clinical facility.
    c. All communication related to the declaration of pregnancy (verbal, written, or electronic) will be documented and retained in the student's confidential program file.
    d. The Clinical Coordinator will communicate directly with the clinical facility regarding pregnancy declarations and follow up to ensure discussions have taken place between the student and the facility regarding radiation safety guidelines and facility-specific policies.

Washburn University – Radiation Therapy Program

Notification of Pregnancy

Formal, voluntary notification is the only means by which the clinical facility and the Washburn University Radiation Therapy program can ensure the dose to the embryo-fetus. In the absence of a voluntary, written disclosure, a student cannot be considered pregnant. Written notification should be given to the Clinical Coordinator. Notification of the pregnancy will be communicated to appropriate faculty and personnel at the clinical site.

This form should be used for notification of pregnancy.

I, _____, am declaring that I am pregnant. I became pregnant in _____(only the month and year need to be provided).

_____ _____

Student Signature **Date**

_____ _____

Program Director Signature **Date**

_____ _____

Clinical Coordinator Signature **Date**

Washburn University – Radiation Therapy Program
Physician's Awareness of Pregnancy

Student Name _____ **DOB** _____

Washburn Identification Number (WIN) _____

The student named above is presently enrolled in the Washburn University Radiation Therapy program. Due to the nature of the program, the student may be exposed to ionizing radiation or other hazards (i.e., lifting, possible exposure to contagious disease, etc.). In order to determine the appropriate precautions, we need the following information:

1. Approximate date of conception: _____
2. Approximate date of delivery: _____
3. Present health status: _____

_____

_____

4. Will the student be under your care during her pregnancy? _____Yes _____No
5. Do you recommend their continuation with clinical education? _____Yes _____No
6. Do you recommend that she continue in the program? _____Yes _____No
7. Recommended date for maternity leave to begin: _____
8. Recommended length of maternity leave: _____

Note: A written release is required before this student may return to clinical education.

_____ _____

Physician's Printed Name **Physician's Phone Number**

_____ _____

Physician's Signature **Date**

Washburn University - Radiation Therapy Program
Physician Release Form

Student Name: _____

The student named above is presently enrolled in the Washburn University Radiation Therapy program. This release form is to be completed by the licensed physician responsible for providing postnatal care and assessment of the named student.

YES NO The physician has reviewed the program's Essential Functions (see pages 30-31 below), which detail the activities expected of a radiation therapy student in the clinical setting.

YES NO The physician has determined that the student is physically capable of returning to clinical activity **without** modifications.

YES NO The physician has determined that the student is physically capable of returning to clinical activity **with** modifications.

Please describe necessary modifications:

_____

_____

_____

Date on which the student may return to clinical education: _____

_____ _____

Physician's Printed Name **Physician's Phone Number**

_____ _____

Physician's Signature **Date**

Washburn University – Radiation Therapy Program
Pregnancy Release Form

I, _____, a student of the Washburn University Radiation Therapy program, currently assigned to _____ (Clinical Education Facility), am confirming my pregnancy. I understand the implications (of radiation and other hazards) stated in the Pregnancy Policy and **NRC Regulatory Guide 8.13 – Instruction Concerning Prenatal Radiation Exposure** (Rev. 3, June 1999) and agree to adhere to the stated guidelines. I will not hold Washburn University or the clinical education facility/facilities liable in case of abnormalities to this pregnancy, which may be caused by radiation exposure.

_____ _____
Student Signature **Date**

Witnessed By: _____ _____
Radiation Safety Officer of Clinical Facility **Date**

Witnessed By: _____ _____
Chair, Department of Oncology **Date**

_____ _____
Program Director **Date**

_____ _____
Clinical Coordinator **Date**

Washburn University Radiation Therapy Program
Essential Functions Form

The following Essential Functions identify the physical, cognitive, behavioral, communication, and professional requirements necessary to safely and effectively perform the duties of a radiation therapist. Students admitted to the program must be able to perform these Essential Functions with or without reasonable accommodations.

Mental/Concentration Demands: Candidates must be able to:

- Concentrate for extended periods of time without losing focus.
- Maintain attention on tasks for prolonged durations.
- Learn, process, and retain new information efficiently.
- Apply theoretical concepts that support the clinical practice of radiation oncology.

Manual Dexterity/Fine Motor: Candidates must be able to:

- Stand, walk, crouch, stoop, bend, balance, twist at neck and waist, and reach/grasp in all directions (above shoulders, in front of the body, to the sides, and below the knees).
- Push and pull objects routinely exceeding forty (40) pounds, including accessory equipment, wheelchairs, and stretchers.
- Lift 10-40 pounds unassisted to and from a height of approximately six (6) feet. Items may include, but are not limited to, blocks, patients, film cassettes, patient charts, electron cones, accessory devices, positioning aids, and other equipment.
- Be independently mobile within and between buildings.
- Maintain sufficient balance to assist and protect patients as needed.
- Push wheelchairs and stretchers safely from waiting areas to treatment, simulation, and nursing rooms.
- Transport, reposition, move, and assist dependent patients from stretchers or wheelchairs onto treatment tables.
- Demonstrate the strength, agility, and flexibility required to properly manipulate and position patients.
- Sustain physical and mental endurance to engage in full hours (8 hours) of patient care, five days per week.
- Exhibit fine motor coordination and dexterity to grasp, handle, hold, cut, push, pull, and feel objects accurately and safely.
- Work effectively in confined spaces, such as assisting patients in bathrooms or sharing workspaces with multiple individuals.
- Use hands, wrists, and shoulders fully, with the ability to remain standing for approximately 80% of the workday.
- Perform CPR effectively.
- Correctly don and use personal protective equipment (PPE) as required for patient and safety.

Visual & Hearing: Candidates must be able to:

- Assess the patient's condition by asking relevant questions, actively listening to responses, and observing both physical condition and behavior.
- Read typewritten, handwritten, and computer-generated information.
- Visually evaluate simulation images and portal verification films.
- Monitor patients via closed-circuit TV cameras and display monitors.
- Distinguish colors and varying levels of opacity.
- Demonstrate depth perception for accurately judging distances and spatial relationships.
- Differentiate sounds and voices over background noise.
- Hear and understand patient communications through the auditory monitoring system.
- Hear verbal communication from patients and coworkers in a darkened treatment/simulation room.

Communication Skills: Candidate must be able to:

- Communicate audibly and clearly in person to exchange accurate information in one-on-one conversations, small groups, a large classroom setting, or larger group environments.

- Communicate effectively in both written and spoken English.
- Detect, interpret, and appropriately respond to verbal and non-verbal communication, as well as acoustically generated signals such as call bells, monitors, phones, and alarms.
- Use therapeutic communication techniques, including attending, clarifying, coaching, facilitating, and appropriately using and interpreting nonverbal cues.
- Communicate effectively, efficiently, and appropriately with peers, faculty, supervisors, other professionals, patients, and their significant others.
- Demonstrate sufficient observational skills to collect data on patient performance and ensure patient safety during treatment activities.
- Gather, analyze, and accurately interpret information.

Exposures: Once accepted into the program, candidates may be exposed to:

- Blood, body fluids, and infectious diseases.
- Potentially hazardous magnetic fields, ionizing radiation, and radioactive materials.
- Electrical hazards.
- Moderate noise from mechanical equipment.
- Other hazardous materials, toxic substances, and irritating particles.

Personal Traits: Candidates must be able to frequently:

- Work within clinical environments that may involve exposure to individuals with physical and mental disabilities, as well as situations involving pain, grief, death, stress, communicable diseases, blood and body fluids, toxic substances, noxious odors, and irritating particles.
- Work respectfully and effectively with a diverse patient population, including individuals of varying ages, ethnicities, races, religions, sexual orientations, gender identities, and socioeconomic backgrounds without prejudice or discomfort.
- Conduct oneself in accordance with professional ethical standards.
- Demonstrate teamwork, cooperation, and respect for peers, faculty, supervisors, other healthcare professionals, patients, and their significant others.
- Function effectively both independently and as part of a team.
- Modify behavior or performance in the classroom or the clinic based on feedback from instructors or Clinical Preceptors.
- Exhibit problem-solving skills sufficient to organize and complete multiple tasks accurately and within assigned periods.
- Independently initiate routine job tasks.
- Respond independently, effectively, and quickly to an emergency.
- Maintain composure and flexibility in stressful or rapidly changing conditions.
- Analyze both abstract and concrete variables, define problems, collect relevant data, establish facts, and draw valid conclusions.
- Interpret instructions provided in oral, written, diagrammatic, or schedule form.
- Follow detailed written and verbal instructions, ranging from simple to complex.
- Comprehend and apply information from medical records, documents, evaluations, manuals, journals, equipment instructions, safety guidelines, and procedural protocols.
- Interact compassionately and effectively with individuals who are sick or injured.
- Function safely, effectively, and calmly in stressful situations.
- Prioritize multiple responsibilities or tasks as needed.
- Maintain personal hygiene appropriate to clinical and professional standards.

If accommodations are needed for didactic courses or clinical education, it is encouraged to submit a request before courses begin; however, requests may be made at any time during the program. All requests shall be submitted to the Student Accessibility Services Office (SASO) at 785-670-1622 or accommodations@washburn.edu.

Radiation Protection Guidelines

The Radiation Therapy Program's radiation protection policies and procedures are designed to promote the safe and appropriate use of radiation for students, patients, staff, and the general public.

Students are expected to practice appropriate radiation safety measures to protect patients, themselves, coworkers, and the public. The following guidelines apply during all clinical education experiences:

1. Students must wear the assigned radiation monitoring device at collar level while in all clinical education areas. Monitoring devices should remain at the clinical site in the designated storage area when not in use and must not be taken home unless otherwise directed by the clinical site.
2. Any accidental damage to, or loss of, or suspected malfunction of a monitoring device must be reported to the Clinical Preceptor and the Radiation Safety Officer (RSO) immediately.
3. Equipment malfunctions or unsafe radiation safety conditions must be reported to appropriate personnel.
4. For occupational radiation workers, NCRP Report No. #116 recommends:
    a. Annual effective dose equivalent limit of 5 rem (50 mSv).
    b. Cumulative effective dose equivalent limit of 1 rem X age in yrs (10 mSv X age)
5. For students under 18 years of age participating in clinical education experiences:
    a. Annual effective dose equivalent limit of 0.1 rem (1 mSv)

Each clinical education site will issue a radiation monitoring device to students assigned to that facility. If a student is also employed at the clinical site (e.g., radiographer, student technologist, tech aide), a separate monitoring device must be worn during work hours in accordance with employer policy.

Based on the clinical site's monitoring schedule, the radiation safety officer (RSO) or the designated personnel will collect the monitoring device for processing and issue a replacement device. The radiation monitoring report will be available at the clinical site without public release of personal identification, such as a Social Security number.

Students must electronically submit a copy of the radiation monitoring report to the program's Clinical Coordinator with all non-applicable names redacted. Upon receipt, the Clinical Coordinator will arrange a time to review the student's radiation monitoring device report. If monitoring devices are turned in monthly, a monthly review of the report with the Clinical Coordinator is necessary. If monitoring devices are turned in quarterly, a quarterly review of the report with the Clinical Coordinator is required. Students are required to ask the Radiation Safety Officer of the clinical education site about the location of the report postings. **The review with the Clinical Coordinator must occur within 30 days of the student receiving the radiation monitoring report.**

- If the report values are less than the defined Level I value, no action is necessary.
- If the report values are between the Level I and Level II values, the Clinical Coordinator will communicate with the RSO at the clinical site and the student to review clinical activity and identify possible actions that would reduce future exposures.
- If the report value exceeds the established Level II values, the Clinical Coordinator will contact the RSO at the clinical site to inquire about the possible causes of the excessive dose and inquire about investigational activities. A report will be completed by the Clinical Coordinator and reviewed/approved by the clinical site RSO. Conclusions from the report will identify required modifications or corrective actions. A copy of the report will be reviewed with the student and provided to the student for signature.

See tables below for the NRC 10CFR20 annual occupational dose limits for adults and the investigational limits that will be utilized by the program.

10CFR20 Annual Occupational Dose Limits

Exposure Category	Annual Dose Limit
Total Effective Dose Equivalent (TEDE)	5 rem (0.05 Sv) per calendar year
Lens Dose Equivalent (LDE) – Eye	15 rem (0.15 Sv) per calendar year
Deep Dose Equivalent (DDE) to Any Individual Organ or Tissue (other than lens of eye)	50 rem (0.5 Sv) per calendar year
Shallow Dose Equivalent (SDE) – Skin or Extremity	50 rem (0.5 Sv) per calendar year

The program uses ALARA investigational levels corresponding to approximately 10% (Level I) and 30% (Level II) of the applicable annual occupational dose limit.

Monthly ALARA Investigational Levels

Exposure Category	Level I	Level II
Total Effective Dose Equivalent	41 mrem/month	125 mrem/month
Lens Dose Equivalent (LDE) - Eye	125 mrem/month	375 mrem/month
Deep Dose Equivalent (DDE) to Any Individual Organ or Tissue (other than lens of eye)	416 mrem/month	1,250 mrem/month
Shallow Dose Equivalent (SDE) – Skin or Extremity	416 mrem/month	1,250 mrem/month

Quarterly ALARA Investigational Levels

Exposure Category	Level I	Level II
Total Effective Dose Equivalent	125 mrem/quarter	375 mrem/quarter
Lens Dose Equivalent (LDE) - Eye	375 mrem/quarter	1,125 mrem/quarter
Deep Dose Equivalent (DDE) to Any Individual Organ or Tissue (other than lens of eye)	1,250 mrem/quarter	3,750 mrem/quarter
Shallow Dose Equivalent (SDE) – Skin or Extremity	1,250 mrem/quarter	3,750 mrem/quarter

Sexual Harassment and Discrimination

Washburn University is committed to maintaining a safe, respectful, and professional learning environment free from sexual harassment, discrimination, and retaliation. Sexual harassment may be defined as any sexually oriented behavior, demand, comment, or physical contact, initiated by an individual at the workplace or educational setting, that becomes a condition of employment or education, influences employment or academic decisions, interferes with the individual's work or learning, or creates a hostile or offensive working environment.

Students have the right to learn in an environment free from harassment and are encouraged to report any concerns promptly. Students who witness or experience conduct of concern should notify the Clinical Coordinator or Program Director. Students will be asked to provide a written statement describing the incident(s) in detail so the matter can be thoroughly reviewed and appropriately addressed by program faculty.

If the student believes the concern has not been adequately resolved, or prefers to report directly to the University, they are encouraged to contact Michelle Godinet, Director of the Equal Opportunity Office/ Title IX Coordinator. Reports may be submitted:

- In person: Morgan Hall, Suite 200K (1700 SW College Ave, Topeka, KS)
- By phone: 785-670-1509
- By email: eodirector@washburn.edu
- Through the online complaint form located on the Equal Opportunity page of the Washburn University website.

Additional information regarding supportive measures, reporting procedures, and the University's Sexual Harassment Policy may be found in the University Catalog and within MyWashburn under the Sexual Harassment, Equal Education, and Employment Opportunity section.

Social Media

Social Media and digital communication platforms may provide opportunities for collaboration, communication, networking, and professional engagement. For purposes of this policy, "social media includes, but is not limited to, text messages, blogs, email, learning management system communications, and platforms such as X, LinkedIn, Facebook, YouTube, Instagram, Snapchat, TikTok, and similar digital communication tools.

Students are expected to maintain professionalism, ethical conduct, and patient confidentiality in all online activities. Confidential, protected, or personally identifiable patient information must never be shared through social media or electronic communication platforms.

Online conduct that reflects unprofessional behavior or negatively impacts patients, clinical affiliates, faculty, staff, classmates, or the Radiation Therapy Program may result in disciplinary action. This includes posts, comments, images, videos, or other content that portray clinical environments, patients, or healthcare personnel in a disrespectful, inappropriate, or unprofessional manner.

Students should understand that online content may be permanent, publicly accessible, and subject to review by the University, clinical affiliates, credentialing agencies, employers, or licensing boards. Breaches of professionalism, ethics, or patient confidentiality may affect continued enrollment, future employment opportunities, credentialing eligibility, or professional licensure.

Concerns related to social media or online conduct may be addressed under program professionalism standards, confidentiality policies, the Student Counseling Policy, or applicable University policies and procedures.

Student Counseling and Dismissal

The student disciplinary procedure will be initiated at the discretion of the Program Director and/or Clinical Coordinator for substandard, unethical, or inappropriate clinical or academic performance.

Disciplinary sanctions that may be imposed include the following:

1. **Documented Initial Warning** – Depending upon the nature of the violation and at the discretion of the faculty and/or administrators of the Radiation Therapy program, the student may be given an initial verbal or a written warning.
2. **Disciplinary Written Warning** – If the student's clinical or academic conduct does not improve following the initial warning, program faculty will provide a second warning in writing, including specific actions needed to improve performance.
3. **Disciplinary Probation with a Performance Contract** – If concerns continue after previous disciplinary action, the student may be placed on disciplinary probation with a performance contract. The performance contract will identify specific deficiencies, expectations for improvement, and a timeline for demonstrating satisfactory progress. The student and program faculty will sign the performance contract for documentation purposes, and a copy will be maintained in the student's file. If clinical performance concerns are involved, the Clinical Preceptor may also be required to sign the document. If a student chooses not to sign and date this counseling performance contract, the disciplinary process will proceed to the program dismissal step.
4. **Program Dismissal** – If satisfactory improvement is not demonstrated by the given deadline cited in the performance contract, the student may be dismissed from the program.

Note: Depending on the circumstance, one or more progressive disciplinary steps may be skipped in instances of particularly serious violations and/or practices. For example, if **patient safety** is at risk related to a student's clinical progress or performance, the student can be withdrawn from the clinical course with a failing course grade and thus dismissed from the program.

Clinical education sites have the right to cancel a student's affiliation based on improper behavior. An individual may also be released from the program for failure to follow University policies and procedures, as presented in the Student Conduct and Academic Impropriety policies in the University Catalog. While clinical education is conducted off-campus, said policies and procedures are still in force. The University policies are published in the University Catalog found in the MyWashburn portal.

Student Employment

Students may choose to obtain employment while enrolled in the Radiation Therapy program; **however, academic and clinical responsibilities must remain the student's primary priority**. Scheduled didactic courses, clinical education hours, assignments, and program obligations will not be modified to accommodate employment schedules.

Students are prohibited from working overnight hours immediately prior to scheduled clinical education hours. Fatigue related to outside employment may negatively impact clinical performance, patient care, and student safety. If employment interferes with academic or clinical performance, the student may be subject to counseling, disciplinary action, or dismissal from the program.

Employment at a clinical affiliate site may not substitute for required clinical education experiences. Students employed at a clinical affiliate must clearly separate employment responsibilities from clinical education responsibilities. Employment hours may not overlap with scheduled clinical education hours, and students will not receive wages or compensation for clinical hours completed to satisfy program requirements.

While functioning as an employee of a healthcare facility, the student is not covered under Washburn University liability or workers' compensation policies. During employment, the student is subject to all policies, procedures, and employment requirements established by the employer.

Student Supervision

The student will be under **direct supervision** at all times, regardless of competency testing status. Under no circumstances may a student perform a procedure without direct supervision from qualified clinical education personnel.

Primary supervision is provided by registered radiation therapists employed by the clinical facility. During rotations involving areas such as nursing and dosimetry, direct supervision may be provided by an appropriately licensed or credentialed healthcare professional.

Observation of student performance through closed-circuit television (CCTV) or remote monitoring systems does not constitute direct supervision.

Students and clinical affiliates are expected to comply with this policy. Concerns regarding supervision violations may result in corrective action or review of the clinical affiliation. If a student feels pressured to violate supervision requirements, the student must immediately notify the Clinical Coordinator so the concern can be appropriately addressed.

Substance Abuse

Washburn University prohibits unlawful possession, use, manufacture, or distribution of alcoholic beverages, controlled substances, or related paraphernalia on University property, or at University-sponsored activities, including clinical education experiences.

Participation in clinical education requires the highest standards of professionalism, patient safety, and clinical competence. The Radiation Therapy Program adheres to a strict substance abuse policy consistent with University policies and professional Codes of Ethics.

Students must remain unimpaired by alcohol, illegal drugs, controlled substances, or misused prescription medications during all academic and clinical activities. Violations may result in disciplinary action up to and including dismissal from the program.

The Student Conduct Code outlines procedures for handling alleged violations of academic and behavioral standards. Additional information regarding alcohol-and drug-related violations is available through the MyWashburn portal and the University website.

Procedure for Suspected Substance Use

1. **Reasonable Suspicion Criteria:** Reasonable suspicion that a student may be impaired exists when:
    a) Alcohol, a controlled substance, or related paraphernalia is found in the possession of the student or under their control (e.g., on their person, in a backpack, locker, or vehicle);
    b) Observable behaviors or physical signs of suggested impairment, including, but not limited to:
        - Increased drowsiness
        - Decreased motor coordination
        - Changes in pupil size
        - Excitation or euphoria
        - Odor of alcohol
        - Intoxicated behavior without alcohol odor
        - Increased or repeated errors
        - Decreased concentration
        - Memory problems
        - Significant changes in verbal or written communication
        - Frequent or unexplained disappearance
        - Irrational, aggressive, or disoriented behavior

2. **Clinical Site Action:** If a student demonstrates signs of possible impairment, the Clinical Preceptor or designated clinical site representative will:
    a) Evaluate whether the possession or observed behavior constitutes reasonable suspicion of impairment;
    b) Document observed behaviors and any relevant findings;
    c) In the presence of a witness, request a list of current prescriptions and over-the-counter medications;
    d) Notify the appropriate clinical site administrator and the Clinical Coordinator;
    e) Remove the student from clinical duties immediately;
    f) In the presence of a witness, present the student with the **Consent/Refusal form** for laboratory drug and/or alcohol testing;
    g) Arrange testing as soon as reasonably possible if the student consents. If on-site testing is not available, the student will be referred to an external testing facility. **Testing must be completed no later than the following calendar day.**
    h) Require the student to assume responsibility for all testing and transportation costs;
    i) Assist in coordinating safe transportation if concerns exist regarding the student's ability to safely transport themselves.
    j) If the student refuses to consent to testing, fails to complete testing, or fails to complete testing within the required timeframe, the action will be considered equivalent to a positive test result. and will be referred to the Chair of the Allied Health Department for disciplinary action, which may include suspension or dismissal from the program.

3. **Program-Initiated Testing:** If the clinical site does not request testing, the Radiation Therapy Program reserves the right to require testing based on:
    a) Information reported by the clinical site regarding students' concerning behavior or suspected impairment;
    b) Student conduct that is inconsistent with safe or professional clinical practice; or
    c) A documented pattern of behavior suggesting possible impairment.

    Program-initiated testing will follow the same guidelines, procedures, and disciplinary processes outlined under Clinical Site Action.

    Drug and/or alcohol testing may include laboratory screening procedures determined appropriate by the testing facility or program.

4. **Post-Test Procedure:** Following completion of the consent form and the testing process, the student will be dismissed from clinical duties for the remainder of the day. The student may not return to clinical education experiences until the Clinical Coordinator reviews the test results and makes a determination.

    If the student is cleared to return to clinical education, any missed clinical education hours must be completed in accordance with program policies.

5. **Test Result Outcomes:** If test results are negative, the student may return to clinical following consultation with the Clinical Coordinator.

    A positive test result will be reported to the Chair of the Allied Health Department for review and disciplinary action, which may include program suspension or dismissal.

    All records related to suspected impairment, testing results, and disciplinary actions will be maintained in accordance with FERPA regulations and institutional policy. Information will only be shared with individuals directly involved in the review and disciplinary process.

    Students may appeal any disciplinary action related to this policy by following the Grievance Policy for Student Program Status (see section 2, pg. 18).

Washburn University - Radiation Therapy Program

Consent Form for Drug and Alcohol Testing

Complete and retain in student's file

I, _____, hereby **consent** to provide a urine and/or blood sample for the purpose of testing for the presence of controlled substances (unlawful drugs and prescription drugs) at a designated laboratory. I understand that I am responsible for the payment of said laboratory testing. I authorize the release of the test results to the appropriate Allied Health program Faculty at Washburn University and other applicable parties. I understand that refusing to provide a sample, tampering with samples, or providing false information on a specimen's chain of custody form may constitute grounds for termination in the educational program. I understand that failure to pass the drug/alcohol test may result in disciplinary action up to and including termination.

Laboratory testing includes the following tests:

_____

_____

_____

Student Signature & Date: _____

Clinical Preceptor Signature & Date: _____

Witness Signature: _____

Washburn University - Radiation Therapy Program

Refusal Form for Drug and Alcohol Testing

I, _____, WIN _____, **do not consent** to provide a urine and/or blood sample for the purpose of reasonable cause testing. I understand that refusal to participate in testing may result in my termination in the educational program.

Student Signature & Date: _____

Clinical Preceptor Signature & Date: _____

Witness Signature Date: _____

Tardy

Promptness is an important component of professionalism and is expected throughout all clinical education experiences. Arrival after the scheduled clinical time is considered tardy. Students are expected to be present in their assigned clinical area and prepared to begin responsibilities at the scheduled time.

If a tardy is unavoidable, the student must notify both the assigned clinical affiliate and the Clinical Coordinator prior to the scheduled start of clinical education hours. Arrival more than 30 minutes late will be considered an unexcused clinical absence.

One tardy per clinical course is permitted without penalty. Beginning with the second tardy of the clinical course, each occurrence of three minutes or greater will result in a deduction of one percentage point from the semester clinical course grade.

Patterns of tardiness throughout the program may also result in progressive disciplinary action under the Student Counseling Policy (see section 2, pg. 35), as follows:

- Three episodes of tardiness in the program beyond the allowed semester tardy: Documented Initial Warning
- Two additional tardies: Disciplinary Written Warning
- Two additional tardies: Disciplinary Probation with a Performance Contract
- Two additional tardies during probation: Dismissal from Program

Trajecsys

Trajecsys Report System™ is a web-based clinical record-tracking system used by the Radiation Therapy Program to document, monitor, and store information on student clinical education performance and progression.

Students are required to purchase access to the system during the program.

If a student withdraws from the program during the fall semester, refunds through the Trajecsys system are available for 30 days following submission of the first-time record or evaluation entered into the system. No refunds will be issued thereafter.

Within this system, **students** will:

- Clock in and out each clinical day and maintain accurate clinical attendance records.
- Review monthly updates posted by the Clinical Coordinator on the Trajecsys homepage.
- Monitor progress of competency evaluations.
- Confirm review of competency and professional development evaluations.
- Complete checklists, self-evaluations, and site evaluations.
- Access program/clinical policies.

Within this system, **Clinical Preceptors** and **designated staff** will:

- Review and approve student time records.
- Complete competency evaluations and performance evaluations.
- Complete student checklists.
- Access program and clinical education policies.

Within this system, the **Clinical Coordinator** will:

- Monitor and approve student time records.
- Review competency and performance evaluations.
- Monitor completion of required student documentation.
- Provide monthly updates and program information within the system.

Trajecsys Guidelines

Quick Reference

Website: [Trajecsys Website - trajecsys.com]
Trajecsys Support: 1-800-741-7964
User Guide: Available on the Trajecsys homepage for student reference
Home Page: Check monthly for announcements and deadlines

System Navigation Overview

- **Documents** – Contains an electronic version of the clinical manual and policies
- **Reports** – View a complete history of all student records, including time records, competency, checklists, and evaluation submissions.
- **Evaluations** – Submit and review clinical evaluations and incident reports
- **Comments** – Review feedback on evaluations

Clocking In and Out

Students will clock in and out daily. It is preferred that students use the facility's computers rather than their mobile devices. Mobile device use requires GeoTracking to be enabled, and location will be verified by the Clinical Coordinator. In the event of computer unavailability, please follow the instructions in this document to file a **time exception**.

Steps to Clock In/Out:

1. Log onto Trajecsys
2. Select "Clock in/Out"
3. Choose site and clock in or out - The system will automatically log the student out after entry.
4. No other individual may clock a student in or out.
5. Do **not** clock in/out for lunch.
6. Students are expected to be in clinical 8 hours each day.
7. The Clinical Preceptor will verify clock hours on a weekly basis.

Important Rules

- Clocking in **after** the designated time will result in a Tardy
- Leaving the clinical site while remaining clocked in will result in student counseling and possible programmatic dismissal
- Clocking out **prior** to the designated departure time will result in the use of personal time or required make-up time. Regularly clocking out early will result in student

See Student Counseling Policy, Section 2, pg. 35 for full details

Tardy

If arriving late to clinical, clock in as normal and then send an email to the Clinical Coordinator with a brief explanation. Please see tardy policy (section 2, pg. 39) for grade deductions.

Time Exceptions

Time exceptions allow students to manually enter their clinical arrival and/or departure time. They may be used when no computer is available, when a student forgets to clock in/out, to log an absence, or when dismissed early by clinical staff.

If used incorrectly, time exceptions can cause the student's clock-in/out to be mismatched, and the student will not receive credit for clinical hours earned. Any incorrect usage will result in a 1% point deduction from the final clinical grade per occurrence.

Computer Unavailability –

If a computer is inaccessible or Trajecsys is unavailable, students should:

Clocking In

1. Click the Time Exceptions tab.
2. Choose the clinical site.
3. Choose "Clock IN" for the exception.
4. Input student arrival time. (Example: 8:00 am = 0800).
5. Check "No Computer" as the reason.

Clocking Out

1. Click the Time Exceptions Tab.
2. Choose the clinical site.
3. Choose "Clock OUT" for the exception.
4. Input departure time. (Example: 4:00 pm = 1600).
5. Check "No Computer" as the Reason.

If computer unavailability becomes a regular event, the Clinical Coordinator will discuss alternative options with the student and Clinical Preceptor for accessing the system.

Forgetting to Clock In or Out –

If a student forgets to clock in or out for a scheduled or make-up day:

1. Click the Time Exceptions Tab.
2. Choose the clinical site.
3. Choose "Clock IN or Clock OUT" for the exception.
4. Input actual arrival or departure time. (Example: 3:00 pm = 1500).
5. Check "Forgot" as the Reason.

Forgotten Clock In/Out Penalties

Semester	Penalty
Fall	3 occurrences allowed without penalty 4th occurrence: student counseling + 2% grade deduction
Spring & Summer	2 occurrences allowed without penalty 3rd occurrence: student counseling + 2% grade deduction

Absences

In the event of an absence, the student should do the following:

Planned Absence - All Day:

File a Time Exception the day before or the day of the absence.

1. Inform the Clinical Preceptor prior to the absence.
2. Email the Clinical Coordinator prior to or at the time of the absence.
3. Click the Time Exceptions Tab.
4. Choose the clinical site.
5. Insert the date of the absence.
6. Check the "Absent" box.
7. In the explanation field, briefly state the reason (e.g., Personal Day, Funeral, Court Date)
8. Submit Time Exception.

Unplanned Absence - All Day:

File a Time Exception within 48 hours of absence.

1. Inform the Clinical Preceptor prior to the absence.
2. Email the Clinical Coordinator prior to or at the time of the absence
3. Click the Time Exceptions Tab.
4. Choose the clinical site.
5. Insert the date of the absence.

6. Check the “Absent” box.
7. In the explanation field, briefly state the reason (e.g., Sick, Inclement Weather)
8. Submit Time Exception

Partial Day Absences – Arriving Late or Leaving Early

1. Inform the Clinical Preceptor prior to the absence.
2. Email the Clinical Coordinator prior to the time of absence.
3. Do **not** file a Time Exception.
4. Clock in/out like normal.

Partial Day Absences – Mid-day

If already clocked in and plan to return to clinical after the absence:

1. Inform the Clinical Preceptor prior to the absence.
2. Email the Clinical Coordinator prior to or at the time of absence.
3. Do **not** clock out midday - Trajecsys only allows one clock in/clock out per day.
4. At the end of the day, file a time exception in place of clocking out – Subtract the length of the absence from the usual clock-out time (e.g., normal departure 1600, absence of 1 hour, file clock out as 1500).
5. In the explanation field, briefly state the reason for and length of absence.

Early Dismissal

On the rare occasion, the student is dismissed early by the clinical staff:

1. Click the Time Exceptions Tab.
2. Choose the clinical site.
3. Choose “Clock OUT” for the exception.
4. Input the usual departure time. (Example: 4:00 pm = 1600)
5. Check “Finished early” as the reason.
6. In the explanation field, briefly state the reason and which staff member approved the dismissal (e.g., Finished treating patients early, dismissed by Sean Conrad).

Make-Up Time

1. Obtain Clinical Preceptor approval to schedule make-up time.
2. Email the Clinical Coordinator in advance to acquire program approval - Make-up time cannot exceed 40 hours per week between didactic and clinical education and cannot be scheduled on a university-observed holiday.
3. Clock in/out like normal.

View Time Totals

1. Choose the “Reports” tab from the main menu.
2. Select the desired dates for review.
3. Choose “Time Totals”.

Status Column Codes

Code	Label	Meaning
A	Approved	Clinical hours approved by Clinical Preceptor
U?	Unmatched	Clock in/out with no matching entry for that day
U	Unapproved	Hours not yet approved by the Clinical Preceptor

Any falsified clinical hours will result in student dismissal from the program.

Student Evaluation of the Clinical Site Experience

On the **15th of every month** (excluding **December, May, and July**), students will complete an evaluation of the Clinical Preceptor and clinical education site. This evaluation is viewed only by the Clinical Coordinator.

1. Choose the "Evaluations" tab from the main menu.
2. Choose the "Student Evaluation of Clinical Site" form.
3. Select the clinical site.
4. Complete the evaluation and submit.

For each day the evaluation is late, a 0.5% percentage point deduction from the final clinical grade will apply for each occurrence in a given semester.

Student Self-Evaluation

At certain points in each semester, students will need to complete a self-evaluation, which will be viewed by the Clinical Preceptor and Clinical Coordinator.

1. Choose the "Evaluations" tab from the main menu.
2. Choose the "Student Self Evaluation" form.
3. Complete the evaluation and submit.

For each day the evaluation is late, a 0.5% percentage point deduction from the final clinical grade will apply for each occurrence in a given semester.

Incident Form

Students will submit an incident report for any incident for which a staff therapist would need to complete an incident report. The student should email the Clinical Coordinator about the incident and submit the report within 24 hours of the incident.

1. Choose the "Evaluations" tab from the main menu.
2. Choose the "Incident Report Form".
3. Select the staff member involved from the dropdown box.
4. Complete the form and submit.

Submit Student Acknowledgment on Completed Competency Evaluation

After completing a competency, the student will log in, review the results, and complete a post-submission comment confirming the evaluation has been reviewed.

1. Choose "Reports" from the main menu.
2. Click on "Skill Summary".
3. Find the correlating category.
4. Click on the date of completion on the right.
5. Review the competency evaluation and any comments.
6. Click "Add Comment" on the bottom left of the page.
7. Select "Student Acknowledgment" from the dropdown.
8. In the comment box, state that the evaluation has been reviewed.
9. Click "Add" to submit the comment.

Comments should only state that the evaluation has been reviewed. All other questions or concerns should be directed to the Clinical Coordinator via email or phone.

Acknowledgment must be submitted so the competency can be verified by the Clinical Coordinator and recorded for a grade.

Submit Student Acknowledgment on Professional Development Evaluation Form

After a professional development evaluation has been submitted, it enters a 7-day hidden review period during which the Clinical Coordinator reviews it before it is released. A notification email will be forwarded to the student indicating the start date of the hidden period.

Evaluation Timeline

- Evaluation submitted ➔ **7-day hidden period** begins (Clinical Coordinator review only)
- After 7 days ➔ Evaluation automatically released to Clinical Preceptor and student
- After release ➔ Student has **7 days** to submit an acknowledgment in Trajecsys

To submit acknowledgment:

1. Choose “Reports” from the main menu.
2. Click on “Evaluation Summaries”.
3. Select the “Professional Development Evaluation form” template from the dropdown.
4. Filter by evaluator, subject, site, and dates if not already pre-filled.
5. Click “Show Report”.
6. Review the evaluation - If more than one evaluation has been submitted, multiple columns and comment rows will appear.
7. Click the “Add Comment” box at the bottom right of the page.
8. Select “Student Acknowledgment” from the dropdown.
9. In the comment box, state that the professional development evaluation has been reviewed.
10. Click “Add” to submit the comment.

Comments should only state that the evaluation has been reviewed. All other questions or concerns should be directed to the Clinical Coordinator via email or phone.

Acknowledgment must be submitted so the competency can be verified by the Clinical Coordinator and recorded for a grade.

Comments

The comments section provides notifications when feedback is given on evaluations.

Note: Students should not rely solely on the comments section as a notification that an evaluation or competency has been submitted, as some will be submitted without comments. Follow the instructions in this document for reviewing evaluations and competencies.

1. Choose the “Comments” tab from the main menu.
2. Review comments from the main screen or choose “view” on the right for each individual comment.
3. After reviewing, click “Mark As Read”.
4. Do **not** reply to comments within Trajecsys – All questions or concerns should be directed to the Clinical Coordinator via email or phone.

Any misuse of the comments section will result in student counseling (see Student Counseling Policy, section 2, pg. 35).

Students are encouraged to be open to feedback – It is an important part of growth as a clinical professional.

SECTION

4

Clinical Objectives, Rotations, Checklists & Evaluation Forms

AL301, AL340, & AL380 Expectations

This section outlines the clinical education expectations, competency requirements, evaluation processes, and supporting resources associated with the Radiation Therapy clinical experience. Included throughout this section are clinical rotation expectations, competency guidelines, evaluation forms, checklists, and reference materials used throughout the program.

Clinical Objectives

The following clinical objectives outline the knowledge, skills, and professional behaviors students are expected to demonstrate upon completion of the Radiation Therapy Program.

- Adhere to accreditation, governmental, institutional, and departmental guidelines.
- Document and communicate errors and discrepancies in patient care and medical records.
- Apply concepts of teamwork.
- Perform simulation, localization, and therapeutic radiation therapy procedures in accordance with national patient safety standards.
- Deliver patient-centered care.
- Use safe patient-transfer techniques.
- Construct and prepare immobilization and beam modification devices.
- Apply the principles of radiation protection and safety.
- Evaluate and verify treatment plan prior to treatment delivery.
- Execute approved treatment plans in accordance with the prescription.
- Assess the patient's condition prior to, during, and after delivery of a prescribed course of radiation therapy.
- Initiate medical interventions and/or life support procedures as necessary.
- Explain programs to promote and maintain patient health and wellness as needed.
- Anticipate potential complications and foster preventive care.
- Demonstrate effective written, oral, and nonverbal communication with patients and other members of the healthcare team.
- Document all aspects of patient care and management in the health record.
- Perform quality assurance procedures for all treatment delivery equipment, accessories, and treatment room doors.
- Identify equipment malfunctions and the necessary steps to resolve them.
- Employ MRI safety and practice concepts in simulation and treatment delivery.

Clinical Education Rotations

Radiation therapy comprises the major components of radiation oncology, from treatment planning to dose calculation to treatment delivery. The clinical education rotation areas include clerical, nursing, block room, brachytherapy, simulation, dosimetry, and treatment room. The combination of didactic and clinical hours cannot exceed 40 hours weekly. Clinical experience is obtained through weekday scheduling. There are no evening, night, or weekend rotations. Objectives and guidelines are available within this manual for each of these clinical areas.

Program-Wide Notes

- Brachytherapy (HDR or LDR): A minimum of 1 observation and 1 competency testing procedure is required in any semester. Electronic brachytherapy does not meet requirements.
- Participatory procedures (TBI, CSA, Stereotactic Treatment, Motion Management, Custom Block): These experiences can and should occur throughout the program year, anytime the opportunity arises.

Fall Semester Rotations

The fall semester offers minor rotations across various areas of the department to provide a broad view of how the department's segments work together and of the procedural sequence involved in preparing patients for treatment. The majority of the semester (≈ 12 weeks) is focused on treatment delivery. It is best if the 12 weeks of treatment room experience are consecutive.

1 Week Orientation to the Department & Clerical Rotation

- Meeting with Clinical Preceptor to discuss expectations, hours, and schedule.
- Orientation of the student to the clinical education site.
  - Clinical Preceptor or other supervising registered radiation therapists will submit the **Orientation Checklist.**
- Minor rotation (2-4 hours) in the clerical area to learn about the department flow, scheduling, phone system, and patient charts.
  - Clinical Preceptor or appropriate supervising staff will complete the **Clerical Checklist.**
- Consider introductory visits with the dietician, social worker, tumor registrar, etc.

1-Week Equivalent Nursing Rotation

- Participation in patient consultations, follow-up visits, and weekly status check appointments with a focus on understanding the impact of a cancer diagnosis; patient confidentiality; radiation therapy side effects, and performing vital signs & oxygen administration.
- By program completion, the **Nursing Skills Checklist** and **7 ARRT-required patient care** competencies will be submitted.

Treatment Accessory Device Experience throughout the Semester

- **Custom bolus fabrication** is a required ARRT competency and can be completed at any point in the program.

1 Week Simulation and Dosimetry Rotation

- Minor rotation in simulation to provide an overview of how the various areas of the radiation therapy department work together to prepare and deliver radiation therapy treatments.

12 Weeks Treatment Room Rotation

- Progressively gaining hands-on experience and proficiency with treatment records, room setup, patient alignment, treatment delivery, patient education/care, radiation protection/safety, and image critique.

- The **Radiation Therapy Treatment Room Checklist** must be completed and submitted by the Clinical Preceptor or other supervision registered radiation therapist prior to attempting pre-competency checklists.
- Prior to performing each primary treatment delivery competency, a pre-competency checklist will be completed to demonstrate the student's readiness for competency testing.
- Students may begin treatment competency testing in the **first week of October.**
- **Seven (7)** treatment competencies are to be completed by the conclusion of the fall semester.
- A maximum of **ten (10)** treatment competencies may be completed in the fall semester.

If the clinical site is a smaller facility, it may be useful for the student to participate in simulation procedures in the fall to increase the range of experience to be better prepared for competency completion in the spring.

Winter Intersession Rotation

The winter intersession is a component of the spring semester - A 2–3-week period in December and January during which students attend clinical full-time, Monday-Friday, for a total of 40 hours per week. Students are not permitted to earn compensation time during winter intersession, as that would exceed the 40-hour-per-week limit.

- Focus on completing **4 continued competency evaluations** - Retesting on 4 of the 7 treatment delivery procedures completed in the fall semester to demonstrate continued competency despite variations in patient age, condition, diagnosis, or setup.

Remainder of Spring Semester Rotations

The spring semester is focused on simulation and dosimetry skills.

8 Weeks Simulation Rotation

- Progressively gaining hands-on experience in the simulation/treatment planning process to include patient education, patient alignment, construction/usage of immobilization devices, obtaining and transferring images, documenting setup details, and **following** image data to the planning workstation or computer to participate in contouring, isocenter placement, field selection, and review of treatment plan with personnel.
- Students will complete the **6 ARRT required simulation competencies** and **Special Treatment Participatory Simulation Procedure** (e.g., 4D CT, SBRT, Gating, or Brachytherapy) upon successful completion of the module 1 assignment in AL340.
- Students will complete **2 ARRT required treatment accessory device competencies** for Competency testing for thermoplastic mask and custom immobilization device for thorax or abdomen/pelvis (foaming agent, vacuum bag, etc.).
- Clinical Preceptor or another supervising registered radiation therapist will submit a **Patient Tattoo Checklist.**

3 Weeks Dosimetry Rotation

- Focus on hand-calculated monitor units and a computer-generated isodose plan. Students will learn about calculation factors and formulas during the spring semester physics course and should be prepared to effectively participate in a dosimetry rotation by mid-March.
- Students will complete the module 2 assignment dosimetry skills assignments in AL340 (gap, electron, single-open, parallel opposed, wedged, and weighted fields calculations) at the clinical site.
- Upon completion of the dosimetry skills assignments, students can work to complete the **5 ARRT required dosimetry competencies** – Completed by hand and verified by a second system (MU Check System). Competencies will be signed, dated, and mailed to the Clinical Coordinator.
- The Clinical Preceptor will complete a dosimetry competency form in Trajecsys to further evaluate and provide feedback on the student's performance of the hand-calculated competencies.

- Student will independently create **1 computer-generated isodose plan** – Printed and signed by supervising dosimetrist or physicist. The Clinical Preceptor will complete a competency form within Trajecsys to further evaluate and provide feedback on the student's performance of the computer-generated plan.
- Upon completion, rotation may be shortened or extended based on the student's preference and Clinical Preceptor agreement.

4-5 Weeks Treatment Room Rotation

- Continuing to develop treatment delivery skills, gaining confidence, and functioning more independently (always under direct supervision).
- Students will complete the **3 program-defined required imaging competencies** (MV, KV, and Cone Beam CT).

Treatment Accessory Device Experience throughout the Semester

- **Custom bolus fabrication** is a required ARRT competency and can be completed at any point in the program.

Summer Semester Rotations:

The summer semester is focused on the completion of the required clinical requirements and continued development of clinical skills.

1-Week Equivalent Nursing Rotation

- Students will revisit the nursing area of the radiation oncology department to reinforce patient care and patient education concepts. Important concepts to review include vital signs, normal lab values, side effects of radiation therapy, interventions used to address treatment side effects, elements of informed consent, tolerance doses, and characteristics of specific cancers.
- By program completion, the **Nursing Skills Checklist** and **7 Patient Care** competencies will be submitted.

Treatment Accessory Device Experience throughout the Semester

- **Custom bolus fabrication** is a required ARRT competency and can be completed at any point in the program.

8 weeks Treatment Room Rotation

- The majority of the summer semester is spent in the treatment room with a focus on patient care, treatment alignment, image review, and problem-solving.
- Completion of **4 continued competency evaluations** is required. These evaluations involve retesting on 4 treatment categories previously tested in the fall or spring semester to demonstrate continued competency despite variations in patient age, condition, diagnosis, or setup.
- Prior to performing each primary treatment delivery competency, a pre-competency checklist will be completed to demonstrate the student's readiness for competency testing.
- Students will complete **any remaining competencies** as well as the participatory procedures (if not already completed) during this time.

Quality Control/Quality Assurance Experience

- Students will complete the **5 ARRT required quality control procedures**.
- Students will complete **2 program-defined required data interpretation competencies** involving the review of treatment data to ensure completeness and accuracy.

Orientation to Clinical Site Checklist

EXAMPLE – Actual Form is in Trajecsys

A department orientation will be provided to each radiation therapy student at their designated clinical site upon arrival. The orientation will include the elements listed below, including radiation and health and safety procedures for radiation therapy. Upon completion, it is expected that the clinical site's operational policies will be followed by the student. Students should understand the policies of the clinical education site and ask questions for clarification.

The clinical site staff will discuss and identify the following items with the student within the first week of clinical education. The Orientation Checklist will be submitted by the Clinical Preceptor or other supervising registered radiation therapist in Trajecsys.

Orientation Checklist Criteria

Orientation Checklist Criteria		
Staff Introductions: Introduction of student to all members of the radiation oncology department.	**No**	**Yes**
Department Tour: Include treatment rooms, simulation, dosimetry, nurse's station, patient exam rooms, physician offices, block room, dark room. Also include tumor registrar, dietician, and social worker offices if applicable.	**No**	**Yes**
Location of Restrooms: Identification of appropriate restrooms for staff/students.	**No**	**Yes**
Location of Break Room and/or Cafeteria: Identification of break room or cafeteria.	**No**	**Yes**
Linac Control Area: Explanation of privacy issues, visibility and purpose of cameras and two-way intercom, location, and function of emergency off buttons and machine interlocks. Discussion of safety issues related to treatment delivery.	**No**	**Yes**
Patient Records: Location of patient charts/films. Review of the patient chart/treatment record, if electronic a brief introduction of the electronic chart (prescription, treatment fields, recorded doses, patient images, and setup instructions). Students will need continued hands-on experience and training with the treatment record (electronic or paper) to develop proficiency over time.	**No**	**Yes**
Simulation Area: Identification of emergency off buttons, light switches for lasers and room lights, immobilization devices, contrast supplies, emergency supplies/medications, and biohazard trash cans/bags.	**No**	**Yes**
Block Room: Orientation to the block room and discussion of the safety issues associated with working in the block room and working with cerrobend.	**No**	**Yes**
Ancillary Equipment: Locations of fire alarms and extinguishers, as well as oxygen and suction units are identified.	**No**	**Yes**
Radiation Detection Devices: Identification of the radiation safety officer or individual who collects/distributes devices and location of exposure reports, as well as awareness of device collection interval (monthly/quarterly).	**No**	**Yes**
Important Numbers: Explanation of emergency numbers used in department such as numbers to call for code blue support, reporting of fire, calling for security, or requesting patient transport.	**No**	**Yes**
Patient Transportation: Explanation of how patients are transported to and from the facility; i.e.: Who is responsible for transporting patients?	**No**	**Yes**
Crash Cart: Location of crash cart (if applicable) and discussion of emergency protocols.	**No**	**Yes**
Safety Data Sheet: Location of SDS and discussion of its purpose.	**No**	**Yes**
Emergency Preparedness: Discuss appropriate actions in the event of emergencies such as fire, extreme weather, active shooter, bomb threat, or other evacuation situations.	**No**	**Yes**

Clerical Rotation Objectives

Students will perform a minimum of two (2) hours of clerical rotation during the first week of clinical experience.

Rotation Objectives

- Discuss the necessary conditions for smooth patient flow when planning a therapy department considering the scheduling, transportation, and entrance/exit pathways to the treatment area.
- Evaluate the function and importance of the receptionist and billing clerk.
- Locate patient information utilizing the department's system.
- Discuss the department's procedure for scheduling patients for treatment, simulation, brachytherapy procedures, and physician appointments.
- Learn the department's telephone system and paging system if appropriate.
- Discuss how diagnostic radiographic images arrive at the oncology department and how images are returned.
- Learn about the facilities method of charging patients for services.
- Identify the essential information included in each patient's permanent therapy record.
- Observe the physician's summary note and total dose delivered to various types of cancer.

Clerical Skills Checklist

EXAMPLE – Actual Form is in Trajecsys

Achievement of the clerical rotation objectives will better prepare the student for his or her clinical experience. The Clerical Skills Checklist will be submitted by the Clinical Preceptor or other supervising registered radiation therapist in Trajecsys.

Clerical Rotation Criteria

Clerical Rotation Criteria		
Receptionist		
Patient Flow	**Yes**	**No**
Filing System	**Yes**	**No**
Communication Systems	**Yes**	**No**
Chart Information	**Yes**	**No**
Billing		
Patient charge procedure	**Yes**	**No**
Identification of the physician's summary and doses delivered to various types of cancer	**Yes**	**No**

Semester-by-Semester Competency Requirements

AL 301: Fall Semester

Required

- 7 primary treatment delivery competencies are required.
    - Competency testing may begin the first week of October.
    - To be eligible to complete competency testing on a treatment delivery procedure, a pre-competency checklist for that procedure must be successfully completed.
    - A maximum of 10 treatment competency evaluations may be completed during the fall semester, if additional testing opportunities arise.

Recommendation

- 6 patient care competencies - Not due until program completion but may be completed at any point in the program
- Custom bolus treatment accessory device competency is not due until program completion but may be completed at any point in the program
- Participatory procedure experiences should occur throughout the program as opportunities arise (e.g., brachytherapy, SBRT/SRS, TBI, CSA, Motion Management)
    - A minimum of 1 documented brachytherapy procedure experience with a case study is required before a student is eligible to attempt the brachytherapy participatory competency

Winter Intersession

Required

- 4 continued treatment delivery competencies - Retesting on any 4 passed primary treatment delivery competencies from the fall semester.

Recommendation

- 6 patient care competencies - Not due until program completion but may be completed at any point in the program
- Custom bolus treatment accessory device competency is not due until program completion but may be completed at any point in the program
- Participatory procedure experiences should occur throughout the program as opportunities arise (e.g., brachytherapy, SBRT/SRS, TBI, CSA, Motion Management)
    - A minimum of 1 documented brachytherapy procedure experience with a case study is required before a student is eligible to attempt the brachytherapy participatory competency.

AL 340: Spring Semester

Required

- 6 simulation competencies
    - To be eligible to complete competency testing on simulation procedures, successful completion of the module 1 assignment in the AL340 is required
- 1 special treatment participatory simulation procedure (e.g., 4D CT, SBRT, Gating, or Brachytherapy)
- 2 treatment accessory device competencies – Custom Immobilization Devices (e.g., Foaming Agents, Vacuum Bags) & Thermoplastic Mold
- 3 imaging competencies
- 6 dosimetry competencies
    - To be eligible to complete competency testing on dosimetry procedures, successful completion of the module 2 assignment in the AL340 is required.

Recommendation

- 6 patient care competencies - Not due until program completion but may be completed at any point in the program
- Custom bolus treatment accessory device competency is not due until program completion but may be completed at any point in the program
- Participatory procedure experiences should occur throughout the program as opportunities arise (e.g., brachytherapy, SBRT/SRS, TBI, CSA, Motion Management)
    - A minimum of 1 documented brachytherapy procedure experience with a case study is required before a student is eligible to attempt the brachytherapy participatory competency.

AL 380: Summer Semester

Required

- Remaining primary treatment delivery competencies
    - To be eligible to complete competency testing on a primary treatment delivery procedure, a pre-competency checklist for that procedure must be successfully completed.
- 4 continued treatment delivery competencies - Retesting on any 4 passed primary treatment delivery competencies from the fall or spring semesters.
- 7 participatory competencies, which include total body irradiation, craniospinal treatment, brachytherapy, stereotactic, motion management, special treatment simulation procedure, and custom block process
- Custom bolus treatment accessory device competency
- 6 patient care competencies
- 5 quality control procedure competencies
- 2 data interpretation competencies

Guidelines for all Competency Evaluations

- Competency Evaluations will be completed by the Clinical Preceptor, supervising registered radiation therapist, or other appropriately credentialed personnel (nurse, dosimetrist, physicist)
- Once submitted, the competency evaluation is visible to the evaluator, student, and Clinical Coordinator.
- The Clinical Coordinator performs a weekly review of Trajecsys submissions. If questions arise, the Clinical Coordinator will contact the Clinical Preceptor.
- Students then have up to seven (7) days from the time the competency submission date to acknowledge the evaluation in Trajecsys, indicating they have reviewed the results and feedback.
- After the student has acknowledged the competency evaluation, the Clinical Coordinator validates the evaluation and records the associated score in D2L.
- For each poor/fail rating, a 4% deduction is applied to the final evaluation score in Trajecsys.
- Competency evaluations that are not acknowledged within the required timeframe will not be recorded in D2L, resulting in the student being required to repeat the competency evaluation.

If the student disagrees with the evaluation result, he/she should contact the Clinical Coordinator within one week of the evaluation completion date (see Grievance Policy for Unsatisfactory Clinical Evaluation, section 2, pg. 17).

Performance Expectations for all Competency Evaluations

A primary competency evaluation score below 88% is considered a failing grade. A continued competency evaluation score below 91% is considered a failing grade.

If a student fails two (2) competency evaluations of any type during the program, the Student Counseling Policy will be implemented as follows:

1. **Documented initial warning** – Issued after two failed competency evaluations.
2. **Disciplinary written warning** – Issued after one additional failed competency evaluation of any type.
3. **Disciplinary probation with a performance contract** – Issued after one additional failed competency evaluation of any type is failed beyond the disciplinary written warning.
4. **Program dismissal** – Occurs when one additional competency evaluation of any type is failed beyond the one failed evaluation beyond disciplinary probation.

Treatment Competency Overview

Pre-Competency Checklist:
Prior to performing a primary treatment delivery or imaging competencies, students will successfully complete a pre-competency checklist for each procedure. The purpose of the pre-competency checklist is to confirm a student's readiness and ensure the student can safely and appropriately demonstrate competency.

Primary Treatment Delivery Competency:
The ARRT requires the student to demonstrate competence in 16 treatment delivery procedures. Thirteen procedures must be completed on actual patients. Up to three (3) procedures may be completed under simulated conditions in accordance with ARRT requirements and may not be completed until the Summer Semester.

Demonstration of competency includes considerations related to radiation safety, equipment operation, patient and equipment monitoring, patient positioning, treatment volume localization, image acquisition and registration, dose verification, record keeping, and patient management and education.

Competencies performed under simulated conditions must be completed using appropriate equipment without activation of the treatment beam. If applicable, students must also evaluate related images as part of the competency evaluation.

If a required procedure is rarely performed or unavailable at a clinical site, students should discuss options with the Clinical Preceptor and notify the Clinical Coordinator regarding competency status throughout the year (see Semester by Semester Competency Requirements, section 3, pg. 8-9).

Continued Competency:
Students are required to complete a total of eight (8) continued competencies during the Winter Intersession and Summer Semester. Four (4) competencies are completed during the Winter Intersession and consist of repeat evaluations of the categories previously completed during the Fall semester. The remaining four (4) continued competencies are to be completed throughout the summer semester and involve repeat evaluations of categories completed during either the Fall or Spring semester.

The purpose of continued competencies is to demonstrate ongoing proficiency, consistency, and retention of clinical skills throughout the program.

Participatory Competency:
Students are required to complete seven (7) participatory procedures, including TBI, CSA, Stereotactic, Motion Management, Special Simulation Procedure, Custom Block Experience, and Brachytherapy.

Participatory procedures are intended to provide exposure to procedures that may occur infrequently, yet remain clinically important. Students are expected to take an active role in the procedure and understand the clinical concepts necessary for successful treatment delivery and patient care.

The brachytherapy competency, if completed on an actual patient, may inolve either LDR or HDR procedures. Electronic brachytherapy does not satisfy the program's brachytherapy participation requirement.

TBI and CSA competencies may be completed at any point in the program, when available clinically. If students are unable to complete TBI, CSA, or Brachytherapy experiences on actual patients, these procedures may be completed under simulated conditions during the final summer semester, in accordance with ARRT requirements.

ARRT Didactic and Clinical Competency Requirements

ARRT BOARD APPROVED: **JANUARY 2026**
IMPLEMENTATION DATE: **FEBRUARY 1, 2027**

Students enrolled in the Radiation Therapy Program must complete all didactic and clinical competency requirements established by the American Registry of Radiologic Technologists (ARRT). These requirements outline the knowledge, skills, and clinical procedures necessary for eligibility for ARRT certification and registration in Radiation Therapy.

The official ARRT Radiation Therapy Didactic and Clinical Competency Requirements document is available directly from the ARRT website and should be reviewed carefully by all students. Current ARRT requirements include information regarding:

Current ARRT requirements include information regarding:

- Didactic competency requirements
- Clinical competency requirements
- General performance considerations
- Simulated competency limitations
- Patient diversity expectations
- Required and participatory clinical procedures

Students are responsible for understanding and complying with all current ARRT requirements throughout the program.

For the most current version of the document, visit the following: ARRT Radiation Therapy Requirements.

ARRT-Required Clinical Competency Requirements

General Patient Care Procedures	Date Completed
BLS or ACLS Certified	
Vital Signs – Blood Pressure	
Vital Signs – Pulse Rate	
Vital Signs – Respiration Rate	
Vital Signs – Temperature	
Pulse Oximetry	
Assisting with O2 Administration (Canula or Mask)	
Patient Transfer	
Quality Control Procedures	
Linear Accelerator	
Laser Alignment	
Imaging Systems	
Beam Output and Symmetry	
Simulator	
Laser Alignment	
QC Water Phantom (e.g., CT Number)	
Simulation Procedures	
Brain	
Head and Neck	
Thorax	
Breast	
Pelvis	
Skeletal	
Dosimetry	
Single Field	
Parallel Opposed Fields	
Weighted Fields	
Wedged Fields	
Computer Generated Isodose Plan	
Electron Field	
Treatment Accessory Devices	
Custom Bolus	
Custom Immobilization Devices (e.g., Foaming Agents, Vacuum Bags)	
Thermoplastic Mold	
Participatory Procedures	
Total Body Irradiation (TBI) Treatment	
Craniospinal Treatment	
Brachytherapy Treatment	
Stereotactic (e.g., SBRT, SRT/SRS)	
Motion Management (e.g., Surface Guidance, Respiratory Gating, Fiducial Tracking, Breath Hold, Abdominal Compression)	
Special Treatment Simulation Procedure (e.g., 4D CT, SBRT, Gating, or Brachytherapy)	
Custom Block (Photon or Electron)*may or may not include actual block fabrication	

Radiation Treatment Delivery Procedures	Date of Pre-Competency Checklist	Date of Competency Testing	Patient or Simulated	Date of Continued Competency
Brain				
Primary				
Metastatic				
Head and Neck				
Multi-field				
Thorax				
Multi-field (non-IMRT)				
IMRT or VMAT				
Breast				
Tangents Only				
Tangents with Nodal Treatment (e.g., SCV, PAB)				
IMRT or VMAT				
Special Set-up (e.g., Photon or Electron Boost, Prone, IMRT, Gating)				
Abdomen				
Multi-field				
Pelvis				
Multi-field Supine				
Multi-field Prone				
Skeletal				
Multi-field Spine				
Extremity				
Electron Fields				
Single				
Photon or Electron				
Abutting Fields				

ARRT Required Clinical Competency

Multi-field includes two or more fields, and may include 3D conformal, IMRT, or VMAT (unless specified otherwise).

Washburn University Radiation Therapy Program Defined Competencies

Program Defined Competencies

Imaging Competency	Date of Competency Testing	Score
MV		
KV		
CBCT		

Data Interpretation Competency

Data Interpretation Competency	Date of Competency Testing
Verification Simulation	
Radiation Therapist Treatment Chart Check	

Nursing Rotation

Students will rotate through nursing for the equivalent of one week during the fall semester and one week during the summer semester. Students will complete the Nursing Skills Checklist and the eight (8) ARRT Patient Care competencies.

A current CPR certification is sufficient to fulfill the BLS/ACLS competency requirement, one of the required ARRT patient care competencies. All students are required to maintain current certification throughout the program year. The remaining seven (7) patient care competencies will be completed during clinical education experiences.

Efforts should be made to complete the nursing rotation requirements during the fall semester; however, the Nursing Skills Checklist and remaining ARRT Patient Care competencies are not due until the completion of the summer semester.

Rotation Objectives

- Act in a professional manner at all times.
- Attend to each patient's safety and comfort.
- Observe the physical, emotional, mental, and spiritual effects of a cancer diagnosis on patients and families.
- Maintain confidentiality in all patient situations.
- Observe appropriate methods for assisting the physician during abdominal, ENT, pelvic, and breast examinations.
- Review radiographic images and/or laboratory results.
- Demonstrate the ability to accurately obtain vital signs.
- Demonstrate the ability to appropriately perform CPR if needed.
- Describe common radiation-induced skin reactions and interventions used for prevention and symptom management.
- Identify common radiation-induced side effects related to treatment site and discuss common interventions, patient instructions, and/or medications that may be used to reduce or manage symptoms.
- Discuss the chain of infection and isolation precautions used to reduce disease transmission.
- Review laboratory values, identify normal ranges for RBC, WBC, platelets, hematocrit, hemoglobin, BUN, and creatinine, and discuss levels at which treatment may be postponed.
- Operate or assist with support equipment such as oxygen tanks, as appropriate.
- Participate in dietary consultations, social work interactions, patient consultations, follow-up appointments, and weekly treatment status checks as opportunities are available.

Nursing Skills Checklist

EXAMPLE – Actual Form is in Trajecsys

This form serves to document various nursing-related observations and experiences. Completion of the following will provide the radiation therapy student with a basic understanding of nursing procedures commonly conducted within radiation oncology departments. The Nursing Skills Checklist will be submitted by the supervising nurse in Trajecsys.

Nursing Skills Checklist Criteria

Nursing Skills Checklist Criteria		
Did the student observe or participate in obtaining the following Vital Signs?		
Temperature	**Yes**	**No**
Blood Pressure	**Yes**	**No**
Pulse Rate	**Yes**	**No**
Pulse Oximetry	**Yes**	**No**
Respiration Rate	**Yes**	**No**
Height and Weight	**Yes**	**No**
Did the student observe or review Instruments for Specific Examinations?		
Oral cavity- Tongue Blade	**Yes**	**No**
Eyes – Ophthalmoscope	**Yes**	**No**
Ears – Otoscope	**Yes**	**No**
Neurological – Percussion Hammer & Tuning Fork	**Yes**	**No**
Gynecological – Vaginal Speculum/Vaginal Dilator	**Yes**	**No**
Rectal Exam – Gloves and Lubricant	**Yes**	**No**
Did the student observe or review Brachytherapy Instruments?		
Fletcher-Suite (GYN)	**Yes**	**No**
Interstitial Needle	**Yes**	**No**
Templates – Used for prostate implants	**Yes**	**No**
Did the student demonstrate or describe the proper procedures for the following?		
Oxygen Set-up	**Yes**	**No**
Suctioning, Oral & Tracheotomy	**Yes**	**No**
Pap Smear with GYN Exam	**Yes**	**No**
Stool for guaiac	**Yes**	**No**
Collection for UA, Culture & Sensitivity	**Yes**	**No**
Recognizing signs of adverse reaction to medications	**Yes**	**No**
Did the student demonstrate or describe indications for patient referrals?		
Hospice	**Yes**	**No**
American Cancer Society Programs – For example, Reach to Recovery or Road to Recovery	**Yes**	**No**
Social Work/Pastoral Care	**Yes**	**No**

Support Groups	**Yes**	**No**
Transportation – Vans, A&A, ACS to Volunteers	**Yes**	**No**
Nutritionist/Dietician	**Yes**	**No**
Did the students observe & verbalize appropriate patient education for the following?		
Skin Care Instructions	**Yes**	**No**
Dietary Instructions for the following cancer types:		
a. Head & Neck	**Yes**	**No**
b. Chest	**Yes**	**No**
c. Pelvis	**Yes**	**No**
d. Weight Loss	**Yes**	**No**
Pain Assessment	**Yes**	**No**
Did the student complete the following in relation to Code Blue procedures?		
Review Code Blue Protocol	**Yes**	**No**
Identify the Location of Crash Cart	**Yes**	**No**
Did the student demonstrate understanding of the following concepts related to Informed Consent?		
Purpose	**Yes**	**No**
Timing	**Yes**	**No**
Consent form Components	**Yes**	**No**

Pulse Rate Competency

EXAMPLE – Actual Form is in Trajecsys

Pulse Rate Competency Criteria

Pulse Rate Competency Criteria		
Did the Student:		
Identify the patient and obtain consent for the procedure?	**Yes**	**No**
Explain the procedure to the patient and answer any questions?	**Yes**	**No**
Wash hands prior to procedure?	**Yes**	**No**
Locate the radial pulse using the index and middle fingers with appropriate pressure?	**Yes**	**No**
Count pulse for one full minute?	**Yes**	**No**
Assess pulse rate, rhythm, and strength?	**Yes**	**No**
Record findings accurately?	**Yes**	**No**
State the normal range of an adult pulse?	**Yes**	**No**

Respiration Rate Competency

EXAMPLE – Actual Form is in Trajecsys

Respiration Rate Competency Criteria

Respiration Rate Competency Criteria		
Did the Student:		
Identify the patient and obtain consent for the procedure?	**Yes**	**No**
Explain the procedure to the patient and answer any questions?	**Yes**	**No**
Wash hands prior to procedure?	**Yes**	**No**
Position patient appropriately for assessment?	**Yes**	**No**
Observe respirations discretely without alerting the patient to the assessment?	**Yes**	**No**
Count respirations for one full minute?	**Yes**	**No**
Assess respiratory rate, rhythm, depth, and effort?	**Yes**	**No**
Record findings accurately?	**Yes**	**No**
State the normal adult respiratory rate range?	**Yes**	**No**

Temperature Competency

EXAMPLE – Actual Form is in Trajecsys

Temperature Competency Criteria

Temperature Competency Criteria		
General Procedure **Did the Student:**		
Identify the patient and obtain consent for the procedure?	**Yes**	**No**
Explain the procedure to the patient and answer any questions?	**Yes**	**No**
Wash hands prior to procedure?	**Yes**	**No**
Maintain appropriate infection control precautions?	**Yes**	**No**
Temperature Assessment Method *The student may complete either the tympanic or oral method*		
Tympanic Temperature Method **Did the Student:**		
Apply clean probe cover?	**Yes**	**No**
Position the thermometer appropriately in the ear canal?	**Yes**	**No**
Obtain an accurate reading?	**Yes**	**No**
Remove/dispose of probe cover appropriately?	**Yes**	**No**
Record reading accurately?	**Yes**	**No**
State normal adult temperature range?	**Yes**	**No**
Oral Temperature Method **Did the Student:**		
Apply clean probe cover?	**Yes**	**No**
Position the thermometer appropriately under the tongue?	**Yes**	**No**
Obtain an accurate reading?	**Yes**	**No**
Remove/dispose of probe cover accurately?	**Yes**	**No**
Record reading accurately?	**Yes**	**No**
State the normal adult temperature range?	**Yes**	**No**

Blood Pressure Competency

EXAMPLE – Actual Form is in Trajecsys

Blood Pressure Competency Criteria

Blood Pressure Competency Criteria		
Preparation **Did the Student:**		
Identify the patient and obtain consent for the procedure?	**Yes**	**No**
Explain the procedure to the patient and answer any questions?	**Yes**	**No**
Wash hands prior to procedure?	**Yes**	**No**
Maintain appropriate infection control precautions?	**Yes**	**No**
Procedure **Did the Student:**		
Position the patient appropriately with the arm supported at heart level?	**Yes**	**No**
Select and apply the appropriate cuff size correctly?	**Yes**	**No**
Position the gauge for accurate visualization?	**Yes**	**No**
Place the stethoscope appropriately over the brachial artery?	**Yes**	**No**
Inflate the cuff appropriately above the expected systolic pressure?	**Yes**	**No**
Deflate the cuff at an appropriate rate while auscultating Korotkoff sounds?	**Yes**	**No**
Correctly identify systolic and diastolic pressures?	**Yes**	**No**
Remove the cuff appropriately following the procedure?	**Yes**	**No**
Record blood pressure accurately?	**Yes**	**No**
State the normal adult blood pressure range?	**Yes**	**No**

Patient Transfer Competency

EXAMPLE – Actual Form is in Trajecsys

Patient Care Transfer Competency

Patient Care Transfer Competency Criteria		
Wheelchair to Radiation Therapy Table **Did the Student:**		
Assess the patient's ability to stand and determine whether additional assistance is required?	**Yes**	**No**
Position the wheelchair appropriately next to the treatment table?	**Yes**	**No**
Lock the wheelchair brakes and move the footrests safely out of the way?	**Yes**	**No**
Ensure all lines, catheters, and monitoring equipment will transfer safely without pulling or dislodging?	**Yes**	**No**
Maintain appropriate physical support while assisting the patient to a standing position?	**Yes**	**No**
Reassess the patient's stability once standing and request assistance if needed?	**Yes**	**No**
Safely assist the patient to the treatment table and into the appropriate treatment position?	**Yes**	**No**
Stretcher to Radiation Therapy Table **Did the Student:**		
Determine the appropriate number of staff required for a safe transfer?	**Yes**	**No**
Explain the transfer procedure to the patient?	**Yes**	**No**
Adjust stretcher and treatment table heights appropriately?	**Yes**	**No**
Lock stretcher and treatment table prior to transfer?	**Yes**	**No**
Ensure all lines, catheters, and monitoring equipment will transfer safely without pulling or dislodging?	**Yes**	**No**
Position staff appropriately to safely assist with the transfer?	**Yes**	**No**
Assist with proper placement and use of the transfer board/slider device?	**Yes**	**No**
Safely transfer the patient to the treatment table using appropriate body mechanics and transfer techniques?	**Yes**	**No**

Ensure the patient is safely positioned on the treatment table prior to removing transfer devices or moving the stretcher?	**Yes**	**No**

Assisting with O_2 Administration Competency

EXAMPLE – Actual Form is in Trajecsys

O2 Administration Competency Criteria

O_2 Administration Competency Criteria		
Procedure **Did the Student:**		
Identify the patient and obtain consent for the procedure?	**Yes**	**No**
Explain the procedure to the patient and answer any questions?	**Yes**	**No**
Wash hands prior to procedure?	**Yes**	**No**
Maintain appropriate infection control precautions?	**Yes**	**No**
Observe and identify the components of the oxygen delivery setup?	**Yes**	**No**
Assist with transfer of oxygen administration from a portable tank to a wall outlet, or vice versa, while maintaining prescribed oxygen settings?	**Yes**	**No**
Demonstrate proper placement and use of a nasal cannula?	**Yes**	**No**
Demonstrate the ability to identify oxygen tank pressure (PSI) on a portable oxygen tank?	**Yes**	**No**
Demonstrate proper adjustment of a wall oxygen flow meter under supervision?	**Yes**	**No**
Demonstrate proper adjustment of a portable oxygen tank flow meter under supervision?	**Yes**	**No**
Identify where oxygen orders and prescribed flow rates are documented in the patient chart?	**Yes**	**No**

Pulse Oximetry Competency

EXAMPLE – Actual Form is in Trajecsys

Pulse Oximetry Competency Criteria

Pulse Oximetry Competency Criteria		
Procedure **Did the Student:**		
Identify the patient and obtain consent for the procedure?	**Yes**	**No**
Explain the procedure to the patient and answer any questions?	**Yes**	**No**
Wash hands prior to procedure?	**Yes**	**No**
Maintain appropriate infection control precautions?	**Yes**	**No**
Apply the pulse oximeter probe appropriately?	**Yes**	**No**
Assess for factors that may interfere with pulse oximetry accuracy (e.g., nail polish, artificial nails, poor circulation, motion)?	**Yes**	**No**
Obtain an accurate oxygen saturation (SpO_2) reading and pulse rate?	**Yes**	**No**
Assess the quality of the waveform/signal, if applicable?	**Yes**	**No**
Remove probe appropriately following the procedure?	**Yes**	**No**
Record oxygen saturation and pulse rate accurately?	**Yes**	**No**
State the normal adult oxygen saturation range?	**Yes**	**No**

Brachytherapy Experiences & Participatory Competency

Both Low Dose Rate (LDR) and High Dose Rate (HDR) brachytherapy procedures are acceptable for clinical experience and competency completion. Electronic brachytherapy procedures are not accepted.

The ARRT requires completion of a participatory brachytherapy competency requirement. Per the ARRT definition, participation means the student takes an active role in the procedure and demonstrates understanding of the critical concepts necessary for its successful completion.

Prior to the evaluation, the student must complete a minimum of one brachytherapy experience and submit a typed case study for each experience, as discussed on the previous page. The case study must be emailed to the Clinical Coordinator within two weeks of the procedure date and should be completed during or immediately following the brachytherapy procedure.

Note: Helpful resources for completing the case studies and preparing for the competency evaluation include:

- Chapter 16 of *Applied Physics for Radiation Oncology* by Stanton and Stinson
- Chapter 17 of *The Physics & Technology of Radiation Therapy* by McDermott & Orton,
- Chapter 14 of *Principles and Practice of Radiation Therapy* by Washington/Leaver (6th edition)

Case Study Requirements

1. Date of procedure.
2. Patient's diagnosis.
3. Type of implant.
    a. Interstitial, intracavitary, endobronchial, endovascular, surface, etc.
    b. LDR or HDR brachytherapy
    c. Permanent or temporary
4. Criteria evaluated by the physician to determine that brachytherapy is an acceptable treatment option for the specific patient.
5. Benefits of brachytherapy versus external beam radiation therapy for the specific case.
6. Radioactive source used.
7. Characteristics of the radioactive source, including half-life and average energy.
8. Description of dose specification/prescription, critical structures, and calculation method.
9. Discussion of radiation safety considerations before, during, and after the procedure, including source storage, source preparation, surveys, source transport, and documentation.
10. Description of how the patient was assessed and monitored by the radiation oncology team before, during, and after the brachytherapy procedure.
11. Student reflection regarding the experience, including thoughts, reactions, and impressions.

Competency Evaluation Process:

A registered radiation therapist, dosimetrist, physicist, and/or other qualified personnel may evaluate the student's participatory performance using the criteria established in the competency evaluation form.

Note: Under no circumstances should an "N/A" be awarded for any evaluation criterion. If a task cannot be physically demonstrated, the student's knowledge should be evaluated verbally through discussion or questioning.

If a student does not successfully complete the brachytherapy participatory competency, the student should discuss recommendations for improvement with the evaluator and may contact the Clinical Coordinator at any time regarding the evaluation process. Once the student and evaluator determine that the student is prepared for re-evaluation, a new competency evaluation will be completed and submitted in Trajecsys.

Example Brachytherapy Case Study

Brachytherapy observations require submission of a case study within 2 weeks of the procedure. The case study will include the following information and resemble the same format as below.

1. Adenocarcinoma of the prostate
2. 3/31/26
3. Permanent prostate seed implant
    a. Interstitial implant
    b. Low Dose Rate (LDR) brachytherapy
    c. Permanent implant
4. The patient completed a urinary function questionnaire assessing urgency, weak urinary stream, nocturia, urinary frequency, intermittency, and bladder emptying. A prostate volume study was also performed to determine candidacy for seed implantation. Patients with excessively large prostate volumes may require hormonal therapy for prostate downsizing or consideration of external beam radiation therapy instead.

    The patient was diagnosed with adenocarcinoma involving the left lobe of the prostate with a Gleason score of 3+4=7 and a PSA of 5.982. No lymphovascular invasion, nodal involvement, or metastatic disease was identified. The disease was staged as T1cN0M0. The prostate volume was approximately 36.9 cc, which was considered acceptable for brachytherapy treatment.
5. The patient was considered a candidate for monotherapy using permanent seed implantation. Brachytherapy allowed delivery of a highly localized dose directly to the prostate while limiting dose to surrounding normal tissues. The patient also preferred the shorter treatment course compared to daily external beam radiation therapy treatments over multiple weeks.
6. Iodine-125 (I-125)
7. The half-life of I-125 is approximately 59.4 days with an average photon energy of approximately 0.028 MeV. Seeds with an activity of 0.38 mCi per seed were used for the implant.
8. The patient underwent a prostate volume study prior to the procedure. Based on the prostate size, a prescription dose of 145 Gy was ordered using 90 I-125 seeds at 0.38 mCi per seed. Critical structures included the bladder, rectum, and urethra. Ultrasound guidance and fluoroscopy were used during the procedure to assist with accurate seed placement and minimize placement outside the prostate. Following the implant, CT imaging was performed for post-implant evaluation and dose assessment to surrounding structures.
9. The radioactive sources were stored in a secured storage area with appropriate radioactive material signage. Prior to the procedure, the implant grid and treatment plan were reviewed by the radiation oncologist and treatment team. Shielded handling devices were used to minimize radiation exposure during source handling. Following the procedure, radiation surveys were performed on linens, trash, equipment, and the patient to ensure no stray radioactive sources remained. Any unused sources were documented and returned according to radiation safety procedures and institutional policy.

10. The patient completed an initial consultation and physical assessment with the radiation oncology team prior to the implant procedure. A bowel preparation was completed before the implant. During the procedure, the patient was continuously monitored while radiation safety precautions were maintained for staff and the patient. Following the procedure, the patient recovered in the post-operative area and was monitored prior to discharge. Discharge instructions included radiation safety precautions around children and pregnant individuals, urinary instructions, and follow-up imaging recommendations. Follow-up appointments were scheduled to assess PSA response and evaluate post-implant dosimetry.
11. This was my first opportunity to observe a permanent prostate seed implant procedure. I observed patient preparation, room setup, ultrasound guidance, seed placement, radiation safety precautions, and post-procedure recovery. The procedure appeared more invasive than external beam radiation therapy; however, it provided the patient with a shorter overall treatment course. Observing the multidisciplinary coordination between the radiation oncologist, urologist, therapists, nursing staff, and physics team helped reinforce the complexity of brachytherapy procedures and the importance of radiation safety throughout the process.

Brachytherapy Learning Objectives:

- Discuss quality assurance procedures related to brachytherapy including source calibration, leak testing, storage area surveys, and source inventory documentation.
- Identify radiation safety considerations related to brachytherapy, including personnel exposure, signage requirements, emergency procedures, and source security.
- Describe various forms of brachytherapy, including interstitial, intracavitary, surface implants, HDR and LDR procedures.
- Identify commonly used radioactive sources and discuss their characteristics.
- Review brachytherapy treatment planning concepts, dose specification methods, and critical structures associated with implant procedures.
- Observe preparation, loading, unloading, transport, cleaning, and maintenance of brachytherapy applicators and sources, as available.
- Describe documentation and record-keeping requirements for brachytherapy programs.
- Participate in or observe radiation surveys, including patient surveys, room/area surveys, and area radiation monitor evaluations.
- Review safety concepts related to brachytherapy delivery, including ALARA principles, radiation protection concepts, occupational versus public dose limits, afterloader safety advantages, and required signage.

Brachytherapy Competency

EXAMPLE – Actual Form is in Trajecsys

Brachytherapy Competency Criteria

Brachytherapy Competency Criteria					
General Brachytherapy QA Concepts **The student demonstrated an understanding of the following critical concepts through active participation and/or questioning:**					
Performs or describes relevant pre-implant quality control testing procedures.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Discusses method of source calibration.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Defines the standard frequency for sealed source leakage testing.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs or describes the procedure for surveying a radioactive source storage area.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Indicates the procedure for logging sources in/out and states how long records are maintained.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Describes actions to take in the event of an emergency, such as if the source fails to retract, the source is lost, the patient suffers a medical emergency, or the patient expires.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Describes information that should be documented after emergency action is taken.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
General Brachytherapy Implant Concepts **The student demonstrated an understanding of the following critical concepts through active participation and/or questioning:**					
Identifies advantages of brachytherapy over external beam radiation therapy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies disadvantages of brachytherapy over external beam radiation therapy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Provides the definition of interstitial implant.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Provides the definition of intracavitary implant.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Provides the definition of surface or topical implants.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Differentiates between temporary and permanent implants.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
States the dose rate associated with LDR brachytherapy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
States the dose rate associated with HDR brachytherapy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

General Source Handling Concepts **The student demonstrated an understanding of the following critical concepts through active participation and/or questioning:**					
Describes the radiation protection techniques used in handling radioactive sources: L-block, forceps, radiation ring devices.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Describes the manner in which radioactive sources are transported.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
General Radiation Survey Concepts **The student demonstrated an understanding of the following critical concepts through active participation and/or questioning:**					
Recognizes the purpose of brachytherapy related radiation surveys.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Participates in or describes procedure for surveying a patient after implantation.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Participates in or describes procedure for surveying adjacent room & hallway of a hospitalized brachytherapy patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
General Radiation Safety Concepts **The student will demonstrate an understanding of the following critical concepts through active participation and/or questioning:**					
Defines ALARA.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Lists the 3 cardinal principles of radiation protection.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reports the annual effective dose equivalent limit for the general public.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reports the annual occupational effective dose equivalent limit.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies safety features specific to high dose rate brachytherapy compared (emergency off, timer, uninterrupted power supply, etc.).	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies the benefits of remote afterloaders.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
States the Nuclear Regulatory Commission's (NRC) requirements for posting signs in and around radioactive storage areas.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies the radiation detection device most commonly used to locate a lost brachytherapy source.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Procedure and Implant Technique **The student demonstrated an understanding of the following critical concepts through active participation and/or questioning:**					
Discusses type of applicator used in the brachytherapy procedure.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Performs or describes imaging procedures used before the implant.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs or describes imaging procedures used after implant.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Review of radioactive source characteristics relevant to brachytherapy procedure:					
Identifies radioactive source used in the brachytherapy procedure.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reports half-life of source used in brachytherapy procedure.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reports average energy of source used in brachytherapy procedure.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reports air kerma strength of source used in brachytherapy procedure.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Implant Dosimetry System **The student demonstrated an understanding of the following critical concepts through active participation and/or questioning:**					
Defines the goals of brachytherapy treatment planning.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies dose specification/prescription.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Discusses calculation method (Patterson-Parker or Manchester, Quimby, Paris, TG-43, other).	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies critical structures of interest.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Patient Assessment **The student will demonstrate an understanding of the following critical concept through active participation and/or questioning:**					
Student took an active role with the Radiation Oncology Team in patient assessment before, during and after the relevant brachytherapy procedure.					

Treatment Accessory Devices

The program requires students to gain hands-on experience with bolus materials and custom immobilization devices throughout the program year. Students will also observe and participate in custom block processes for electron and photon beam shaping (if available) to develop an understanding of beam shaping concepts and block fabrication principles.

Achievement of the treatment accessory device objectives and the ARRT competencies will provide the student with entry-level knowledge and skills related to custom bolus fabrication, immobilization devices, and beam-shaping concepts. The custom block process is completed as an ARRT participatory competency rather than a standard treatment accessory device competency.

Treatment Accessory Device Objectives

- Discuss the purpose of block fabrication in radiation therapy treatment delivery.
- Explain methods of custom block construction.
- Discuss common alloys used in block fabrication.
- Identify safety precautions related to block fabrication materials and equipment.
- Locate, identify, and discuss the equipment necessary for block fabrication.
- Identify custom block specifications such as block thickness, maximum transmission, and distance from patient.
- Review concepts of transmission, half-value layer (HVL), homogeneity coefficient, and beam hardening.
- Observe and participate in custom block processes, including block cutting, block adjustments, and verification of block accuracy, as available.
- Discuss multileaf collimators (MLCs) as a method of beam shaping, including leaf configuration, limitations, and quality assurance considerations.
- Discuss the purpose and construction of bolus materials and tissue compensators.
- Explain the importance of effective immobilization in radiation therapy treatment delivery.
- Construct and prepare immobilization devices.
- Apply appropriate immobilization techniques while considering patient positioning, alignment, leveling, and comfort.
- Identify appropriate clinical applications for various immobilization devices.
- Provide effective patient instruction and address commonly asked patient questions regarding immobilization.

Treatment Accessory Devices Part 1 – Custom Immobilization Devices

Custom immobilization devices are key components of radiation therapy simulation and treatment delivery because they help ensure reproducible patient positioning and accurate field alignment. Students will complete the two ARRT competencies for custom immobilization device (e.g., thorax or abdomen/pelvis) and thermoplastic mold fabrication.

These competencies should not be attempted until the spring semester, when simulation procedures become a major focus of clinical education. Students should attempt competency evaluations only after they feel they have gained adequate experience and understanding related to the construction and use of custom immobilization devices. These competencies can be found in Trajecsys under the “Comp Evals” tab.

See Performance Expectations for all Competency Evaluations (section 3, pg. 11) in the event of a failed competency.

Treatment Accessory Devices Competency - Custom Immobilization Devices

EXAMPLE – Actual Form is in Trajecsys

Custom Immobilization Device Competency

Custom Immobilization Device Competency Criteria		
Custom Immobilization Devices (e.g., Foaming Agents, Vacuum Bags) **Did the Student:**		
Appropriately plan for immobilization device construction by gathering required supplies and preparing equipment.	**Yes**	**No**
Effectively educate the patient regarding the fabrication procedure to obtain the patient's cooperation.	**Yes**	**No**
Properly position patient on the table, straightening and leveling the patient prior to the construction of the immobilization device.	**Yes**	**No**
Efficiently construct the device, achieving the prescribed treatment position.	**Yes**	**No**
Appropriately document settings and label the device (per site's procedure).	**Yes**	**No**

Treatment Accessory Devices Competency - Thermoplastic Mold

EXAMPLE – Actual Form is in Trajecsys

Thermoplastic Mold Competency Criteria

Thermoplastic Mold Competency Criteria		
Thermoplastic Mold or Aquaplast **Did the Student:**		
Appropriately plan for immobilization device construction by gathering required supplies and preparing equipment?	**Yes**	**No**
Effectively educate the patient regarding the fabrication procedure to obtain the patient's cooperation?	**Yes**	**No**
Properly position the patient on the table, straightening and leveling the patient prior to the construction of the immobilization device?	**Yes**	**No**
Assure that the temperature of the heated thermoplastic mold is appropriate before placing it on the patient's skin?	**Yes**	**No**
Efficiently construct the device, achieving the prescribed treatment position?	**Yes**	**No**
Appropriately document settings and label the device (per site's procedure)?	**Yes**	**No**

Treatment Accessory Devices Part 2 – Custom Blocks and Bolus

Students will gain experience with electron block processes and/or fabrication throughout the program year. Photon block processes are also encouraged if the clinical facility utilizes photon block fabrication or block shaping methods. Simulated experiences may be used with previous simulation radiographs or digitally reconstructed radiographs (DRRs) printed at 1:1 scale. Students should discuss simulated experiences with the Clinical Coordinator.

Facilities Utilizing Outsourced Block Fabrication: At facilities that outsource block fabrication to a third-party vendor, students are still expected to participate in the overall block process whenever possible. This may include reviewing simulation data and prescriptions, observing or participating in digital contouring or field cutout processes, understanding block submission procedures, and reviewing the completed block upon return to the department.

The final verification step is especially critical; students should confirm that the physical block matches the treatment plan parameters and fits the block tray properly.

Students will also gain experience with custom bolus fabrication and the clinical applications of bolus materials throughout the program year.

The ARRT custom block process is completed as a participatory procedure competency rather than a standard treatment accessory device competency. Students should attempt competency evaluations only after they feel they have gained adequate experience and understanding related to block processes, beam shaping concepts, and bolus fabrication techniques. These competencies may be completed at any point during the program and can be found in Trajecsys under the “Comp Evals” tab.

See Performance Expectations for all Competency Evaluations (Section 3, pg. 11) in the event of an unsuccessful competency evaluation.

Treatment Accessory Devices Competency - Custom Bolus

EXAMPLE – Actual Form is in Trajecsys

Custom Bolus Competency Criteria

Custom Bolus Competency Criteria		
Application and Knowledge of Bolus		
Demonstrate correct placement of prefabricated bolus (e.g., Superflab)	**Yes**	**No**
Construct a 1cm custom bolus using wet gauze, paraffin wax, or other approved material.	**Yes**	**No**
Identify three clinical applications for bolus materials.	**Yes**	**No**
Define skin sparing and explain the effect of bolus on skin dose for both electron and photon treatments.	**Yes**	**No**
Discuss the effect of air gaps on bolus applications and methods used to minimize air gaps during treatment setup.	**Yes**	**No**

Custom Block Process (Photon or Electron)
Participatory Procedure
EXAMPLE – Actual Form is in Trajecsys

Custom Block Competency Criteria

Custom Block Competency Criteria		
Safety Elements **Did the Student:**		
Identify the location of the Safety Data Sheet and state its purpose.	**Yes**	**No**
State the metals that make up the alloy called Cerrobend?	**Yes**	**No**
Describe risks associated with Cerrobend exposure?	**Yes**	**No**
Discuss safety precautions that should be used when working with Cerrobend?	**Yes**	**No**
Fabrication Procedure **Did the Student:**		
Accurately perform block fabrication or third-party outsourcing, per the site's protocol?	**Yes**	**No**
Identify the required thickness of electron blocks to achieve acceptable transmission?	**Yes**	**No**
Identify how many half-value layers make up a typical photon block (if applicable)?	**Yes**	**No**
Indicate methods by which the accuracy of photon blocks can be verified (if applicable)?	**Yes**	**No**
State the acceptable level of transmission through an electron or photon block?	**Yes**	**No**
State the minimum distance electron or photon blocks will be from a patient's skin and why?	**Yes**	**No**

Treatment Delivery Rotation

Students will perform treatment delivery procedures throughout the clinical phase of the program. There are 16 mandatory ARRT primary treatment delivery competency requirements; 3 of these may be completed under simulated conditions during the final summer semester.

Requirements to become eligible for primary treatment delivery competency testing:

1. The Radiation Therapy Treatment Room Checklist will be submitted by the Clinical Preceptor or other supervising registered radiation therapist prior to attempting pre-competency checklists.
2. A pre-competency checklist will be successfully completed for **each** ARRT treatment delivery procedure prior to attempting competency testing. Pre-competency checklists will be submitted by the Clinical Preceptor or other supervising registered radiation therapist in Trajecsys.

Additionally, students will complete continued competency evaluations on selected primary treatment delivery procedures to demonstrate continued knowledge and skill development despite variations in patient condition, treatment technique, diagnosis, or setup (see Semester by Semester Competency Requirements, section 3, pg. 8-9)

Total Body Irradiation, Brachytherapy, SBRT/SRS, Special Simulation Procedures, Motion Management, Custom Block and Craniospinal Axis competency requirements are a separate ARRT competency category called Participatory Procedures (see ARRT Competency Requirements, pg. 13-16). In the Participatory Procedure, students take an active role and demonstrate understanding of critical concepts vital to its success, but may not complete all steps independently. Participatory Procedure competencies may be completed on actual patients or, if necessary, may be completed under simulated conditions in the final summer semester.

Rotation Objectives

- Provide consistent radiation protection for the patient and operator.
- Attend to each patient's safety and comfort.
- Act in a professional manner at all times.
- Incorporate HIPAA requirements into clinical practice.
- Demonstrate proper body mechanics.
- Observe proper isolation techniques.
- Communicate effectively with patients, physicians, nurses, physics staff, and other professionals.
- Demonstrate the ability to provide patient education and answer questions.
- Demonstrate the ability to effectively read the treatment prescription and recorded doses.
- Deliver a prescribed course of treatment adhering to acceptable departmental, institutional, governmental, and professional standards.
- Demonstrate the ability to accurately record treatment doses and document necessary information such as portal images, shifts, and changes in SSD.
- Demonstrate proper treatment alignment and develop efficiency with treatment setup protocols.
- Demonstrate proper usage and care of equipment.
- Critically assess images (weekly portals or daily acquisitions) for positioning accuracy.
- Demonstrate competency through the evaluation process of all ARRT treatment categories.
- Demonstrate continued knowledge through the completion of continued competency testing.
- Validate manual and computer dosimetric calculations.
- Demonstrate the ability to perform non-routine treatment procedures such as Cord Compression and SVC treatment emergencies.

Radiation Therapy Treatment Room Checklist

EXAMPLE – Actual Form is in Trajecsys

Listed below are activities routinely incorporated into daily treatment delivery procedures. Because many of these tasks become second nature to experienced radiation therapists, important information or workflow processes may unintentionally be overlooked when mentoring radiation therapy students.

The Radiation Therapy Treatment Room Checklist is designed to ensure students are appropriately oriented to treatment room workflow, equipment, safety procedures, and departmental expectations prior to assuming a more active role in patient treatment procedures.

This checklist will be submitted in Trajecsys by the Clinical Preceptor or other supervising registered radiation therapist prior to the student completing any pre-competency checklists. Completion of this checklist is also recommended whenever students rotate to a new treatment machine.

Treatment Room Checklist Criteria

Treatment Room Checklist Criteria		
Emergency Stops		
Identify the location of all emergency stop buttons	**Yes**	**No**
Explain the effect of emergency stop activation on equipment operation	**Yes**	**No**
Lasers		
Identify the location of all treatment room lasers	**Yes**	**No**
Visualize laser convergence/isocenter location	**Yes**	**No**
Control Panel of Treatment Couch	**Yes**	**No**
Move treatment couch (vertical, longitudinal, lateral, couch rotation)	**Yes**	**No**
Identify important control panel functions (SSD, field light, couch, table lock functions)	**Yes**	**No**
Demonstrate how interlocks related to the treatment couch control panel are cleared, when applicable.	**Yes**	**No**
Hand Pendant		
Move treatment couch (vertical, longitudinal, lateral, couch rotation)	**Yes**	**No**
Move gantry and collimator	**Yes**	**No**
Identify important pendant functions (SSD, field light, auto buttons, etc).	**Yes**	**No**
Retract/load MLC	**Yes**	**No**
Demonstrate how pendant interlocks are cleared, when applicable	**Yes**	**No**
Demonstrate awareness of safe positioning during gantry rotation to avoid collisions	**Yes**	**No**
Field Size (Inside Treatment Room)		
Manually set field size (symmetric and asymmetric Y1, Y2, X1, X2)	**Yes**	**No**
Automatically set field size according to patient treatment parameters	**Yes**	**No**

Demonstrate understanding of half-beam block setup concepts.	**Yes**	**No**
Imaging Functions		
Position and retract MV/kV imaging equipment appropriately for image acquisition	**Yes**	**No**
Demonstrate understanding of imaging-related interlocks, when applicable	**Yes**	**No**
Accessory Devices		
Attach accessory mount	**Yes**	**No**
Insert wedges, cones, electron attachment, and electron blocks, as applicable	**Yes**	**No**
Patient Shifts		
Demonstrate understanding of manual patient shifts from inside the treatment room, even if shifts are typically performed automatically from the console area	**Yes**	**No**
Explain the impact of treatment shifts on the numerical value of treatment couch coordinates	**Yes**	**No**
Treatment Chart		
Identify treatment prescription	**Yes**	**No**
Identify photo ID/setup photos	**Yes**	**No**
Identify consent form	**Yes**	**No**
General Interlocks		
Understand parameter settings and table tolerances, including how tolerance warnings/interlocks are displayed and cleared	**Yes**	**No**
Identify where treatment interlocks are displayed on monitors	**Yes**	**No**

Guidelines for Radiation Treatment Procedure Competency Testing

First Three Days of a New Rotation

During the first three days of a new clinical rotation, it is recommended that the student:

- **Observe** – step back during the actual patient set-up and watch what the therapists are doing.
- **Listen** – listen to what the therapists are discussing with the patient regarding their well-being.
- **Practice** – during slow periods, go into the room and practice with the hand controls, pendants, and become familiar with all aspects of the room.

All students progress at different rates. In the fall semester, students generally begin treatment competency evaluations the first week of October. The supervising radiation therapist will agree that the student's skill level is acceptable for a competency attempt.

Student Responsibilities for Competencies:

***Prior to the Day of Competency**:*

- Complete a pre-competency checklist for the selected primary treatment delivery competency prior to performing treatment competencies.
- Once approved to begin, pick out the patient for competency **three (3) clinical days** or more in advance and inform the Clinical Preceptor.
- Initiate a conversation with the supervising radiation therapist about evaluation expectations.
- Review competency study guides available in this manual to prepare for evaluator questions.
- Review and learn all details of the patient's care and complete a typed case study following the template provided in this manual.

On the Day of Competency:

- Confirm the desire to complete a competency evaluation prior to the patient arriving
- Review the patient's treatment chart – Be able to state the diagnosis, prescription, whether images are to be taken, and the cumulative dose
- Have the room completely set up prior to the patient entering
- Escort the patient from the waiting room to the treatment room
- Be responsible for conversation and assessment of the patient's physical and emotional state
- Be the lead person during the procedure – a therapist may assist but not lead
- Be prepared to answer questions regarding the patient's case, treatment set-up, dose record, related anatomy, and critical structures

Therapist Responsibilities for Competencies:

- Allow the student to observe and practice during the first three days of a new rotation.
- After day 3, progressively step back to allow increased hands-on experience; consider deciding each clinical day what role the student will take.
- During competency testing, allow the student to lead the procedure.
- Question the student to verify their level of understanding – Have the student critique images, answer questions about oncology/pathology, identify anatomy, and discuss critical structures. Use open-ended questions beyond "yes" or "no".
- Complete the appropriate competency form in Trajecsys with written and verbal feedback.
- Discuss the results of the competency evaluation with the student.
- If the student fails the treatment competency, the student should perform the procedure a minimum of three times before re-evaluating and submitting a new competency form in Trajecsys.

Treatment Delivery Competency Evaluation – Remediation of Failed Competency

Failed competency attempts are factored into the student's clinical grade. Students must successfully complete all required competencies to meet program and ARRT requirements; however, the original failing score will remain recorded in the gradebook.

If a student does not successfully complete a competency evaluation, the following remediation process will occur:

- The student will review the evaluation and discuss areas needing improvement with the evaluating therapist or Clinical Preceptor.
- The student will review related course materials, procedures, and clinical expectations associated with the competency.
- The student will continue performing procedures within the same treatment or imaging category for additional supervised practice.
- Prior to re-testing, the student must successfully perform the procedure a minimum of three (3) additional times.
- Once the student or evaluator determine readiness for re-evaluation, a new competency evaluation will be completed.
- Students are responsible for maintaining communication with the Clinical Coordinator regarding failed competencies and re-evaluation plans.

If a student fails two competency evaluations of any type during the program, the Student Counseling Policy will be initiated (see Performance Expectations for Competency Evaluations, pg. 11).

Pre-Competency Checklist

EXAMPLE – Actual Form is in Trajecsys

Prior to performing a primary treatment delivery competency, a pre-competency checklist will be completed for each competency category to demonstrate readiness for competency testing. The checklist will be completed by the Clinical Preceptor or another supervising therapist within Trajecsys. All checklist criteria must be successfully met prior to performing the corresponding competency evaluation.

Pre-Competency Checklist Criteria

Pre-Competency Checklist Criteria		
Did the student demonstrate the following criteria:		
1. Data Interpretation • Demonstrates location of prescription. • Demonstrates understanding of prescription content. • Compares patient's cumulative dose against prescribed total dose. • Assesses need for imaging, diode readings and/or SSD verifications. • Selects appropriate treatment plan/course/phase for treatment.	**Yes**	**No**
2. Treatment Room Preparation • Accurately and efficiently prepares room for specified patient. • Demonstrates ability to use or adjust immobilization devices and employ auxiliary equipment during treatment, if applicable.	**Yes**	**No**
3. Greeting of Patient • Identifies correct patient using 2 forms of appropriate identification. • Properly introduces self to patient. • Assists patient as needed. • Properly explains procedure and/or addresses patient questions. • Maintains patient-focused conversation. • Demonstrates empathy.	**Yes**	**No**
4. Patient Assessment • Assesses patient status through observation and questioning • Provides accurate patient education within scope of practice. • Recognizes when the patient should be referred to the nursing staff or the physician.	**Yes**	**No**
5. Patient Positioning • Properly positions patient on table, using immobilization device(s) properly. • Accurately reproduces setup in a timely fashion. • Verifies SSDs and/or other pre-determined measurements • Assesses setup in regards to match lines, shifts, skin gaps, etc. • Confirms all record and verify parameters have been met. • Informs patient to remain still for treatment.	**Yes**	**No**
6. Treatment Delivery • Performs procedural timeout prior to beam activation. • Verifies setup data with registered radiation therapist. • Describes use of intercom and beam off process in case such action is needed. • Demonstrates or describes operation of console controls for beam activation. • Closely monitors patient during treatment delivery. • Transitions to next treatment field efficiently. • Accurately records daily doses, MU settings & cumulative dose(s).	**Yes**	**No**

7. Professionalism • Performs procedure with professional confidence. • Performs procedure while maintaining professional work standards. • Demonstrates adherence to ethical standards.	**Yes**	**No**
8. Image Critique *(may be simulated using previous films)* • Identifies pertinent gross anatomy. • Identifies pertinent critical structures. • Critically evaluates image for accurate positioning.	**Yes**	**No**
9. Safety Issues • Performs procedure at an acceptable pace. • Makes certain treatment delivery is accurate by drawing and checking match lines, confirming flash, verifying relationship of light field to treated area (i.e. field shape and location "make sense" for area being treated.) • Ensures safety by using equipment properly, stands on correct side of the table when rotating the gantry, inserts accessories safely, and employs MRI safety and practice concepts in treatment delivery, if applicable.	**Yes**	**No**
10. Communication • Provides clear instructions to the patient as needed. • Effectively answers patient questions & addresses patient concerns. • Communicates discrepancies to appropriate members of the treatment team.	**Yes**	**No**

Primary Treatment Delivery Competency Case Study Requirement

Email a typed case study (following the format below) for each primary treatment delivery competency, TBI, CSA, stereotactic competency, and motion management competency (if performed on a patient rather than simulated) to the Clinical Coordinator **at least** 1 day prior to performing the competency.

Each case study will include the following information. An example is provided on the next page.

1. Diagnosis
2. Stage
3. Grade
4. Patient's Medical History
5. Social History
6. Symptoms
    a. What did the patient present with upon diagnosis?
7. Treatment
    a. Prescription
    b. Type of treatment (3DCRT, IMRT, Arc, etc.)
    c. Field structure (4 field, Tangents, Parallel Opposed, 7-field IMRT, 2 Arcs, etc.)
    d. Imaging schedule
    e. Are there specific nodes to be included in the fields?
    f. Is the patient receiving concurrent chemo?
    g. Did the patient have surgery?
8. Alternate Treatment Options
    a. *Example:* If the patient was prescribed IMRT treatments, consider why 3DCRT or arc therapy was not prescribed.
    b. *Example*: Consider why the patient is not a good candidate for brachytherapy.
    c. *Example*: Consider why daily CBCT was selected rather than weekly portal imaging.
9. Relevant Critical Structures
10. Side Effects
    a. Discuss side effects that may be expected with this form of treatment, including alleviation methods.
    b. Consider whether the patient is currently experiencing side effects related to the treatment and what interventions have been prescribed or recommended to manage the side effects.
11. Evaluation of Case Against Research or Known Facts of Cancer Type
    a. Evaluate of how the case coincides or contradicts current research about the cancer's epidemiology, etiology, and presentation.
        i. Did the patient present with the typical symptoms for the diagnosis?
        ii. Did the patient have any typical risk factors that are associated with the given cancer type?
        iii. Does the patient's age/gender/ethnicity correlate to the typical age/gender/ethnicity for the given cancer type?

Example Treatment Competency Case Study

Name: Sean Conrad
Competency Category: Pelvis Multi-Field Supine

DIAGNOSIS, STAGE, & GRADE
This patient has been diagnosed with high-grade invasive transitional cell carcinoma of the bladder. During a cystoscopy, partial tumor resection was performed with approximately 50g of tumor removed. The disease is locally advanced without evidence of distant metastatic disease.

MEDICAL HISTORY
This patient experienced menarche at age 14 and menopause at age 50. She was pregnant 6 times and gave birth six times. Her last pregnancy was at age 32. The patient's family history is significant for colon cancer in her mother, who died of the disease. She has one sister with cancer (type unknown). Her current medications include Actonel, Vitamin D, Calcium, Coumadin, Ferrous Sulfate, Zoloft, and Strattera.

SOCIAL HISTORY
The patient is an 80-year-old Caucasian female. She is married and has six grown children. She has been a homemaker all of her life. She and her husband are from Kansas and have lived there all of their lives. She has a history of tobacco use, approximately 60-pack per year for over 50 years but quit 3 years ago. She denies any alcohol use.

SYMPTOMS
The patient started having multiple episodes of gross hematuria which prompted a cystoscopy. The cystoscopy noted a massive tumor involving the bladder; virtually 60-70% of the entire bladder along the floor, trigone, and neck region were affected. Resection of the tumor was done at the time of the cystoscopy. Metastatic evaluation including a PET/CT scan showed a 6.7cm mass arising in the right trigone of the urinary bladder highly suspicious for pedunculated bladder neoplasm. No other abnormities were noted and no evidence of metastatic disease was identified.

TREATMENT
The patient is not a candidate for definitive surgical resection or aggressive combination chemotherapy but has been deemed a candidate for radio sensitization doses of cisplatin. Definitive radiation treatment using 3DCRT. 4 field technique has been prescribed to deliver 180cGy/fraction to a total dose of 65Gy with a field reduction scheduled at 45Gy. The fields include the following nodes: perivesical, obturator, external iliac and internal iliac nodes.

ALTERNATIVE TREATMENT OPTIONS
Other possible options for radiation therapy treatment to the pelvis could have been Arc therapy or IMRT. Daily IGRT could be beneficial due to the high degree of movement and placement uncertainty of the bladder. However, due to the necessary field size to include lymph nodes, a four field technique was chosen for this patient.

RELEVANT CRITICAL STRUCTURES
Since the patient is being treated using a conformal four-field technique, other structures that would be of concern include the small bowel and rectum. Contrast may be used at the time of simulation in order to help the physician and dosimetrist visualize critical structures when planning the patient's treatment.

SIDE EFFECTS
A patient who is undergoing radiation treatment for bladder cancer may experience dysuria and cramping. Because of the location it is also possible for the patient to have diarrhea as some of the small bowel and rectum may be included in the treatment field. To help reduce side effects, the patient may be simulated with an empty bladder which would allow for a smaller treatment field. The side effects can usually be managed by maintaining the recommended diet and using antidiarrheal medications and pyridium when instructed.

EVALUATION
This patient has been diagnosed with high grade transitional cell carcinoma of the bladder without any evidence of metastatic disease. Bladder cancer is the 5th most commonly diagnosed cancer in the U.S.: 4th in men and 9th in women. Transitional cell is the most common histology of bladder cancer. This patient had several risk factors which included smoking, a family member with colon cancer (certain types of colon cancer are related to bladder cancer), being over the age of 65 and being Caucasian. As well, the patient presented with the primary symptom of bladder cancer; gross hematuria.

Treatment Delivery Competency

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Treatment Delivery Competency Criteria

Treatment Delivery Competency Criteria					
Data Interpretation					
a. Demonstrates location of the prescription.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Demonstrates understanding of the prescription content.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Compares patient's cumulative dose against prescribed total dose.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Assesses need for imaging, diode readings, SSD verifications.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
e. Selects appropriate treatment plan/course/phase for treatment.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment Room Preparation					
a. Accurately and efficiently prepares room for specified patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Demonstrates ability to use or adjust immobilization devices and employ auxiliary equipment during treatment, if applicable.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Greeting of Patient					
a. Identifies correct patient using 2 forms of appropriate identification.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Properly introduces self to patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

c. Assists patient as needed.	Poor/Fail	Below Average	Average	Above Average	Excellent
d. Properly explains procedure or addresses patient questions.	Poor/Fail	Below Average	Average	Above Average	Excellent
e. Maintains patient-focused questions.	Poor/Fail	Below Average	Average	Above Average	Excellent
f. Demonstrates empathy.	Poor/Fail	Below Average	Average	Above Average	Excellent
Patient Assessment					
a. Assesses patient status through observation and questioning.	Poor/Fail	Below Average	Average	Above Average	Excellent
b. Provides accurate patient education within scope of practice.	Poor/Fail	Below Average	Average	Above Average	Excellent
c. Recognizes when patient should be referred to nursing staff or physician.	Poor/Fail	Below Average	Average	Above Average	Excellent
Patient Positioning					
a. Properly positions patient on table, using immobilization properly.	Poor/Fail	Below Average	Average	Above Average	Excellent
b. Accurately reproduces setup in a timely fashion.	Poor/Fail	Below Average	Average	Above Average	Excellent
c. Verifies SSDs and/or other predetermined measurements.	Poor/Fail	Below Average	Average	Above Average	Excellent
d. Assesses setup in regards to match lines, shifts, skin gaps, etc.	Poor/Fail	Below Average	Average	Above Average	Excellent
e. Confirms all record and verify parameters have been met.	Poor/Fail	Below Average	Average	Above Average	Excellent
f. Informs patient to remain still for treatment.	Poor/Fail	Below Average	Average	Above Average	Excellent
Treatment Delivery					
a. Performs procedural timeout prior to beam activation.	Poor/Fail	Below Average	Average	Above Average	Excellent
b. Verifies setup data with registered radiation therapist.	Poor/Fail	Below Average	Average	Above Average	Excellent
c. Describes use of intercom and beam off process in case such action is needed.	Poor/Fail	Below Average	Average	Above Average	Excellent
d. Demonstrates or describes operation of console controls for beam activation.	Poor/Fail	Below Average	Average	Above Average	Excellent
e. Closely monitors patient during treatment delivery.	Poor/Fail	Below Average	Average	Above Average	Excellent
f. Transitions to next treatment field efficiently.	Poor/Fail	Below Average	Average	Above Average	Excellent
g. Accurately records daily doses, MU settings, and cumulative doses.	Poor/Fail	Below Average	Average	Above Average	Excellent
Professionalism					
a. Performs procedure with professional confidence.	Poor/Fail	Below Average	Average	Above Average	Excellent
b. Performs procedure while maintaining professional work standards.	Poor/Fail	Below Average	Average	Above Average	Excellent
c. Demonstrates adherence to ethical standards.	Poor/Fail	Below Average	Average	Above Average	Excellent
Image Critique					
a. Identifies pertinent gross anatomy.	Poor/Fail	Below Average	Average	Above Average	Excellent

b. Identifies pertinent critical structures.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Critically evaluates image for positioning accuracy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Safety Issues					
a. Performs procedures at an acceptable pace.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Makes certain treatment delivery is accurate by drawing match lines, confirming flash, verifying relationship of light field to treated area (i.e. field shape and location “make sense” for area being treated.)	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Ensures safety by using equipment properly, stands on correct side of the table when rotating the gantry, inserts accessories safely, and employs MRI safety and practice concepts in treatment delivery, if applicable.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Communication					
a. Provides clear instruction to patient as needed.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Effectively answers patient questions and addresses patient concerns.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Communicates discrepancies to appropriate members of the treatment team.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Stereotactic Treatment Participatory Competency (e.g., SBRT, SRT/SRS)

The ARRT requires completion of a participatory stereotactic treatment procedure. Per the ARRT's definition, participation means the student takes an active role in the procedure and demonstrates understanding of the critical concepts necessary for its successful completion.

If the stereotactic participatory competency is completed on an actual patient rather than under simulated conditions, the student must review and understand all aspects of the patient's care.

A registered radiation therapist, dosimetrist, and/or physicist may evaluate the student's participatory performance using the criteria established in the competency evaluation form.

Note: Under no circumstances should an "N/A" be awarded for any evaluation criterion. If a task cannot be physically demonstrated, the student's knowledge should be evaluated verbally through discussion or questioning.

If a student does not successfully complete the stereotactic participatory competency, the student should discuss recommendations for improvement with the evaluator and may contact the Clinical Coordinator at any time regarding the evaluation process. Once the student and evaluator determine that the student is prepared for re-evaluation, a new competency evaluation will be completed and submitted in Trajecsys.

Stereotactic Treatment – Participatory Competency

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Stereotactic Competency Criteria

Stereotactic Competency Criteria					
Purpose					
a. Accurately states the rationale for the use of stereotactic procedures.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Data Interpretation					
a. Demonstrates understanding of the location of the prescription and understanding of the prescription content.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment Room Preparation					
a. Accurately and efficiently prepares room for specified patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Greeting of Patient					
a. Identifies correct patient using 2 forms of appropriate identification and properly introduces self to patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Properly explains procedure or addresses patient questions within scope of practice.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Patient Positioning					
a. Properly positions patient on table, using stereotactic immobilization.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Demonstrates ability to employ management devices, if applicable (i.e., respiratory gating equipment, abdominal compression, optical tracking system, etc).	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Accurately reproduces setup in a timely fashion.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

d. Verifies SSDs and/or other predetermined measurements.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
e. Confirms all record and verify parameters have been met.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment Delivery					
a. Performs procedural timeout prior to beam activation.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Verifies setup data with registered radiation therapist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Accurately operates treatment unit after radiation oncologist and physicist have approved the clinical and technical aspects of beam delivery.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Closely monitors patient during treatment delivery.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
e. Completes all required treatment delivery documentation.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
f. Accurately captures billing charges, per institution's guidelines.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Image Critique					
a. Identifies pertinent gross anatomy and critical structures.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Critically evaluates images for positioning accuracy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Safety Issues					
a. Adheres to institutional guidelines regarding the supervision by the Radiation Oncologist and Medical Physicist during stereotactic procedures	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Performs procedures at an acceptable pace.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Motion Management Participatory Competency (e.g., Surface Guidance, Respiratory Gating, Fiducial Tracking, Breath Hold, Abdominal Compression)

The ARRT requires completion of a participatory motion management procedure. Per the ARRT's definition, participation means the student takes an active role in the procedure and demonstrates understanding of the critical concepts necessary for its successful completion.

If the motion management participatory competency is completed on an actual patient rather than under simulated conditions, the student must review and understand all aspects of the patient's care.

A registered radiation therapist, dosimetrist, and/or physicist may evaluate the student's participatory performance using the criteria established in the competency evaluation form.

Note: Under no circumstances should an "N/A" be awarded for any evaluation criterion. If a task cannot be physically demonstrated, the student's knowledge should be evaluated verbally through discussion or questioning.

If a student does not successfully complete the motion management participatory competency, the student should discuss recommendations for improvement with the evaluator and may contact the Clinical Coordinator at any time regarding the evaluation process. Once the student and evaluator determine that the student is prepared for re-evaluation, a new competency evaluation will be completed and submitted in Trajecsys.

Motion Management – Participatory Competency

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Motion Management Competency Criteria

Motion Management Competency Criteria					
Purpose					
a. Accurately states the rationale for motion management techniques in radiation therapy treatment planning and delivery.	Poor/Fail	Below Average	Average	Above Average	Excellent
Data Interpretation					
a. Demonstrates understanding of the location of the prescription and understanding of the prescription content.	Poor/Fail	Below Average	Average	Above Average	Excellent
b. Identifies the motion management technique being utilized (e.g., DIBH, respiratory gating, abdominal compression)	Poor/Fail	Below Average	Average	Above Average	Excellent
Treatment Room Preparation					
a. Accurately and efficiently prepares room for specified patient.	Poor/Fail	Below Average	Average	Above Average	Excellent
Greeting of Patient					
a. Identifies correct patient using 2 forms of appropriate identification and properly introduces self to patient.	Poor/Fail	Below Average	Average	Above Average	Excellent
b. Properly explains procedure or addresses patient questions within scope of practice.	Poor/Fail	Below Average	Average	Above Average	Excellent
Patient Positioning					
a. Properly positions patient on table, using applicable immobilization devices.	Poor/Fail	Below Average	Average	Above Average	Excellent

b. Demonstrates proper use of motion management equipment or accessories.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Accurately reproduces setup in a timely fashion.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Confirms all record and verify parameters have been met.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment Delivery					
a. Performs procedural timeout prior to imaging or beam activation.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Verifies setup data with registered radiation therapist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Accurately participates in gated or motion-management treatment delivery according to institutional guidelines.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Closely monitors patient compliance and motion reproducibility throughout treatment delivery.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
e. Accurately captures billing charges, per institution's guidelines.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Motion Verification					
a. Participates in acquisition and review of applicable motion management imaging.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Demonstrates understanding of motion assessment using fluoroscopy, 4D imaging, respiratory tracing, surface guidance, or applicable monitoring systems.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Critically evaluates images or motion data for positioning and motion reproducibility.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Recognizes unacceptable motion variation and communicates concerns appropriately.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Safety Issues					
a. Performs procedures at an acceptable pace.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Treatment Delivery Rotation – Imaging Procedures

Students will gain experience with the treatment console and imaging software throughout the clinical phase of the program. While students are prohibited from "beaming on" in the fall semester, students will play an active role in the treatment delivery and image alignment processes.

The program has defined three mandatory Imaging Competencies to be completed in the **Spring Semester**. Completion of the MV, KV, and Cone Beam CT competencies will provide students with entry-level knowledge and skills regarding image acquisition and alignment.

Rotation Objectives

- Provide consistent radiation protection for the patient and operator.
- Attend to each patient's safety and comfort by critiquing imaging in a timely fashion.
- Act in a professional manner at all times.
- Incorporate HIPAA requirements into clinical practice.
- Demonstrate proper usage and care of imaging equipment.
- Demonstrate the ability to effectively answer patient questions and address patient concerns regarding imaging.
- Critically assess the image for positioning accuracy and treatment field alignment.
- Communicate discrepancies to appropriate members of the treatment team.
- Demonstrates understanding of manual matching with image comparison as well as the IGRT process for verification/localization.

Imaging Competency (MV, kV, and CBCT)
EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Imaging Competency Criteria

Imaging Competency Criteria					
Data Interpretation					
Identifies documentation for necessity of image.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates understanding as to why the selected type of imaging is being performed.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Shows knowledge of advantages and disadvantages of the applicable imaging format.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Communication					
Provides clear instructions to the patient as needed.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Effectively answers patient questions and addresses patient concerns regarding necessity of imaging.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Informs patient to remain still for imaging process as well as the scheduled treatment to follow.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Communicates discrepancies to appropriate members of the treatment team.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Safety					

Appropriately identifies imaging equipment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Follows recommended order of operations regarding bringing out of imaging arms and gantry rotation.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Ensures safety by using equipment properly.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies safety by closely monitoring the rotation of the imaging equipment in relation to patient position on table.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs image alignment and critique at an acceptable pace.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Closely monitors patient during imaging process.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Image Console Preparation & Imaging Process					
Demonstrates knowledge of proper hand pendant usage for arm extension and retraction.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of imaging console usage for arm extension and retraction.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately and efficiently prepares treatment software for specified patient.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates ability to accurately select and mode up appropriate imaging format.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Applies appropriate techniques or modifies window levels to enhance image details, reduce image distortion, and localize specific anatomy.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Requests physician approval of imaging, when applicable.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately performs imaging process from start to finish.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of exiting imaging software and the transition to treatment software efficiently.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Image Evaluation & Critique					
Discuss field border landmarks for standard treatment fields.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies pertinent gross anatomy and normal anatomical structures via applicable imaging format.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies pertinent critical structures.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Determines accuracy of patient positioning via image alignment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies accuracy of isocenter and treatment field placement via image alignment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Comparison analysis of image for verification/localization.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Understanding of manual matching with image comparison as well as the IGRT process for verification/localization.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Identifies various treatment planning and anatomical contours as well as their representation on a Cone Beam CT image, if applicable.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates understanding of patient shifts versus isocenter shifts.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Utilizes fiducials or markers for alignment, if applicable.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Image Assessment					
Recognizes need of physician or dosimetry notification when image demonstrates abnormalities.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates understanding of site standard regarding table shift limits.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates understanding of site regarding repeat-image requirements.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately performs repeat-image, if applicable.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Completes necessary documentation in respect to the imaging process.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately schedules patient's future images per physician's request.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Professionalism					
Performs procedure with professional confidence.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs procedure while maintaining professional work standards.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates adherence to ethical standards.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Simulation Rotation

Students will complete a brief simulation rotation during the fall semester to gain a broad understanding of the simulation process and workflow within the radiation oncology department.

The majority of the simulation experience will occur during the spring semester. During this time, students are expected to complete the following requirements by the end of the semester;

- **Two (2) treatment accessory device competencies** involving:
  - Thermoplastic mask fabrication
  - Custom immobilization device
- **One (1) participatory special treatment simulation** (e.g. 4D CT, SBRT, Gating, or Brachytherapy)
- **Six (6) simulation competencies**
  - All ARRT simulation competencies must be performed on actual patients
  - Students completing CT simulation competencies are expected to follow the simulation process beyond image acquisition and participate in activities such as:
    - Isocenter placement
    - Target volume contouring
    - Critical structure contouring
    - Field selection and design
    - Treatment plan review and analysis
- The **patient tattoo checklist**

Rotation Objectives

- Provide consistent radiation protection for the patient and operator.
- Attend to each patient's safety and comfort.
- Act in a professional manner at all times.
- Demonstrate proper body mechanics.
- Effectively communicate with physician and physics staff regarding the treatment planning procedure.
- Demonstrate the location of the signed consent form in the patient's chart.
- Demonstrate an understanding of the treatment prescription.
- Provide clear information to the patient regarding the procedure.
- Demonstrate the ability to answer patient questions.
- Demonstrate knowledge of patient positioning and effective use of immobilization localization devices.
- Display ability to operate the simulation equipment.
- Demonstrate knowledge regarding treatment field delineation and required measurements.
- Display knowledge regarding treatment volume localization and isocenter placement.
- Display consideration of dose to critical structures and the process of structure contouring.
- Describe methods of determining a patient's external contour, definition of internal structures, and volumes of interest used in treatment planning.
- Accurately obtain necessary images.
- Accurately record patient set-up, immobilization methods, SSD, separation measurements, table top measurement, and document setup with appropriate photographs.

Simulation Competency

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Data Interpretation Competency

Data Interpretation					
a. Demonstrates location of the prescription or preliminary instructions.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Demonstrates understanding of the prescription or preliminary instruction content.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Verifies presence of signed patient consent form.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Simulation Room Preparation					
a. Cleans and prepares room prior to patient procedure.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Prepares supplies/equipment for immobilization device construction and usage.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Prepares contrast agents and brachytherapy necessities (i.e.: wires, seeds, fiducials, etc.) as applicable	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Greeting of Patient					
a. Identifies correct patient using 2 forms of appropriate identification.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Properly introduces self to patient.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Assists patient as needed.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Demonstrates empathy and compassion.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Patient Education & Communication					

a. Properly explains procedure using terminology understandable to the patient.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Allows patient to ask questions and effectively addresses patient questions.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Maintains patient-focused conversation.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Provides accurate patient education within scope of practice.	Poor/ Fail	Below Average	Average	Above Average	Excellent
Patient Positioning					
a. Properly positions patient on table.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Straightens and levels patient on table.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Accurately creates or uses immobilization devices.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Aligns patient according to procedure protocol.	Poor/ Fail	Below Average	Average	Above Average	Excellent
e. Marks patient according to procedure protocol.	Poor/ Fail	Below Average	Average	Above Average	Excellent
f. Obtains applicable measurements according to procedure protocol (if applicable).	Poor/ Fail	Below Average	Average	Above Average	Excellent
Patient Safety					
a. Tends to patient safety and employs MRI safety and practice concepts in simulation, if applicable...	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Assesses BUN and creatinine levels if IV contrast is to be used.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Completes required paperwork (questionnaire/consent) if IV contrast is to be used.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Monitors patient for possible contrast reactions (if applicable.)	Poor/ Fail	Below Average	Average	Above Average	Excellent
e. Closely monitors patient during simulation procedure and image acquisition.	Poor/ Fail	Below Average	Average	Above Average	Excellent
Acquisition of Data					
a. Performs CT scan for region of interest.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. In an effort to reduce patient dose, utilized protocols for area of interest.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Adjusts imaging parameters such as slice thickness and FOV.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Transmits network images to workstation or treatment planning system.	Poor/ Fail	Below Average	Average	Above Average	Excellent
Treatment Design/Planning					
a. Participates in isocenter placement.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Participates in contour of target volumes and critical structures.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Participates in determining treatment beams/fields.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Participates in review of CT images and evaluation of treatment plan with appropriate personnel.	Poor/ Fail	Below Average	Average	Above Average	Excellent

Documentation					
a. Records patient position and other relevant setup information on measurements such as immobilization device, device settings, indexing values, patient position, special procedure devices (e.g. brachytherapy, SBRT, Gating, etc).	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Records pertinent measurement readings (if applicable)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Obtains photographs of patient setup and marks.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Patient Education & Dismissal					
a. Educates patient regarding proper care of simulation markings and treatment instructions (i.e. Bladder fill expectations)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Informs patient of the schedule for verification on first day of treatment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Escorts patient back to waiting room.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Cleans Room	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Patient Tattoo Checklist

EXAMPLE – Actual Form is in Trajecsys

Patient Tattoo Checklist

The student will demonstrate the following criteria:		
Safety Criteria		
Discuss the importance of obtaining patient consent prior to tattoo application.	**Yes**	**No**
Identify all necessary Universal/Standard precautions associated with blood and bodily fluids.	**Yes**	**No**
Describe the basic concepts involved with maintaining a sterile technique/environment.	**Yes**	**No**
Discuss the proper technique used to clean the area (skin) both before and after the insertion of the needle.	**Yes**	**No**
Describe the importance of proper communication prior to needle insertion.	**Yes**	**No**
Identify the proper technique of disposal of contaminated needle.	**Yes**	**No**
Application Procedure		
Accurately describe the reason for applying permanent tattoos.	**Yes**	**No**
Correctly identify and locate all tools involved in the application process.	**Yes**	**No**
Properly explain the step-by-step application process according to the site's protocol.	**Yes**	**No**
Discuss the importance of stabilizing the skin before and during the insertion of the needle.	**Yes**	**No**
Accurately identify characteristics that constitute an acceptable tattoo per site's requirements.	**Yes**	**No**
Describe the importance of communicating the process to the patient prior to application.	**Yes**	**No**

Special Treatment Simulation Participatory Competency (e.g., 4D CT, SBRT, Gating, or Brachytherapy)

The ARRT requires completion of a participatory Special Treatment Simulation Procedure. Per the ARRT's definition, participation means the candidate takes an active role in the procedure and demonstrates understanding of the critical concepts necessary for its successful completion.

A registered radiation therapist, dosimetrist, and/or physicist may evaluate the student's participatory performance using the criteria established in the competency evaluation form.

> ***Note:*** Under no circumstances should an "N/A" be awarded for any evaluation criterion. If a task cannot be physically demonstrated, the student's knowledge should be evaluated verbally through discussion or questioning.

If the student does not successfully complete the Special Treatment Simulation Procedure competency, the student should discuss recommendations for improvement with the evaluator and may contact the Clinical Coordinator at any time regarding the evaluation process. Once the student and evaluator determine that the student is prepared for re-evaluation, a new competency evaluation will be completed and submitted in Trajecsys.

Special Treatment Simulation Participatory Procedure Competency (e.g., 4D CT, SBRT, Gating, or Brachytherapy)

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING:

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

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Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Special Treatment Simulation Competency

Special Treatment Simulation Competency Criterion					
DATA INTERPRETATION **The student will demonstrate the following criteria:**					
a. Demonstrates location of the prescription or preliminary instructions.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Demonstrates understanding of the prescription or preliminary instruction content.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Verifies presence of signed patient consent form.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SIMULATION ROOM PREPARATION **The student will demonstrate the following criteria:**					
a. Cleans and prepares room prior to patient procedure.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Prepares supplies/equipment for immobilization device construction and usage.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Prepares contrast agents and brachytherapy necessities (i.e.: wires, seeds, fiducials, etc.) as applicable	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Greeting of Patient **The student will demonstrate the following criteria:**					

a. Identifies correct patient using 2 forms of appropriate identification.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Properly introduces self to patient.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Assists patient as needed.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Demonstrates empathy and compassion.	Poor/ Fail	Below Average	Average	Above Average	Excellent
PATIENT EDUCATION & COMMUNICATION **The student will demonstrate the following criteria:**					
a. Properly explains procedure using terminology understandable to the patient.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Allows patient to ask questions and effectively addresses patient questions.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Maintains patient-focused conversation.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Provides accurate patient education within scope of practice.	Poor/ Fail	Below Average	Average	Above Average	Excellent
Patient Positioning **The student will demonstrate the following criteria:**					
a. Properly positions patient on table.	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Straightens and levels patient on table.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Accurately creates or uses immobilization devices.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Aligns patient according to procedure protocol.	Poor/ Fail	Below Average	Average	Above Average	Excellent
e. Marks patient according to procedure protocol.	Poor/ Fail	Below Average	Average	Above Average	Excellent
f. Obtains applicable measurements according to procedure protocol (if applicable).	Poor/ Fail	Below Average	Average	Above Average	Excellent
Patient Safety **The student will demonstrate the following criteria:**					
a. Tends to patient safety throughout the procedure and employs MRI safety and practice concepts in simulation, if applicable...	Poor/ Fail	Below Average	Average	Above Average	Excellent
b. Assesses BUN and creatinine levels if IV contrast is to be used.	Poor/ Fail	Below Average	Average	Above Average	Excellent
c. Completes required paperwork (questionnaire/consent) if IV contrast is to be used.	Poor/ Fail	Below Average	Average	Above Average	Excellent
d. Monitors patient for possible contrast reactions (if applicable.)	Poor/ Fail	Below Average	Average	Above Average	Excellent
e. Closely monitors patient during simulation procedure and image acquisition.	Poor/ Fail	Below Average	Average	Above Average	Excellent
Acquisition of Data **The student will demonstrate the following criteria:**					
a. Performs CT scan for region of interest.	Poor/ Fail	Below Average	Average	Above Average	Excellent

b. In an effort to reduce patient dose, utilized protocols for area of interest.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Adjusts imaging parameters such as slice thickness and FOV.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Transmits network images to workstation or treatment planning system.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment Design/Planning **The student will demonstrate the following criteria:**					
a. Participates in isocenter placement.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Participates in contour of target volumes and critical structures.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Participates in determining treatment beams/fields.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Participates in review of CT images and evaluation of treatment plan with appropriate personnel.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Documentation **The student will demonstrate the following criteria:**					
a. Records patient position and other relevant setup information on measurements such as immobilization device, device settings, indexing values, patient position, special procedure devices (e.g. brachytherapy, SBRT, Gating, etc).	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Records pertinent measurement readings (if applicable).	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Obtains photographs of patient setup and marks.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Patient Education & Dismissal **The student will demonstrate the following criteria:**					
a. Educates patient regarding proper care of simulation markings and treatment instructions (i.e. Bladder fill expectations)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
b. Informs patient of the schedule for verification on first day of treatment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
c. Escorts patient back to waiting room.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
d. Cleans Room	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Dosimetry Rotation

Students will complete a brief dosimetry rotation during the fall semester to gain a broad understanding of the radiation oncology department; however, their primary dosimetry experience will occur during the spring semester.

The spring dosimetry rotation is frequently completed in conjunction with the spring simulation rotation. Students are expected to follow the simulation process beyond image acquisition to participate in treatment planning activities such as isocenter placement, target and critical structure contouring, field design, and treatment plan review in order to satisfy the intent of the ARRT competencies.

Students will complete six (6) ARRT dosimetry competencies by the conclusion of the spring semester.

Rotation Objectives

- Discuss the purpose of radiation therapy treatment planning.
- Review patient treatment records, including prescription, daily dose, cumulative dose, and fractionation schedules.
- Demonstrate understanding of treatment volumes, target delineation, and organs at risk.
- Review isodose distributions, dose-volume histograms, and treatment plan evaluation concepts.
- Discuss factors that influence dose distribution and treatment planning accuracy.
- Demonstrate understanding of SSD, SAD, and isocenter treatment techniques.
- Discuss treatment planning considerations for photons, electrons, wedges, compensators, and beam modifiers.
- Demonstrate understanding of SSD, SAD, and isocenter treatment techniques.
- Discuss treatment planning considerations for photons, electrons, wedges, compensators, and beam modifiers.
- Review dose limitations for critical structures and the importance of normal tissue sparing.
- Observe or participate in treatment planning activities including contouring, field design, isocenter placement, and treatment plan review.
- Analyze treatment plans and discuss planning considerations with appropriate personnel.
- Observe or discuss brachytherapy treatment planning concepts and associated radiation safety procedures, when available.
- Discuss the importance of quality assurance, treatment verification, and error prevention in radiation therapy planning and delivery.
- Complete hand-calculated monitor unit calculations for single field, parallel-opposed, wedged, weighted, and electron treatment setups, with verification using a secondary calculation system.

Dosimetry Competency Requirements

Prior to completing the 5 hand-calculated monitor unit competencies, the student will submit solutions to the module 2 assignment (dosimetry skills assignment) in AL340. Students may work on the dosimetry skills assignment at clinical while in the dosimetry rotation. Once all the dosimetry requirements are complete, the Preceptor/Student may elect to end rotation early.

Important Note: The spring physics course (AL035) will cover the concepts and methods required to accurately complete the monitor unit calculations. Students are encouraged to wait until these topics have been taught in AL305 before attempting the dosimetry competencies.

Students will have a basic answer key to track their progress on the dosimetry skills assignment. A detailed answer key will be provided to the Clinical Preceptor only – This should not be shared with the student as it is intended to help site personnel understand expectations.

Hand-Calculated Monitor Unit Competencies

Students will complete **5 hand-calculated competencies** for single, parallel opposed, wedged, weighted, and electron beam fields by completing hand calculations from a prescription, determining dosimetric factors, and solving for monitor units. Results will be verified using a secondary MU Check System; this two-phase approach reinforces the didactic understanding of manual calculation methods and the practical use of clinical verification tools.

Competency calculations may be based on current patient data or pre-developed scenarios provided by the Clinical Coordinator to the Clinical Preceptor prior to the spring semester.

- Each calculation competency will be signed by the supervising dosimetrist or physicist.
- The Clinical Preceptor or Dosimetrist will submit the Dosimetry Competency – Monitor Unit Calculation form within Trajecsys.
- The student will mail the hand-calculated calculations to the Clinical Coordinator.

Computer-Generated Isodose Plan Competency

The student will independently run **1 treatment plan** according to the site's guidelines and the prescription provided, calculating doses for each field, considering critical structures, and evaluating the plan.

- Print the calculation and isodose plan – Signed by the supervising dosimetrist or physicist
- The Clinical Preceptor or Dosimetrist will submit the Dosimetry Competency – Computer Generated Isodose Plan form within Trajecsys
- The student will mail the compuer plan to the Clinical Coordinator

Students will also type responses to the following questions related to the generated isodose plan:

- Why was the energy selected for this particular patient?
- What critical structures were you trying to avoid with this plan, and what are the dose tolerances for these structures?
- How did you determine the isocenter?
- Were any special modifications made to the treatment plan? (Wedge, compensator, weighted fields, etc.)
- How was the beam arrangement determined? (i.e. – Why do we use tangent fields for breast patients, lateral beams for whole brain, AP/PA, etc.)
- Why was the given treatment technique selected for this patient? (IMRT, 3D-CRT, etc.)

Competency scores will not be recorded until all required competency forms, signatures, and supporting calculations/plans have been received by the Clinical Coordinator and submitted in Trajecsys.

Dosimetry Competency Criteria

The following criteria outline the knowledge and skills required for successful completion of dosimetry competency evaluations.

Dosimetry Competency Preparation:

Evaluate Patient Chart

a. Identify treatment prescription
b. Identify prescribed total dose
c. Identify daily dose
d. Identify fractional schedules (hyper vs. accelerated fractionation)
e. Identify patient diagnosis

Elements of the Process:

Identify Appropriate Anatomy

a. Gross Anatomy
b. Critical Structures

Define Various Treatment Volumes/Terms

a. Gross Tumor Volume
b. Clinical Target Volume
c. Internal Target Volume
d. Planning Target Volume
e. Treated Volume
f. Irradiated Volume
g. Maximum, Minimum, Mean, Modal & Mean Doses

List General Tissue Tolerance Doses

a. Small bowel
b. Spinal Cord
c. Kidney
d. Liver
e. Lens of the Eye
f. Optic Nerve
g. Lung

Dosimetric Factors:

Define/Describe Terms and Apply Appropriately

a. Tumor Dose
b. Cumulative Dose
c. Field Size/Distance Relationship
d. Inverse Square Law
e. SSD Technique
f. SAD Technique
g. Tissue Inhomogeneity
h. Isodose Curves
i. Factors Affecting Isodose Curves
j. Beam Modification Devices (e.g., Bolus, Wedge, Compensator)

Discuss Calculation Factors and Their Relationships

a. Percent depth dose
b. Tissue maximum dose

c. Tissue air ratio
d. Output factor
e. Tray factor
f. Tray factor
g. Wedge Factor
h. Inverse square factor
i. Mayneord's factor
j. Machine output

Calculations:

Calculate Monitor Units for the Following (*by hand and then verified by a second system*):

a. Electron MU calculation
b. Single, Open field calculation
c. Parallel opposed field
d. Weighted field calculation
e. Wedged field calculation

Independently Create a Computer-Generated Treatment Plan.

Run basic plans using the treatment planning computer.

Analyze and discuss plans with appropriate personnel

Dosimetry Competency - Monitor Unit Calculation

EXAMPLE – Actual Form is in Trajecsys

Dosimetry Competency Criteria 1

Dosimetry Competency Criteria		
Directions: Students will independently complete the dosimetry calculations; No N/A marks are accepted		
SINGLE FIELD		
Did the student:		
Interpret the prescription for the necessary components of the monitor unit calculation.	**Yes**	**No**
Accurately select the correct tissue absorption factor (pdd, TMR, TPR) per the physician's prescription.	**Yes**	**No**
Demonstrate ability to figure open and blocked equivalent square field sizes (if applicable).	**Yes**	**No**
Independently perform hand calculation to solve for correct monitor units.	**Yes**	**No**
Verify monitor unit calculation by use of a second system (MU Check System).	**Yes**	**No**
PARALLEL OPPOSED FIELDS		
Did the student:		
Interpret prescription for necessary components of monitor unit calculation.	**Yes**	**No**
Accurately select correct tissue absorption factor (pdd, TMR, TPR) per physician's prescription.	**Yes**	**No**
Correctly determine tumor dose per field.	**Yes**	**No**
Demonstrate ability to figure open and blocked equivalent square field sizes (if applicable).	**Yes**	**No**
Independently perform hand calculation to solve for correct monitor units.	**Yes**	**No**
Verify monitor calculation by use of a second system (MU Check System).	**Yes**	**No**
WEIGHTED FIELDS		
Did the student:		
Interpret prescription for necessary components of monitor unit calculation.	**Yes**	**No**
Accurately select correct tissue absorption factor (pdd, TMR, TPR) per physician's prescription.	**Yes**	**No**
Correctly determine tumor dose per field based on weighting provided in problem.	**Yes**	**No**
Demonstrate ability to figure open and blocked equivalent square field sizes (if applicable).	**Yes**	**No**
Independently perform hand calculation to solve for correct monitor units.	**Yes**	**No**
Verify monitor unit calculation by use of a second system (MU Check System).	**Yes**	**No**
WEDGED FIELDS		
Did the student:		
Interpret prescription for necessary components of monitor unit calculation.	**Yes**	**No**
Accurately select correct tissue absorption factor (pdd, TMR, TPR) per physician's prescription.	**Yes**	**No**
Correctly determine necessary attenuation factors based on information provided in problem.	**Yes**	**No**

Demonstrate ability to figure open and blocked equivalent square field sizes (if applicable).	**Yes**	**No**
Independently perform hand calculation to solve for correct monitor units.	**Yes**	**No**
Verify monitor unit calculation by use of a second system (MU Check System).	**Yes**	**No**
ELECTRON FIELD **Did the student:**		
Interpret prescription for necessary components of monitor unit calculation.	**Yes**	**No**
Independently perform hand calculation to solve for correct monitor units.	**Yes**	**No**
Verify monitor unit calculation by use of a second system (MU Check System).	**Yes**	**No**

Dosimetry Competency – Computer-Generated Isodose Plan

EXAMPLE – Actual Form is in Trajecsys

Computer Generated Competency

Dosimetry Competency Criteria		
Directions: Students will independently complete the dosimetry calculations; No N/A marks are accepted		
Did the student:		
Interpret dose prescription.	**Yes**	**No**
Identify gross anatomy and critical structures.	**Yes**	**No**
Demonstrate understanding of treatment volumes (Gross Tumor Volume, Clinical Target Volume, Planning Target Volume, Treated Volume, and Irradiated Volume)	**Yes**	**No**
Demonstrate knowledge of general tissue tolerance doses.	**Yes**	**No**
Accurately contour necessary structures based on treatment constraints.	**Yes**	**No**
Correctly place isocenter per physician request.	**Yes**	**No**
Properly consider beam placement/field arrangements.	**Yes**	**No**
Accurately align beam to isocenter.	**Yes**	**No**
Demonstrate ability to accurately create Digitally Reconstructed Radiograph.	**Yes**	**No**
Properly create MLC for accurate blocking (if applicable).	**Yes**	**No**
Demonstrates knowledge of correct operation of treatment planning computer.	**Yes**	**No**
Assess need to modify parameters of treatment to achieve optimum dose distribution (isocenter depth, gantry angles, fields size, etc.)	**Yes**	**No**
Independently perform and run basic treatment plan.	**Yes**	**No**
Demonstrate ability to analyze and discuss plan with appropriate personnel.	**Yes**	**No**

Quality Assurance

The combination of didactic instruction and hands-on clinical experience will provide students with entry-level knowledge of quality assurance and quality control procedures utilized within the radiation oncology department.

Under direct supervision, students will work with registered radiation therapists, dosimetry personnel, and/or physics personnel on quality assurance and quality control procedures.

By the conclusion of the summer semester, students will complete the following 5 ARRT Quality Control competencies:

- **Linear Accelerator Beam Output & Symmetry**
- **Linear Accelerator Laser Alignment**
- **Linear Accelerator Imaging System**
- **Simulator Water Phantom,**
- **Simulator Laser Alignment**

In addition, the program has defined two data interpretation competencies related to the review of treatment data to ensure accuracy:

- **Verification Simulation**
- **Radiation Therapy Treatment Chart Check**

Note: The 5 ARRT Quality Control procedures and the 2 Data Interpretation competencies **are not** to be completed until the summer semester.

Rotation Objectives

- Discuss the purpose of quality assurance procedures in the radiation oncology department.
- Describe the procedure for assuring accuracy of manual and electronic records.
- Explain the purpose, procedures, and frequency for manual and electronic treatment documentation.
- Identify errors in treatment documentation, if applicable.
- Display an understanding of TG66 and TG142 recommendations regarding quality assurance procedures.
- Provides tolerance values by the TG66 and TG142.
- Differentiates between the quality control devices and demonstrates an understanding as to how each device works.
- Demonstrates the ability to accurately complete the quality control procedures per site's protocol.
- Effectively communicates with necessary staff regarding the procedure.
- Analyze results of quality assurance procedures.
- Identify corrective measures (if any) to take based on quality assurance results.
- Identifies patient safety concerns if results are out of tolerance.
- Provides clear reasoning as to how or why the tests could be out of tolerance.
- Accurately describes environmental influences on testing results of beam output and symmetry.

Quality Control Competency
Linear Accelerator – Beam Output & Symmetry
EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

QC Competency

Quality Control Competency Criteria					
PURPOSE					
The student will demonstrate the following:					
Accurately explains the purpose for verifying beam symmetry and beam output.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately addresses patient safety concerns if beam output and symmetry are out of tolerance.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
MATERIALS AND METHODOLOGY					
The student will demonstrate the following:					
Accurately states frequency of performing beam output and symmetry checks (daily and monthly; photon and electron.)	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Selects appropriate quality control device and demonstrates understanding about how the quality control device works to measure beam output.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately aligns device (ensure device is level, sets correct SSD, field size, selects correct cone size for electrons) and connects device to portal.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Prepares computer for testing (opens software programs, selects correct settings on program, etc.)	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Sets accurate testing parameters at treatment console (machine in standby, sets correct MU, selects correct beam energy.)	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs procedure accurately and timely for all beam energies being tested per site protocol.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Easily navigates the software program and workstation.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Follows all safety protocols prior to beaming on.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
EVALUATION AND INTERPRETATION OF RESULTS **The student will demonstrate the following:**					
Accurately evaluates and interprets the beam output and symmetry using the software system; notices any discrepancies in measurements.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of and follows site policy in regards to output and symmetry tolerances for photon and electron energies.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
State tolerance values for daily and monthly beam output and symmetry for photon and electron energies per TG142 recommendations.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CORRECTIVE MEASURES **The student will demonstrate the following:**					
Describes site policy and follows (if applicable) site policy for any out of tolerance results (verify setup, repeat test, notify physics staff, etc.)	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Knows policy and corrective actions for reporting out of tolerance test results.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DOCUMENTATION **The student will demonstrate the following:**					
Follows site policy for documenting results	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge on how often qualified physics personnel should review documentation of results and how long those results are maintained	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SOURCES OF MALFUNCTION **The student will demonstrate the following:**					
Provides examples or reasoning as to how or why test could be out of tolerance (influencing factors, setup errors, etc.)	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately describes the environmental influences on testing results (humidity effect on temperature and pressure that influences amount of ionizations produced.)	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates ability to troubleshoot if a malfunction were to occur.	**Poor /Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Quality Control Competency
Linear Accelerator – Laser Alignment
EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Quality Control Competency

Quality Control Competency Criteria					
PURPOSE					
The student will demonstrate the following:					
Accurately explains the purpose for performing laser alignment check.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately addresses patient safety concerns if lasers are not aligned.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
MATERIALS AND METHODOLOGY					
The student will demonstrate the following:					
Accurately states the frequency of completing laser alignment check per TG142 recommendations.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Selects appropriate quality control device to perform the test.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Independently sets up the device to perform the test.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately uses device to verify laser alignment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies alignment of wall and ceiling lasers.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of correct operation of linear accelerator equipment during procedure.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge and expertise in laser alignment process.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Performs procedure in a timely manner.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
EVALUATION AND INTERPRETATION OF RESULTS **The student will demonstrate the following:**					
Accurately evaluates and interprets laser alignment localization.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge in visually determining correct vs. incorrect laser alignment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Shows knowledge of and follows site policy in regards to laser alignment tolerance.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
State tolerance values for non-IMRT, IMRT, and SBRT/SRS techniques per TG142 recommendations.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CORRECTIVE MEASURES **The student will demonstrate the following:**					
Describes site policy and takes appropriate action for any out of tolerance results (adjust laser, notify physics staff, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Determines which (if any) corrective actions to take based on laser alignment results.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DOCUMENTATION **The student will demonstrate the following:**					
Follows site policy for documenting results.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately states minimum length of time documentation on quality control tests are maintained.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge on how often qualified physics personnel should review documentation of results.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SOURCES OF MALFUNCTION **The student will demonstrate the following:**					
Provides examples or reasoning as to how or why test could be out of tolerance (influencing factors, setup error, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Quality Control Competency
Linear Accelerator – Imaging System
EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

QC Comp

Quality Control Competency Criteria					
PURPOSE **The student will demonstrate the following:**					
Accurately explains the purpose for imaging system checks, including patient safety concerns if imaging system performance tests are not precise.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
MATERIALS AND METHODOLOGY **The student will demonstrate the following:**					
Selects appropriate quality control device and demonstrates understanding about how it works to verify imaging and treatment coordinate coincidence and positioning/repositioning.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately sets up imaging device (ensure device is level, correctly aligned to lasers for isocenter verification or accurately displaced for positioning/repositioning verification, sets correct SSD, etc.)	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Prepares computer for testing and selects accurate testing parameters (opens imaging software program, accurately modes up appropriate imaging format, etc.)	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Follows recommended order of operations regarding extending imaging arms and gantry rotation.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Acquires image(s) accurately and timely for all modalities being tested, per site protocol.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Applies appropriate techniques or modifies window levels to enhance image details	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs image alignment and applies necessary shifts to obtain match.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies accuracy of isocenter for imaging and treatment coordinate coincidence check.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately compares applied shifts to displaced distance for positioning/repositioning verification check.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Easily navigates the software program and workstation and demonstrates knowledge of exiting software.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Independently enters room to check accuracy of the shifts and verify alignment.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
EVALUATION AND INTERPRETATION OF RESULTS **The student will demonstrate the following:**					
Demonstrates knowledge of and follows site policy in regards to imaging verification tolerance.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
State tolerance values for daily and monthly imaging quality control checks, per TG142 recommendations.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CORRECTIVE MEASURES **The student will demonstrate the following:**					
Describes site policy and follows (if applicable) site policy for any out of tolerance results (verify setup, repeat test, notify physics staff, etc.)	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Knows policy and corrective actions (if any) for reporting out of tolerance test results.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DOCUMENTATION **The student will demonstrate the following:**					
Follows site policy for documenting results.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge on how often qualified physics personnel should review documentation of results and how long those results are maintained	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SOURCES OF MALFUNCTION **The student will demonstrate the following:**					
Provides examples or reasoning as to how or why test could be out of tolerance (influencing factors, setup errors, etc.)	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates ability to troubleshoot if a malfunction were to occur.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Quality Control Competency
Simulator – Laser Alignment
EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

QC Comp

Quality Control Competency Criteria					
PURPOSE					
The student will demonstrate the following:					
Accurately explains the purpose for performing laser alignment check.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately addresses patient safety concerns if lasers are not aligned.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
MATERIALS AND METHODOLOGY					
The student will demonstrate the following:					
Accurately states frequency of completing laser alignment check per TG66 recommendations.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Selects appropriate quality control device to perform the test.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Independently sets up the device to perform the test.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately uses device to verify laser alignment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies alignment of all necessary lasers.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of correct operation of simulator equipment during procedure.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge and expertise in laser alignment process.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs procedure in a timely manner.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

EVALUATION AND INTERPRETATION OF RESULTS **The student will demonstrate the following:**					
Accurately evaluates and interprets laser alignment localization.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge in visually determining correct vs. incorrect laser alignment.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Shows knowledge of and follows site policy in regards to laser alignment tolerance.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
State tolerance values for laser alignment for simulator per TG66 recommendations.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CORRECTIVE MEASURES **The student will demonstrate the following:**					
Describes site policy and takes appropriate action for any out of tolerance results (adjust laser, notify physics staff, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Determines which (if any) corrective actions to take based on laser alignment results.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DOCUMENTATION **The student will demonstrate the following:**					
Follows site policy for documenting results.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately states minimum length of time documentation on quality control tests are maintained.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge on how often qualified physics personnel should review documentation of results.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SOURCES OF MALFUNCTION **The student will demonstrate the following:**					
Provides examples or reasoning as to how or why test could be out of tolerance (influencing factors, setup error, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Quality Control Competency
Simulator – QC Water Phantom
(Ex: CT Number, Image Noise, etc.)
EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

QC Comp

Quality Control Competency Criteria

PURPOSE

The student will demonstrate the following:

Accurately explains the purpose for simulator checks, including patient safety concerns if simulator tests are out of tolerance	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

MATERIALS AND METHODOLOGY

The student will demonstrate the following:

Selects appropriate quality control device and demonstrates understanding about how it functions to perform the simulator water phantom check	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately secures device to the treatment table (replaced treatment table or insert in site cradle/holder for alignment, ensure device is centered and leveled, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Correctly aligns device to the simulator lasers and zeroes table at the correct position before exiting the room	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Prepares computer for testing and selects accurate testing parameters at the CT console	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Accurately acquires scan(s) of the water phantom, per site protocol	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Applies appropriate techniques or modifies window levels to enhance scan details	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately selects the measuring tool for the water phantom check being tested, per site protocol	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Places the Region of Interest (ROI) tool at the predetermined positions to obtain necessary scan information for the water phantom check being tested	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Correctly obtains necessary scan information for the water phantom check being tested, per site protocol (identifies standard deviation, average density of CT water, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Easily navigates the software program and workstation and demonstrates knowledge of ending study and exiting software	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Independently enters room to store phantom, remove cradle and/or replace tabletop, if applicable	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
EVALUATION AND INTERPRETATION OF RESULTS **The student will demonstrate the following:**					
Correctly uses the averages obtained from the scan to determine whether the test is within tolerance	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of and follows site policy in regards to the simulator quality control check tolerance	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
State tolerance values for simulator quality control checks utilizing the water phantom, per TG142 recommendations	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CORRECTIVE MEASURES **The student will demonstrate the following:**					
Describes site policy and follows (if applicable) site policy for any out of tolerance results (verify setup, repeat test, notify physics staff, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DOCUMENTATION **The student will demonstrate the following:**					
Follows site policy for recording values and documenting results	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge on how often qualified physics personnel should review documentation of results and how long those results are maintained	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SOURCES OF MALFUNCTION **The student will demonstrate the following:**					
Provides examples or reasoning as to how or why test could be out of tolerance (influencing factors, setup errors, etc.)	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates ability to troubleshoot if a malfunction were to occur.	**Poor/ Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Data Interpretation Competency - Verification Simulation

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Data Interpretation Competency

Data Interpretation Competency Criteria					
INITIAL CHART REVIEW					
The student will verify the following criteria:					
Consent is signed by patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Prescription is signed by radiation oncologist, and if applicable, changes to prescription are signed by radiation oncologist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment is in alignment with prescription.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment plan has been signed by radiation oncologist and medical physicist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Patient identification photo and set-up photos are available in chart.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accuracy of data transfer from treatment planning software to treatment machine. Examples include: 1. Monitor units of treatment fields 2. SSD measurements 3. Gantry angles 4. Collimator angles 5. Couch angles 6. Field sizes 7. Number of treatments 8. Fractionation schedule	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
TREATMENT ROOM PREPARATION					
The student will verify the following criteria:					

Reviews applicable simulation images and documents in preparation of treatment.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately prepares room for specified patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
COMMUNICATION **The student will verify the following criteria:**					
Identifies correct patient using two forms of appropriate identification.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Properly introduces self to patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Properly explains verification simulation procedure.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accurately addresses patient questions.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
PATIENT POSITIONING **The student will verify the following criteria:**					
Properly positions patient on table, using immobilization.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies appropriate set up using necessary photos, and if applicable, patient external markings.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Properly aligns patient to external marks and if applicable, make appropriate shifts to treatment isocenter.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies SSDs and/or other predetermined measurements in accordance with department policy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DATA VERIFICATION **The student will verify the following criteria:**					
Verifies accuracy of isocenter and treatment field placement via image alignment.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Obtains physician approval of verification images in accordance with department policy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DOCUMENTATION **The student will verify the following criteria:**					
Ensures accurate submission of CPT codes.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Completes necessary verification simulation documentation.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Data Interpretation Competency -
Radiation Therapist Treatment Chart Check

EXAMPLE – Actual Form is in Trajecsys

COMPETENCY SCORING

Excellent – Performance demonstrates exceptional proficiency and self-initiative; student displays a high level of insight regarding the procedure, problem solving and safety. *This is a high rating for the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average – Performance is consistent with entry-level practice; student performs the procedure in a safe and accurate manner with a reasonable pace. *This rating may not be as frequently given for all evaluation criteria in the first clinical semester and is considered to be a strong rating for student performance.

Average – Performance is progressing but still needs improvement for entry-level practice. Student may require occasional verbal and physical directives in addition to supportive cues. *This is a realistic rating of performance in the first clinical semester.

Below Average – Performance is progressing at a marginal rate and demonstrates some significant problems considering the level the student is at in the program; student requires continuous verbal and occasional physical directives in addition to supportive cues to complete the procedure in a safe and accurate manner.

Poor/Fail – Performance is unskilled and is not progressing; student is unable to demonstrate fundamental elements of the procedure; student requires continuous verbal and continuous physical directive cues to complete the procedure in a safe and accurate manner. *A 4% deduction is manually applied for each Poor/Fail rating.

Data Interpretation Competency

Data Interpretation Competency Criteria					
INITIAL CHART REVIEW					
The student will verify the following criteria:					
Consent is signed by patient.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Prescription is signed by radiation oncologist, and if applicable, changes to prescription are signed by radiation oncologist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment is in alignment with prescription.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment plan has been signed by radiation oncologist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Treatment plan has been signed by medical physicist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Presence of patient's identification photo and set-up photos.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Initial radiation therapist treatment plan check has been completed and documented.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
WEEKLY CHART REVIEW					
The student will verify the following criteria:					
Accuracy of treatment calendar.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Alignment of treatment calendar and treatment schedule, and if applicable, appropriate scheduling of cone-down or boost treatments.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
All fields **NOT** receiving treatment are hidden.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Initial images (V-Sim images) have been approved by the radiation oncologist.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Images have been acquired in accordance with the physician order.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Daily or weekly images have been approved by radiation oncologist within time frame designated by department policy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accuracy of recorded fractional and cumulative doses.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accuracy of fraction number.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Set-up notes are up-to-date.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Applicable radiation therapist documentation. Examples may include: 1. SSD readings 2. Diode measurements 3. Sign off/acknowledgment of alerts 4. Application of bolus 5. Missed treatments 6. Changes/shifts 7. Pacemaker	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Time out procedure has been performed and documented daily.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Accuracy of reimbursement charges.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Weekly radiation therapist chart checks completed and documented in accordance with the interval designated by department policy.	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Frequently Asked Questions – Competencies

When can I start primary treatment delivery competency testing?

Prior to completing primary treatment delivery competency testing, students will complete a pre-competency checklist for the selected procedure. Students may begin competency testing the first week of October if the supervising radiation therapist agrees the student is prepared.

Do I have to complete all required pre-competency checklists before performing my first treatment delivery competency?

No, complete only the pre-competency checklist for the procedure you plan to attempt. For example, complete the primary brain pre-competency checklist before attempting the primary brain competency.

What happens if a pre-competency checklist is not successfully completed?

The goal of the pre-competency checklists is to help the student and clinical site staff determine the student's readiness for competency testing. Unsuccessful completion indicates the need for continued learning. Although a score is not attached to the pre-competency checklist, it must be successfully completed before moving on to competency testing.

Who can evaluate my competency – Does it have to be my Clinical Preceptor?

No, a competency evaluation may be completed by the Clinical Preceptor or any other appropriately credentialed professional at the clinical site. The evaluator must hold credentials relevant to the competency being performed. For example, a registered radiation therapist evaluates treatment delivery competencies, and a nursing professional evaluates patient care competencies. If you are unsure who is appropriate to evaluate a specific competency, contact the Clinical Coordinator.

Is a case study required for all treatment delivery competencies?

No, a case study is required for all **primary treatment delivery competencies** performed on an actual patient. Only 3 primary treatment delivery competencies may be completed under simulated conditions. Case studies are also required for brachytherapy procedures.

Can I complete the patient care competencies in the fall semester?

Yes, the patient care competencies may be completed in the fall semester, although they are not due the end of the program. Nursing professionals may submit competency evaluations in Trajecsys for these categories. Current ALS/BCLS certification must be maintained throughout the program year and will satisfy the ARRT patient care competency requirement.

Do the treatment accessory device competencies for photon/electron block and bolus have to wait until the summer semester?

No, block and bolus competencies may be completed at any point during the program. Students should attempt these competencies when they feel they have gained sufficient experience and are confident in their readiness for competency testing.

My site says I'll never be able to see certain treatment procedures. How am I supposed to complete the competency evaluation?

Be patient to see what procedures present themselves throughout the program year. Up to 3 of the 16 mandatory treatment delivery competencies may be completed under simulated conditions in the summer semester. If concerned about access to certain procedures or equipment, students will communicate this concern to the Clinical Coordinator as soon as it is identified.

My site does not perform Total Body Irradiation or Craniospinal Axis treatments. How can I achieve these competency requirements?
Participatory competencies may be completed under simulated conditions, but not until the final summer semester. Additional resources will be made available to help students prepare for the simulated experience.

Can I complete more than 7 primary treatment delivery competencies in the fall semester if I have the opportunity to do so?
Yes, the program requires a minimum of 7 primary treatment delivery competencies, but students may complete a maximum of 10 if the opportunity arises.

What are continued competencies?
Continued competencies reassess clinical skills and knowledge after initial competency testing to demonstrate continued proficiency despite variations in patient age, condition, or diagnosis.

Do I have to run the console and demonstrate knowledge of the treatment record for competency testing?
Yes, this is a criterion of the treatment delivery competency forms. Students will demonstrate knowledge of the treatment record either through demonstration or verbal explanation.

What happens if I fail a competency?
The Clinical Preceptor or other supervising registered radiation therapist will review the evaluation with the student and provide meaningful feedback. Additionally, the student may contact the Clinical Coordinator at any time to discuss the failed treatment competency. After the student performs the procedure a minimum of three times, the student may reattempt the competency and the Clinical Preceptor or other supervising registered radiation therapist will submit a new competency evaluation in Trajecsys (see Performance Expectations for all Competency Evaluations, section 3, pg. 9).

How many competencies can I fail?
If a student fails two competencies or has failed two attempts on the same competency category, the Student Counseling process will begin (see Section 2, pg. 45).

Can more than one treatment-delivery competency be completed for a given patient?
No, each competency must be completed on a separate patient.

My site is not allowing hands-on experience. What should I do?
Contact the Clinical Coordinator early. Students must take the initiative to communicate program requirements and deadlines to clinical site staff. Taking no action until the end of the semester will not serve a student well. Communication with clinical staff and program faculty is essential.

Does the abutting field treatment delivery competency include photon-to-photon abutment, electron-to-electron abutment, or electron-to-photon abutment?
Yes, per the ARRT, all three abutment types meet the requirement as long as the student understands the concept and how the three circumstances differ.

What if the supervising therapist and I disagree on my competency outcome?
If a student has questions or concerns about a competency evaluation, contact the Clinical Coordinator to discuss. Students may formally appeal an evaluation outcome per the Clinical Evaluation Appeals policy (see Section 2, pg. 17-18). However, students are reminded to be open to feedback as it is an important part of growth as a clinical professional.

Professional Development Evaluations

As students participate in radiation therapy education, they are expected to demonstrate that they are developing the knowledge, skills, and professional behaviors required to become competent radiation therapists. Learning may generally be categorized into three main component areas: cognitive, psychomotor, and affective. All three areas are important and interrelated.

When most people think of education, they often focus on the cognitive and psychomotor domains. Students first learn facts, theories, and concepts and then apply them through the performance of clinical skills and procedures. However, the development of professional attitudes, values, behaviors, and interpersonal skills associated with the affective domain should not be assumed to occur automatically.

A truly balanced education requires attention to all three domains. To help assess student progression, evaluations are used to determine how effectively students demonstrate the professional behaviors and skills expected by faculty, Clinical Preceptors, and supervising staff. Because thoughts and feelings cannot be directly measured, assessment of the affective domain is based on observable behaviors. This is accomplished by:

1. Informing students of the professional behaviors and attitudes considered important within the profession.
2. Informing students of the observable behaviors used to evaluate mastery of affective skills.

Assessment is based on the degree to which student behaviors demonstrate professionalism as recognized by the majority of members of the profession and the public. Students' personal beliefs or characteristics are not evaluated. The professional development evaluations contain traits faculty have identified as essential elements of the affective domain, while also including items related to the cognitive and psychomotor domains.

Evaluations of clinical progress are completed for the following reasons:

1. To provide feedback regarding the student's affective, cognitive, and psychomotor progress.
2. To help maintain quality patient care.
3. To document continuing competency progression.
4. To contribute to the clinical course grade.

Professional Development Evaluations are due by the 15th of each month **(except for December, May, and July).**

Evaluations will be completed by the Clinical Preceptor or other supervising registered radiation therapist.

- The evaluation will remain hidden from both the Clinical Preceptor and the student for **7 days,** while the Clinical Coordinator reviews the evaluation. If questions arise, the Clinical Coordinator will contact the Clinical Preceptor. The Clinical Coordinator will forward a notification email to the student to inform them that the evaluation has been submitted. The forwarded email will indicate the date on which the 7-day hidden period begins so students may calculate the anticipated release date.
- After the 7-day hidden period ends, the evaluations will automatically be released for viewing by both the Clinical Preceptor and the student.
- Once released, students have up to **7 days** to submit an acknowledgment in Trajecsys indicating they reviewed the evaluation with the Clinical Preceptor.
- After the student acknowledges the Professional Development Evaluation, the Clinical Coordinator validates the evaluation.
- For each poor/fail rating, a 4% deduction is applied to the final evaluation score in Trajecsys.
- The Clinical Coordinator then enters the associated score into D2L.
- Professional Development Evaluations that are not acknowledged within the required timeframe will be reported as 0 in D2L.

If the student disagrees with the evaluation result, he/she should contact the Clinical Coordinator within one week of the evaluation completion date (see Grievance Policy for Unsatisfactory Clinical Evaluation, section 2. Pg 17).

Performance Expectations for all Professional Development Evaluations

A professional development evaluation with a score below 88% is considered failed. In the event that 1 evaluation is failed during the program, the Student Counseling Policy will be applied as follows:

1. **Documented initial warning** – Issued after one failed evaluation.
2. **Disciplinary written warning** – Issued after one additional failed professional development evaluation.
3. **Disciplinary probation with a performance contract** – Issued after one additional failed evaluation beyond the disciplinary written warning.
4. **Program dismissal** – Occurs when significant improvement, as defined in the performance contract (step 3), is not demonstrated.

Professional Development Evaluation

EXAMPLE – Actual Form in Trajecsys

Excellent- Performance of a specific evaluation criterion exceeds entry-level standards. *This rating is not as frequently given in the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average- Performance of a specific evaluation criterion is consistent with entry-level standards. *This rating may not be as frequently given for all evaluation criteria in the first semester and is considered to be a strong rating for student performance.

Average- Performance of a specific evaluation criterion is progressing nicely; the student needs additional clinical experience to meet entry-level standards. *This is a realistic rating of performance in the first clinical semester.

Below Average- Performance of a specific evaluation criterion is progressing slowly; the student needs significantly more experience to meet the standards/skills equivalent for the length of time the student has been in the program.

Poor/Fail- Performance of a specific evaluation criterion is unskilled, inefficient, or unacceptable. A 4% deduction will be manually applied for each Poor/Fail rating.

Instructions: Evaluators are to complete the sections below and provide as much detailed feedback as possible including specific examples. This evaluation serves as a tool to help students assess their skill level and identify areas of needed improvement. Keep in mind the length of time the student has been in the clinical setting and which rotations he/she has experienced at the time of evaluation.

Professional Development Evaluation Criteria

Professional Development Evaluation Criteria					
INITIATIVE					
The student:					
Is motivated and willing to participate in procedures	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Uses clinical time constructively	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates awareness of the expectations/daily tasks of the given rotation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DEPENDABILITY					
The student:					
Arrives at the assigned area at the scheduled time	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Remains in assigned area	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Communicates whereabouts to staff	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
ADAPTABILITY					
The student:					
Observes clinical facility's policies and procedures	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Is receptive to feedback	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Applies feedback	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
ATTITUDE **The student:**					
Demonstrates a cooperative, courteous and positive attitude	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Maintains professional standards and behaviors	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates a desire to learn	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
PATIENT CARE **The student:**					
Demonstrates empathy	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Maintains a good patient rapport	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates effective oral communication skills with patients	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Shows concern for patient privacy and comfort	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
EQUIPMENT **The student:**					
Demonstrates the ability to operate equipment and/or software	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates proper care for equipment	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
KNOWLEDGE AND APPLICATION **The student:**					
Demonstrates the retention and application of knowledge of information/skills gained in rotation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates knowledge of tolerance doses	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Provides accurate patient education within the scope of practice	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Is able to discuss the rationale for a given treatment approach	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Interprets pertinent data to plan or deliver radiation treatments	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
POSITIONING SKILLS **The student:**					
Positions patients appropriately for treatment delivery or simulation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Applies appropriate shifts and adjustments when necessary	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Creates and/or uses appropriate immobilization devices to aid reproducibility	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SAFETY **The student:**					
Maintains an awareness of patient safety	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies patient identity using two methods prior to procedure	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Verifies selection of the correct patient chart/record	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reviews prescription	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Performs procedural timeout prior to beam activation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Reviews cumulative doses	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
PROFESSIONALISM **The student:**					
Maintains a professional demeanor and appearance	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Avoids involvement in departmental issues and does not gossip or complain	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Understands the role of a student in the department	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CRITICAL THINKING **The student:**					
Evaluates images using various imaging technologies (MV, kV, CBCT) to ensure proper patient alignment	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Recognizes discrepancies in patient alignment, patient record, or treatment plan	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Solves challenges related to non-routine clinical situations	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verifies treatment information for completeness and accuracy	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates ability to perform specialized procedures in the clinical setting	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Student Evaluation of Clinical Experience

As students participate in radiation therapy education, the program faculty is interested in learning about students' experiences with the Clinical Preceptor and the clinical education site as a whole. Since this is an online program, communication from the student to the University faculty regarding the clinical site environment and personnel is even more important.

Students will complete the "Student Evaluation of Clinical Experience Form" within Trajecsys at the scheduled times. It is important that the student provides comments in the comment section of each category. Because there is generally only 1 student assigned to a given clinical site, the student's direct comments and ratings are not provided to that site. Instead, a summary of responses from the entire class will be provided to the clinical sites to help them receive feedback and gain knowledge of their strengths and areas for possible improvement in educating student therapists.

If specific issues or concerns arise, the Clinical Coordinator will communicate with the student to discuss the issue(s) and develop a plan for resolution before reaching out to the Clinical Preceptor.

Evaluations will be due by the 15th of each month **(except for December, May, and July**).

Student Evaluation of Clinical Experience

EXAMPLE – Actual Form in Trajecsys

Instructions: Students are to complete the sections below and provide as much detailed feedback as possible, including specific examples.

Student Evaluation of Clinical Experience

Student Evaluation of Clinical Experience Criteria			
INSTRUCTION			
The degree to which the **CLINICAL PRECEPTOR** discusses clinical objectives, explains procedures and activities, answers questions, and provides additional teaching when I demonstrate interest in order to support my clinical learning:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
The degree to which the **CLINICAL EDUCATION SITE (all staff in general)** discusses clinical objectives, explains procedures and activities, answers questions, and provides additional teaching when I demonstrate interest in order to support my clinical learning:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
Comments:			
PARTICIPATION			
The degree to which the **CLINICAL PRECEPTOR** encourages participation in clinical activities, provides opportunities to practice skills, demonstrates and explains procedures, and supports progressive hands-on experiences in the rotations:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
The degree to which the **CLINICAL EDUCATION SITE (all staff in general)** encourages participation in clinical activities, provides opportunities to practice skills, demonstrates and explains procedures, and supports progressive hands-on experiences in the rotations:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
Comments:			
ROLE MODEL			
The degree to which the **CLINICAL PRECEPTOR** promotes a positive learning environment, maintains professionalism in the presence of students, and serves as an effective role model for the profession:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
The degree to which the **CLINICAL EDUCATION SITE (all staff in general)** promotes a positive learning environment, maintains professionalism in the presence of students, and serve as effective role models for the profession:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
Comments:			
COMMUNICATION			
The degree to which the **CLINICAL PRECEPTOR** provides positive and constructive feedback regarding my performance and offers guidance throughout my clinical education:	**Room for Improvement**	**As Expected**	**Exceeds Expectations**
The degree to which the **CLINICAL EDUCATION SITE (all staff in general)** provides positive and constructive feedback regarding	**Room for Improvement**	**As Expected**	**Exceeds Expectations**

my performance and offers guidance throughout my clinical education:			
Comments:			

ADDITIONAL FEEDBACK

What specifically does the **CLINICAL PRECEPTOR** do to help you develop and progress in the clinical setting?	
What suggestions could you offer the **CLINICAL PRECEPTOR** to help improve instruction and mentoring of radiation therapy students?	
What specifically does the **CLINICAL EDUCATION SITE** do to help you develop and progress in the clinical setting?	
What suggestions could you offer the **CLINICAL EDUCATION SITE** to help improve instruction and mentoring of radiation therapy students?	
Further Comments:	

Student Self-Evaluation

The self-evaluation survey challenges students to reflect on the knowledge and skills they have developed, while also assessing their role in patient care and their overall responsibility within the clinical setting. Self-evaluation surveys are located in Trajecsys under the “Evaluations” tab and will be scheduled periodically throughout the program.

The purpose of the self-evaluation is to encourage students to critically examine their role as student therapists and their developing responsibility for active participation within the oncology department. By reflecting on their progress, students can recognize current levels of achievement, identify strengths, and determine areas in which additional instruction or participation may be necessary to further develop their skills. This process should help students establish goals for their continued growth throughout the remainder of the clinical education experience.

Evaluations will be due at the **end of each semester.** Specific due dates will be provided in the clinical course syllabus.

Student Self Evaluation

EXAMPLE – Actual Form in Trajecsys

Excellent- Performance of a specific evaluation criterion exceeds entry-level standards. *This rating is not as frequently given in the first semester and would represent the top 5% of all the students the evaluator has supervised.

Above Average- Performance of a specific evaluation criterion is consistent with entry-level standards. *This rating may not be as frequently given for all evaluation criteria in the first semester and is considered to be a strong rating for student performance.

Average- Performance of a specific evaluation criterion is progressing nicely; the student needs additional clinical experience to meet entry-level standards. *This is a realistic rating of performance in the first clinical semester.

Below Average- Performance of a specific evaluation criterion is progressing slowly; the student needs significantly more experience to meet the standards/skills equivalent for the length of time the student has been in the program.

Poor/Fail- Performance of a specific evaluation criterion is unskilled, inefficient, or unacceptable. A 4% deduction will be manually applied for each Poor/Fail rating.

Instructions: Students are to complete the self-evaluation below. This evaluation is intended to help students assess their level of proficiency, participation, and professional development within the clinical setting.

Student self-evaluation Criteria

Student Self- Evaluation Criteria					
INITIATIVE					
The degree to which I:					
Am motivated and willing to participate in procedures	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Use clinical time constructively	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrate awareness of the expectations/daily tasks of the given rotation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
DEPENDABILITY					
The degree to which I:					
Arrive at my assigned area at the scheduled time	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Remains in my assigned area	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Communicate my whereabouts to staff	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
ADAPTABILITY					
The degree to which I:					
Observe the clinical facility's policies and procedures	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Am receptive to feedback	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Apply feedback	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

ATTITUDE					
The degree to which I:					
Demonstrate a cooperative, courteous, and positive attitude	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Maintain professional standards and behaviors	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrate a desire to learn	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
PATIENT CARE					
The degree to which I:					
Demonstrate empathy	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Maintain a good patient rapport	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrate effective oral communication skills with patients	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Show concern for patient privacy and comfort	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
EQUIPMENT					
The degree to which I:					
Demonstrate the ability to operate equipment and/or software	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrate proper care for equipment	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
KNOWLEDGE AND APPLICATION					
The degree to which I:					
Demonstrate the retention and application of knowledge of information/skills gained in rotation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrate knowledge of tolerance doses	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Provide accurate patient education within the scope of practice	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Am able to discuss the rationale for a given treatment approach	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Interpret pertinent data to plan or deliver radiation treatments	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
POSITIONING SKILLS					
The degree to which I:					
Position patients appropriately for treatment delivery or simulation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Apply appropriate shifts and adjustments when necessary	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Create and/or use appropriate immobilization devices to aid reproducibility	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
SAFETY					
The degree to which I:					
Maintain an awareness of patient safety	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verify patient identity using two methods prior to the procedure	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verify selection of the correct patient chart/record	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**

Review the prescription	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Perform the procedural timeout prior to beam activation	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Review cumulative doses	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
PROFESSIONALISM **The degree to which I:**					
Maintain a professional demeanor and appearance	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Avoid involvement in departmental issues and do not gossip or complain	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Understand the role of a student in the department	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
CRITICAL THINKING **The student:**					
Evaluate images using various imaging technologies (MV, kV, CBCT) to ensure proper patient alignment	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Recognize discrepancies in patient alignment, patient record, or treatment plan	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Solve challenges related to non-routine clinical situations	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Verify treatment information for completeness and accuracy	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
Demonstrates ability to perform specialized procedures in the clinical setting	**Poor/Fail**	**Below Average**	**Average**	**Above Average**	**Excellent**
PROFESSIONAL DEVELOPMENT GOALS					
Identify three actions or goals that would serve to enhance your development into a safe, effective, and confident radiation therapist.					

Supplemental Clinical Review Resources

The following materials are provided as supplemental review resources to support clinical education, competency preparation, and reinforcement of foundational radiation therapy concepts throughout the program.

Study Guides for Competency Testing

The following study guides are provided to assist students in preparing for treatment delivery competency evaluations. The questions and topics are intended to reinforce clinical reasoning, anatomy review, patient care concepts, treatment techniques, radiation safety principles, and commonly discussed topics during competency testing. Students are encouraged to use these guides throughout the program to support competency preparation and continued development of clinical knowledge and confidence.

General Information:

Address the following questions or statements:

- What is the Radiation therapist's responsibility in understanding the patient's medical history?
- Explain the importance of identifying a patient by two methods.
- State the importance of escorting the patient in and out of the treatment room.
- Why is a multidisciplinary approach, involving dietary, social work, nursing, and spiritual health beneficial to cancer patients?
- What is accomplished during weekly treatment status checks with the physician?
- Identify common immobilization devices and the treatment setups in which they are commonly used.
- What skin side effects may occur as a result of radiation therapy?
- Why is routine image verification important during radiation therapy treatment?
- For stereotactic procedures, describe the imaging and localization process.
- For stereotactic procedures, explain the importance of dose verification.
- Explain the importance of verifying SSDs.
- What impact can an incorrect SSD have on treatment delivery?
- Define isocenter.
- Compare SSD and SAD treatment techniques.
- Why is quality assurance testing an important aspect of radiation therapy?
- How frequently are treatment charts, calculations, and treatment data reviewed?
- What emotional, physical, and psychosocial effects can a cancer diagnosis have on a patient?
- What impact can a cancer diagnosis have on family members and care givers?
- Review the patient treatment chart (paper or electronic) and identify:
    - Treatment prescription
    - Daily treatment documentation
    - Recorded treatment doses
    - Imaging and setup instructions
    - Cumulative dose information

rain

In preparation for the competency, consider the following:

- What types of brain treatments are commonly performed in radiation therapy?
- What are the traditional field borders for a whole brain treatment?
- What are common total doses and fractionation schedules used for:
    - Whole brain radiation therapy
    - Primary brain tumors
    - SRS/SRT treatments
- What critical structures are considered during brain treatment planning?
- What are possible acute and chronic side effects associated with brain irradiation?
- List examples of steroids that may be prescribed.
- A separation of the head is taken, it measures 16cm. For an SAD setup, what would the right- and left-lateral SSDs read?

- Review the anatomy of the Central Nervous System.

Head and Neck

- What types of head and neck cancers are commonly treated with radiation therapy?
- What critical structures are commonly considered during head and neck treatment planning?
- What are the possible acute and chronic effects associated with head and neck irradiation?
- What patient education and supportive care measures may be necessary during treatment?
- Why are nutritional support and weight monitoring important for head and neck cancer patients/ What is the purpose of a PEG tube and when might it be necessary?
- Define the following terms:
    - Mucositis
    - Xerostomia
    - Dysphagia
    - Osteoradionecrosis?
- What role do dental evaluations play prior to radiation therapy?
- What critical structures may require shielding or dose limitation during treatment?
- Review anatomy of the head and neck.

Thorax

- What thoracic disease sites are commonly treated with radiation therapy?
- What lung cancer is notorious for metastasizing to the brain early?
- What critical structures are considered during thoracic treatment planning?
- What symptoms may patients with thoracic malignancies experience?
- What are possible acute and chronic side effects associated with thoracic irradiation?
- Why may treatment fields transition from AP/PA fields to oblique fields during treatment?
- What is Superior Vena Cava Syndrome?
- Why is motion management important during thoracic radiation therapy, and what techniques may be used to account for respiratory motion?
- Define the following terms:
    - Anoxia
    - Hemoptysis
    - Apnea
    - Carina
    - Asphyxia
    - Brachial Plexus
    - Aspirate
- Review the anatomy of the respiratory system.

Breast

- What treatment techniques are commonly used for breast irradiation?
- Discuss the prognostic factors related to breast cancer.
- What are common total doses and fractionation schedules used for breast irradiation?
- Why are lumpectomy scars or mastectomy scars boosted?
- What treatment techniques are commonly used for scar boosts?
- Discuss the purpose of bolus during breast irradiation.
- Explain why air gaps beneath bolus material may reduce treatment effectiveness.
- What is the purpose of “flash” during tangent breast treatments?
- What lymph node regions may be included in breast radiation therapy treatment fields?
- When treating a supraclavicular field, why is the patient’s head commonly turned away from the affected side?
- What techniques are used to match the tangent and supraclavicular fields while minimizing overlap and hot spots?
- What heart and lung-sparing considerations are important during breast treatment planning?

- What are the potential advantages of prone breast positioning during radiation therapy?

Abdomen

- What critical structures are commonly considered during abdominal treatment planning?
- Why is motion management important during abdominal radiation therapy?
- What techniques may be used to account for respiratory motion during abdominal treatments?
- What gastrointestinal side effects may occur during abdominal radiation therapy?
- What dietary or supportive care recommendations may be provided to patients receiving abdominal irradiation?
- What is the purpose of contrast during CT simulation or imaging procedures for abdominal treatments?
- Review the anatomy of the abdomen.

Pelvis

- What form of cancer falls under the category of male reproductive and genitourinary tumors?
- What forms of cancer fall under the category of gynecologic tumors?
- What forms of cancer fall under the category of gastrointestinal or digestive tumors?
- What critical structures are commonly considered during pelvic treatment planning?
- What lymph node regions may be included in pelvic radiation treatment fields?
- What are the possible side effects of treating the pelvis?
- Why may bladder filling or bowel preparation be important during pelvic treatments?
- Why is the prone position sometimes used for colorectal or gynecologic radiation therapy treatments?
- What gastrointestinal and genitourinary side effects may occur during pelvic irradiation?
- What medications or supportive care interventions may help manage diarrhea during treatment?
- List standard total curative doses for:
    - Prostate cancer:
    - Colorectal cancer:
    - Bladder cancer:
    - Endometrial cancer:
    - Cervical cancer:
- What is the role of brachytherapy for the treatment of gynecologic tumors?
- What is an APR scar, and why would it be important to bolus it during treatment of the pelvis for colorectal cancer?
- What impact may concurrent chemotherapy and radiation therapy have on side effects and patient care?
- Review anatomy of the GU, GI and GYN systems.

Spine

- What conditions commonly require radiation therapy treatment to the spine?
- What critical structures are considered during spine treatment planning?
- What is the tolerance dose for the spine?
- What are common total doses and fractionation schedules used for metastatic spine lesions?
- The spinal cord extends from approximately:
- Review common landmarks and what they represent.
    - C2/C3 =
    - C4 =
    - C6 =
    - T2 =
    - T4 =
    - T7 =
    - T10 =
    - L4/L5 =

- What are the possible side effects of treating the spine?
- What signs and symptoms may indicate spinal cord compression?
- Why is rapid treatment initiation important for patients with spinal cord compression?
- Review the anatomy of the spinal cord and vertebral bodies.

Extremity

- What are common total doses and fractionation schedules used for extremity treatments?
- Why is it important to spare a strip of tissue during circumferential extremity treatments?
- What skin care instructions may be provided to patients receiving extremity radiation therapy?
- For a humerus field, the collimator of the AP field is rotated 10 degrees to match the angle of the humerus. When rotating the PA field, does the collimator position stay the same?
- What instructions are given to a patient concerning skin care?
- Review skeletal anatomy.

Electron

- What clinical situations may require electron beam treatments?
- What are the common advantages of electron therapy compared to photon therapy?
- How does electron energy impact treatment depth?
- How do irregular surfaces or tissue inhomogeneities affect electron dose distribution?
- Why are custom cutouts used during electron treatments?
- What is the typical SSD used for electron treatments?
- How can an extended SSD affect electron output and penumbra?

Total Body Irradiation

- What is the role of Total Body Irradiation (TBI) in cancer treatment?
- What disease processes commonly require TBI treatments?
- Describe a typical TBI schedule and fractionation approach.
- Why is a low dose rate commonly used during TBI treatments?
- What are the possible acute and late side effects associated with TBI?
- Why are infection control and isolation precautions important for many TBI patients?
- What is the purpose of lung transmission blocks during TBI treatments?
- What supportive care considerations are important for patients undergoing TBI?
- The purpose of lung transmission blocks is to:
- Define the following terms:
    - Leukocytosis
    - Leukopenia
    - Leukemia
    - Bone marrow
    - Stem cells
    - Nadir

Craniospinal Axis

- Which fields commonly make up a craniospinal axis technique?
- What is the overall purpose of craniospinal irradiation?
- What disease processes may require craniospinal axis treatment?
- What is the purpose of field junctions or skin gaps during craniospinal treatments?
- What critical structures are considered during treatment planning?
- What are possible side effects of a craniospinal axis treatment?
- What total doses are commonly delivered to:

    - The cranial portion of the treatment
    - The posterior fossa boost region
    - The spinal axis
- Find the necessary skin gap if:
    - Length of the first field is 22cm
    - Length of the second field is 38cm
    - Fields are treated at 100cm SSD
    - Treatment depth is 6 cm

Stereotactic Treatment

- What is the difference between SRS, SRT, and SBRT?
- What disease processes are commonly treated using stereotactic radiation therapy techniques?
- Why is immobilization especially important during stereotactic treatments?
- What imaging guidance techniques are commonly used for stereotactic localization and verification?
- Why are small treatment margins commonly used during stereotactic treatments?
- What patient education or safety considerations are important for stereotactic procedures?

Low Workload Guidelines

Radiation therapy departments naturally experience fluctuations in patient workload. During busy clinical periods, students gain hands-on experience through active participation in patient care and treatment procedures. During periods of lower patient volume, students are expected to remain engaged in meaningful educational activities and professional development opportunities rather than entering a passive learning mode. Clinical Preceptors are encouraged to use lower workload periods as opportunities to reinforce knowledge, develop clinical reasoning skills, and expand the student's understanding of radiation therapy procedures and workflow.

Suggested learning activities include:

1. Demonstrate treatment room and imaging system warm-up procedures.
2. Practice image acquisition, review and alignment utilizing offline review, phantoms, or imaging warm-up procedures (MV, KV, CBCT).
3. Demonstrate patient chart review and basic dose calculation concepts.
4. Practice patient care techniques such as blood pressure, pulse assessment, CPR review, and oxygen administration.
5. Practice using the record & verify system, imaging equipment, linear accelerator controls, or simulation controls.
6. Review daily/weekly images and judge the accuracy of the treatment position to gain experience and confidence in evaluation skills.
7. Observe or assist with quality assurance procedures with the physicist, if appropriate.
8. Practice answering common patient questions through role-playing scenarios.
9. Review medical terminology (see terminology list).
10. Observe physicians or nurses during follow-up visits, consultations, or status checks.
11. Simulate positioning and procedures for non-routine set-ups such as CSA or TBI.
12. Practice hand dosimetry calculations or gap calculations (late spring/summer).
13. Review the daily treatment schedule, including diagnoses, treatment techniques, imaging, and simulation procedures.
14. Assist with organization and cleanliness of the assigned clinical area.
15. Review anatomy using the program anatomy guide or sectional anatomy resources.
16. Review isodose plans and identify clinically relevant information from treatment plans.
17. Review dose-volume histograms (DVHs) and evaluate doses to target volumes and organs at risk (OARs).
18. Become familiar with treatment billing/coding concepts and the documentation used to support charges for radiation therapy services.
19. Discuss possible machine faults or malfunctions and appropriate troubleshooting responses.
20. Review treatment planning contours and structures (e.g., GTV, CTV, PTV, OARs) using treatment planning software, if available.
21. Practice or observe motion management techniques, such as breath hold, gating, or abdominal compression.
22. Use case studies or treatment summaries to follow a patient from simulation through treatment completion.
23. Review the most recent radiation monitoring report with the Radiation Safety Officer or designated staff member.

Anatomy Review

Head and Neck Anatomy:

- Bones of the skull, face, spine
- Salivary glands/ducts
- Brain anatomy
- Landmarks
    - Outer canthus
    - Infraorbital ridges
    - External occipital protuberance
    - Tragus
    - Tentorium cerebelli
    - EAM
    - Sella turcica
    - C4-5 = Larynx
    - T2-3 = Suprasternal notch
    - T4-5 = Angle of Louis
    - T9-10 = Xiphisternal junction
    - Iliac crest = L4-5
- Lymphatics of the Head and Neck
    - Submental
    - Submandibular
    - Anterior cervical/jugular
    - Posterior cervical/spinal accessory
    - Supraclavicular
- Waldeyers Ring
    - Nasopharyngeal tonsils
    - Palatine tonsils
    - Lingual tonsils

Chest/Thorax:

- Respiratory system anatomy
    - Naso/Oro/Hypo Pharynx
    - Larynx
    - Trachea
    - Carina
    - Bronchi
- Cardiovascular system anatomy
- Lymphatics of the Chest/Thorax:
    - Paratracheal
    - Scalene
    - Carinal
    - Intrapulmonary
    - Bronchopulmonary (hilar)
    - Thoracic duct

Abdomen/Pelvis:

- Gastrointestinal anatomy
    - Mouth
    - Epiglottis
    - Esophagus
    - Stomach
    - Cardiac/pyloric sphincters
    - Small intestine
    - Large intestine
    - Splenic/Hepatic flexures
- Male reproductive system
- Female reproductive system
- Urinary system anatomy
    - Kidney: nephron
- Lymphatics
    - Pre-aortic (celiac, sup/inf mesenteric)
    - Thoracic duct
    - Cisterna chyli
    - Para-aortic
    - Sacral
    - Common iliac
    - Internal iliac
    - External iliac
    - Obturator
    - Inguinal
- Liver, Gallbladder, Pancreas anatomy

Cross-sectional Anatomy review is also important. The Portal Design in Radiation Therapy (2nd Edition) includes cross-sectional images for review.

The AL311 Imaging in Radiation Therapy also presents significant information about cross-sectional anatomy.

Tolerance Doses (TD5/5 & TD50/5)

Tolerance Doses

Organ	TD5/5	TD50/5	Injury
Bone Marrow	2.5Gy whole 30Gy (2/3)	4.5Gy whole 40Gy (2/3)	Pancytopenia, aplasia
Bladder	65Gy whole 80Gy (2/3)	80Gy whole 85Gy (2/3)	Contracture
Bone (mature)	60Gy	100Gy	Necrosis
Brain	45Gy whole 50Gy partial	60Gy whole 65Gy partial	Necrosis
Brachial Plexus	60Gy whole 61Gy (2/3)	75Gy whole 76Gy (2/3)	Nerve damage
Colon	45Gy whole 50Gy (1/3)	55Gy whole 65Gy (1/3)	Obstruction, fistula, ulceration
Ear	30Gy whole & partial		Acute serous otitis, chronic serous otitis (55Gy)
Esophagus	55Gy whole 58Gy (2/3)	68Gy 70Gy	Stricture or ulceration
Femoral Head & Neck	52Gy whole & partial		Necrosis
Fetus	2Gy	4Gy	Death
Heart	40Gy whole 45Gy (2/3) 60Gy (1/3)	50Gy whole 55Gy (2/3) 70Gy (1/3)	Pericarditis
Kidney	23Gy whole 30Gy (2/3)	28Gy whole 40Gy (2/3)	Clinical nephritis
Lacrimal Gland	26Gy whole & partial		Dry eye
Lens of Eye	10Gy	18Gy	Cataract needing intervention
Liver	30Gy whole 35Gy (2/3)	40Gy whole 45Gy (2/3)	Liver failure
Lung	17.5Gy whole 30Gy (2/3)	24.5Gy whole 40Gy (2/3)	Acute, chronic pneumonitis
Optic Chiasm/Optic Nerve	50Gy whole	65Gy whole	Blindness
Parotid	32Gy whole & partial		Xerostomia
Rectum	60Gy whole 61Gy (1/3)		Severe proctitis, necrosis, stenosis, fistula
Salivary Gland (Parotid)	32Gy whole 32Gy (2/3)	46Gy whole 46Gy (2/3)	Xerostomia
Skin	55Gy 100cm2 70Gy 10cm2	70Gy 100cm2	Necrosis, ulceration
Spinal Cord	47Gy (20cm) 50Gy (5-10cm)	70Gy 70Gy	Myelitis, necrosis
Small Intestine	45Gy whole 50Gy partial (1/3)	55Gy 60Gy	Obstruction, fistula, perforation
Testis	1Gy	2Gy	Sterilization
Vagina	90Gy	100Gy	Ulcer, fistula

Review of Treatment Side Effects & Interventions

Treatment Side Effects & Interventions

Effect	Dose	Treatment of Effect
Alopecia/Epilation	Occurs at 20Gy	• Discuss scalp care instructions
Increased Intracranial Pressure	Occurs due to the tumor itself or radiation treatment of the brain	• Corticosteroids such as Dexamethasone and Prednisone
Mouth Changes: Stomatitis, xerostomia, mucositis, taste changes	Dose-dependent; all occur between 20-30Gy, becoming more severe with increased dose and more severe when rt is combined with chemo (e.g., methotrexate).	• Viscous xylocaine 2% mixed in water • 1:1:1 solution of Benadryl elixir, Maalox, xylocaine to swish and spit or swallow. • Miracle Mouth Wash • Soft bland diet
Xerostomia	Occurs at 20-30Gy Greater than 40-60Gy, dryness becomes permanent	• Salogen, Xero Lube, Saliva-aid, Moisture
Esophagitis, Pharyngitis, and Laryngitis	Occurs within 2-4 weeks (about 20-30Gy) Laryngitis occurs around 40Gy.	• Soft, non-spicy, non-acidic diet such as cottage cheese, yogurt, milk shakes, puddings, casseroles, scrambled eggs, meats/veggies in sauces/gravies. • Avoid hot/spicy foods or drinks, dry/coarse foods, crackers, nuts, potato chips, raw veggies, citrus fruits and juices, alcohol, caffeine • 1:3 lidocaine mixed with Mylanta or Maalox • Prevacid or Prilosec
Erythema	Faint erythema occurs around 30-40 Gy; Erythema occurs around 40-60Gy	• Aloe Vera
Dry and Moist Desquamation	Both occur around 40-60Gy	• Hydrocortisone cream (2%) for irritated/inflamed skin. • Silvadene Cream • Topical Soaks: Blu-Boro or Domeboro
Fatigue	Depends on the patient	• Check nutritional habits, help patient pace activities
Diarrhea	Occurs around 20-50Gy	• Low residue diet: white bread, baked, broiled or roasted meat, macaroni, cooked veggies, peeled apples/bananas. • Foods to avoid: whole grain breads/cereals, fried or fatty foods, milk or milk products, raw veggies, fresh fruit • Loperamide (Imodium AD), Pepto-Bismol, Kaopectate, Lomotil.
Cystitis	Occurs 30-40Gy	• For painful urination: Pyridium
Nausea and Vomiting	Occurs around 10-20Gy	• Fluid intake to prevent dehydration • Low fat, low sugar diet • Compazine, Kytril, Tigam suppositories, Zofran, Valium

Review acute and chronic effects and side effects of specific treatment areas (Principle & Practices text).

Acute or early effects are defined as those appearing within 6 months post-treatment. Examples include edema, erythema, desquamation, denudation, hemorrhage, mucositis, esophagitis, fatigue, nausea/vomiting, and loss of taste.

Chronic or late effects are defined as those appearing more than 6 months after treatment. Examples include fibrosis, stenosis, necrosis, atrophy, lymphedema, telangiectasia, xerostomia, ulceration, myelitis, Lhermitte syndrome, scoliosis, stricture, and obstruction.

Review of Radiation Therapy Key Terms

Radiation Therapy Key Terms and Definition

Key Term	Definition
Abdominoperineal Resection	Surgical removal of the rectum and anus through abdominal and perineal incisions, typically resulting in the creation of a permanent colostomy.
Absorption	The process by which energy is removed from a beam by a material and retained within a material.
Accelerated Fractionation	A radiation therapy technique in which the overall treatment time is shortened.
Acceptance Testing	Testing performed on new equipment to verify the machine operates according to manufacturer specifications and clinical requirements.
Adaptive Radiation Therapy (ART)	Modification of a radiation treatment plan during the course of treatment to account for changes in patient anatomy, tumor size, or internal motion.
Adenocarcinoma	A type of carcinoma arising from glandular epithelial tissue.
Adjuvant Therapy	Treatment used in addition to the primary treatment to improve outcomes.
Alopecia	Hair loss.
Alpha Particle	Particulate radiation with a +2 charge, consisting of two protons and two neutrons, similar to a Helium nucleus. Emitted during nuclear decay.
Analgesics	Medication used to relieve pain.
Anaplastic	Undifferentiated cells that lack normal cellular structure and function.
Anemia	A decrease in the normal number of red blood cells or hemoglobin.
Anesthetics	Medications used to suppress sensation or pain.
Angle of Louis	The junction between the manubrium and the body of the sternum, located at approximately the T4-T5 vertebral level; also referred to as the sternal angle.
Antianxiety Medications	Medication used to reduce anxiety
Antibiotics	Medications used to suppress the growth of bacteria (e.g., Erythromycin, penicillin, tetracycline)
Anticoagulants	Medications used to slow the clotting of blood (e.g., Warfarin or Coumadin).
Anticonvulsants	Medications that inhibit or control seizures (e.g., Clonazepam or Klonopin).
Assault	The threat of touching a patient in a way that would cause injury.
Atomic Number	The number of protons in a nucleus.
Attenuation	The removal of photons and electrons from a radiation beam by scatter or absorption as it travels through a medium.
Autonomy	The right of patients to make decisions for themselves, free from interference of others.
Back Scatter	When radiation is scattered back to the source.
Back Scatter Factor	Ratio of the dose with scattering medium (tissue or phantom) to the dose at the Dmax without a scattering medium (in air or free space).
Barrett's Esophagus	A condition in which the normal squamous epithelium of the distal esophagus is replaced by columnar epithelium, commonly associated with gastroesophageal reflux disease (GERD). Barrett's Esophagus increases the risk of esophageal adenocarcinoma.
Battery	Intentional harmful or unauthorized physical contact with another person.
Beam Flatness	The degree to which the dose is even across a beam profile; defined across the central 80% of the beam at a depth of 10cm.
Beam Flattening Filter	A high-density metal filter located in the linear accelerator head that shapes the x-ray beam to create a more uniform dose distribution across the treatment field.
Beam Profile	A one-dimensional representation of the variation in beam intensity across a radiation field.

Bending Magnet	A component of a linear accelerator that redirects electrons exiting the accelerating waveguide toward the patient
Beneficence	The ethical principle of acting for the benefit or the good of the patient.
Benign	A noncancerous tumor that is typically well differentiated, encapsulated, and slow growing.
Binding Energy	The amount of energy required to remove an electron from an atom.
Bite Block	A positioning device placed between the patient's teeth to help immobilize and position the tongue, chin, or head.
Bolus	Tissue-equivalent material placed on the patient surface to increase surface dose or compensate for tissue irregularities (examples include wet gauze, Vaseline gauze, paraffin wax, superstuff or superflab, water bags)
Boost Fields	Radiation fields used to deliver an additional dose to a smaller target volume following treatment of a larger area.
Brachytherapy	A radiation treatment method that uses radioactive sources placed inside or near the patient to deliver a high radiation dose locally.
Bragg Peak	Sharp increase in the dose distribution curve of a charged particle at a particular depth.
Bremsstrahlung Radiation	X-ray photons produced when high-speed electrons are slowed or deflected near the nucleus of a target atom. Also called "braking radiation."
Cachexia	A state of general ill health and malnutrition with early satiety; electrolyte and water imbalances; and progressive loss of body weight, fat, and muscle.
Carcinomas	Tumors arising from the epithelium, which include tissues that line or cover a surface or cavity.
Cellular Differentiation	The degree to which a cell resembles its cell of origin. Well-differentiated cells are more mature and specialized, while poorly differentiated cells are immature and less specialized.
Cerrobend	A low-melting-point alloy used to create custom radiation shielding blocks. Typically composed of 50% bismuth, 26.7% lead, 13.3% tin, and 10% cadmium.
Cone Beam Computed Tomography (CBCT)	A type of CT imaging that uses a cone-shaped x-ray beam to acquire volumetric images during a single rotation.
Conventional Fractionation	A radiation treatment schedule typically delivering daily fractions of 180–200 cGy, five days per week.
Coronal Plane	A plane perpendicular to the sagittal plane that divides the body into anterior and posterior sections.
Cutie Pie Ionization Chamber	A portable ionization chamber survey meter that is used to measure low-intensity radiation fields.
Cyclotron	A charged particle accelerator used to generate proton or other particle beams.
Deglutition	The act of swallowing.
Digitally Reconstructed Radiograph (DRR)	A computer-generated radiographic image created from CT data that provides a Beam's Eye View (BEV) for treatment localization and image alignment.
Dose Buildup Region	The region between the skin surface and the depth of maximum dose (Dmax), where dose increases with depth in megavoltage photon beams.
Dose Equivalent	A radiation quantity that accounts for the biological effect of radiation and is calculated by multiplying absorbed dose by a quality factor. Units include sievert (Sv) and rem.
Dose Maximum (D_{max})	The depth at which the maximum radiation dose occurs. For megavoltage photon beams, Dmax occurs below the skin surface, contributing to skin sparing. *Co-60 = .5cm, 4MV = 1cm, 6MV = 1.5cm, 10MV = 2.5cm, 18MV = 3.5cm, 24MV = 4.0cm*
Dose Volume Histogram (DVH)	A graphical representation of dose distribution within target volumes and normal tissues used to evaluate treatment plans.
Dynamic Wedge	A wedge-shaped dose distribution created through movement of a collimator jaw during radiation delivery. Also referred to as a virtual wedge.
Dysphagia	Difficulty swallowing.
Dyspnea	Difficult or labored breathing.
Elapsed Days	The total number of calendar days over which a radiation treatment course occurs, including treatment and non-treatment days.
Electron Gun	A component of the linear accelerator that produces and injects electrons into the accelerating waveguide.
Empathy	The ability to understand and share another person's feelings or experiences.

Epidemiology	The study of the distribution and causes of disease within populations.
Epistaxis	Nosebleed
Erythema	Redness and inflammation of the skin or mucous membranes, often caused by dilation of superficial capillaries.
Exit Dose	Radiation dose at the exit surface of the patient.
Exposure	A measure of ionization produced by x-ray or gamma radiation in air. Traditional units include roentgen (R); SI units include coulomb per kilogram (C/kg). *1 R = 2.58 X 10^{-4} C/kg*
False Imprisonment	The act of restricting a person's movement or freedom without consent.
Feathering	The planned movement of field junctions during treatment to reduce dose overlap or underdosing at field match lines.
Fiducial Marker	Artificial markers placed internally or externally to assist with localization and image guidance during treatment.
Field of View	The diameter or size of the imaging area displayed during CT scanning.
Forward Planning	A treatment planning method in which the planner manually selects beam arrangements and dose-modifying parameters.
Fraction Dose	The radiation dose delivered per treatment session.
Gamma Ray	A photon emitted from the nucleus of an atom; Identical to X-ray photons except for their origin from the nucleus rather than orbital electron shells.
Glioma	A tumor arising from glial cells within the central nervous system.
Given Dose	The radiation dose delivered at the depth of maximum dose (Dmax). Also referred to as applied dose.
Good Catch	A reporting process used to identify and document potential safety concerns or near misses before harm occurs.
Grade	A classification describing tumor aggressiveness based on the degree of cellular differentiation and abnormality.
Gynecomastia	Benign enlargement of male breast tissue.
Half-Life	The time required for radioactivity to decay to one-half of its original value.
Half-Value Layer	The thickness of material required to reduce radiation intensity to one-half its original value.
Hematuria	Blood in the urine.
Hemoglobin	The iron-containing protein in red blood cells responsible for transporting oxygen.
Hemoptysis	Coughing up of blood from the respiratory tract.
Heterotopic Bone	Abnormal bone formation within soft tissue.
High Dose Rate (HDR)	A form of brachytherapy delivered at a high dose rate, typically greater than 12 Gy per hour.
Hinge Angle	The angle formed between the central axes of two intersecting radiation beams.
Hounsfield Units	(Numerical values used in CT imaging to represent tissue density.
Hyperfractionation	A fractionation schedule using smaller doses delivered more than once daily to increase total dose while limiting normal tissue toxicity.
Hypovolemic Shock	A life-threatening condition caused by severe blood or fluid loss resulting in inadequate circulation.
Image-Guided Radiation Therapy (IGRT)	The use of imaging before or during radiation treatment to improve treatment localization and accuracy.
Image Matrix	A grid of rows and columns that forms a digital image.
Immunotherapy	A cancer treatment that stimulates or enhances the body's immune system to fight cancer.
Informed Consent	The process of ensuring a patient understands the purpose, benefits, risks, and alternatives of a proposed treatment or procedure before agreeing to it.
Intensity Modulated Radiation Therapy (IMRT)	Therapy that delivers non-uniform exposure across the radiation field using a variety of techniques and equipment.
Interfraction Motion	Change in target position between treatment fractions.
Intrafraction Motion	Movement that occurs during radiation delivery within the same treatment fraction.

Intraoperative Radiation Therapy (IORT)	A radiation therapy technique in which a single high dose of radiation is delivered directly to the tumor bed during surgery while surrounding normal tissues are displaced or shielded.
Intrathecal	Within the cerebrospinal fluid (CSF) space.
Inverse Planning	A treatment planning method in which clinical objectives are defined and computer software determines beam parameters to achieve the desired dose distribution. Commonly used in IMRT planning.
Isocenter	The point where the axes of rotation of the gantry, collimator, and treatment couch intersect.
Isodose Curve	A line connecting points of equal radiation dose on a dose distribution map.
Kwashiorkor	A severe form of protein malnutrition caused by inadequate protein intake despite adequate caloric intake.
Klystron	A high-power microwave amplifier used in some linear accelerators.
L'hermittes Syndrome	A sensation resembling an electric shock that travels down the spine or body, often triggered by neck flexion.
Leukocytosis	An elevated white blood cell count.
Leukopenia	A decreased white blood cell count.
Libel	Written defamation.
Linear Attenuation Coefficient	A measure of how readily a material attenuates radiation per unit thickness.
Linear Energy Transfer	The amount of energy deposited by ionizing radiation per unit distance traveled through matter.
Low Dose Rate (LDR)	A form of brachytherapy delivered at a dose rate less than 2 Gy per hour.
Lymphedema	Swelling caused by the accumulation of lymphatic fluid within tissues.
Malignant	Cancerous cells or tumors that are invasive, capable of spreading, and often poorly differentiated.
Marasmus	Severe calorie deficiency resulting in significant weight loss and muscle wasting.
Mass Number	The total number of protons and neutrons within an atomic nucleus.
Meiosis	A type of germ cell division that produces four haploid daughter cells.
Medical Image Management and Processing System (MIMPS)	A digital system used to store, process, manage, and retrieve medical images and related patient imaging data. Formerly referred to as PACS.
Mitosis	A type of somatic cell division that produces two diploid daughter cells.
Mohs Surgery	A surgical technique in which skin cancer is removed layer by layer and examined microscopically until clear margins are achieved.
Moist Desquamation	Breakdown of the skin in which the epidermis is lost, resulting in a moist, weeping appearance.
Monitor Unit	A unit of radiation output used in linear accelerator calibration and treatment delivery.
Multileaf Collimator (MLC)	A device within the linear accelerator head that uses motorized leaves to shape the radiation treatment field.
Myelosuppression	A decrease in bone marrow function which results in reduced blood cell production.
Nadir	The lowest point reached by blood cell counts following treatment.
Near Miss	An event or situation that could have resulted in an error or patient harm but was identified before reaching the patient.
Necrosis	Death of tissue.
Neoplasia	Abnormal and uncontrolled new tissue growth resulting in the formation of a neoplasm or tumor.
Nonmaleficence	The ethical principle of avoiding harm to others.
Nosocomial Infection	An infection acquired within a healthcare facility. Also called a hospital-acquired infection (HAI).
On Board Imaging (OBI)	Imaging systems integrated into a linear accelerator used for treatment localization and image guidance.
Organ at Risk (OAR)	A normal organ or tissue whose radiation sensitivity may significantly influence treatment planning or dose delivery.

Organ Segmentation	The process of contouring or identifying target volumes and normal tissues on medical images.
Orthogonal Films	Images obtained at perpendicular angles to one another.
Orthopnea	Difficulty breathing while lying flat.
Osteonecrosis	Death of bone tissue.
Otalgia	Ear pain.
Output Factor	The ratio of the dose rate for a given field size compared to a reference field size.
Oxygen Enhancement Ratio	Response of cells to radiation in the absence of O_2 (hypoxic conditions) / in the presence of oxygen (oxic conditions).
Pair Production	An interaction in which a high-energy photon interacts with the nuclear field and is converted into an electron-positron pair. This interaction requires photon energies greater than 1.02 MeV.
Palliative Care	Care focused on relieving symptoms, reducing side effects, and improving quality of life for patients.
Parallel-Opposed Field Set	Two radiation treatment fields directed 180 degrees apart that share a common central axis.
Parenteral Nutrition	Administration of nutrition intravenously, bypassing the gastrointestinal tract.
Particle Therapy	A form of radiation therapy that uses accelerated particles, such as protons or carbon ions, to treat disease.
Past Pointing	A treatment technique in which the isocenter is placed beyond the target volume to improve dose uniformity in rotational therapy. The rule of thumb for finding the isocenter depth is to multiply the tumor depth by 1.5cm.
Penumbra	The region at the edge of a radiation beam where the dose rapidly decreases.
Percent Depth Dose	The ratio, expressed as a percentage, of the absorbed dose at a given depth to the absorbed dose at a reference depth, usually Dmax.
Photoelectric Effect	An interaction in which a photon transfers all of its energy to an inner-shell electron.
Photon	A massless particle of electromagnetic energy that travels at the speed of light.
Physical Half-Life	The time required for one-half of the radioactive nuclei in a sample to decay.
Pixel	The smallest individual element within a digital image matrix.
Plummer-Vinson Syndrome	A condition characterized by iron-deficiency anemia, esophageal webs, and dysphagia, associated with an increased risk of esophageal cancer.
Points A & B	Historically used reference points in cervical brachytherapy planning to estimate dose distribution within the pelvis.
Positive Ion	An atom that has lost one or more electrons, resulting in a net positive charge.
Practical Range of Electrons	The depth at which the electron beam dose approaches zero, approximately equal to beam energy in MeV divided by 2.
Proton	A positively charged particle located within the atomic nucleus.
Protraction	The total elapsed time over which a course of radiation treatment is delivered.
Purines	Nitrogenous bases consisting of adenine and guanine.
Pyrimidines	Nitrogenous bases consisting of cytosine and thymine.
Quality Assurance	A systematic program designed to ensure safe, accurate, and consistent patient care and treatment delivery.
Quality Control	Specific tests and procedures used to monitor the performance and function of radiation therapy equipment.
Rad	A traditional unit of absorbed radiation dose equal to 100 ergs per gram. Replaced in SI units by the gray (Gy).
Radiolysis	The dissociation of molecules caused by ionizing radiation.
Reconstruction Time	The time required for CT data to be processed and displayed as an image.
Relative Biologic Effectiveness (RBE)	A comparison of how effectively different types of radiation produce biologic damage for the same absorbed dose.
Rem	A traditional unit of dose equivalent based on absorbed dose and radiation quality factor. 100 rem equals 1 sievert (Sv).

Remote Afterloading	A brachytherapy technique in which radioactive sources are inserted remotely after applicator placement, reducing radiation exposure to staff.
Rhabdomyosarcoma	A malignant tumor arising from skeletal muscle tissue commonly occurs in children.
Roentgen	A traditional unit used to measure radiation exposure in air from x-rays or gamma rays.
Role fidelity	The ethical principle of remaining faithful to professional responsibilities and commitments.
Rotational Therapy	A radiation treatment technique in which the treatment beam rotates around the patient to deliver dose from multiple angles.
Sarcoma	A malignant tumor arising from mesenchymal tissues such as bone, muscle, cartilage, or blood vessels.
Scatter	Deflection of photons from their original path following interaction with matter.
Scatter Air Ratio	The ratio of scattered dose at a given point to the dose in free space at the same point.
Scattering Foil	A thin metal foil used in electron therapy to broaden and evenly distribute the electron beam.
Sentinel Node	The first lymph node that receives drainage from a primary tumor site.
Separation	The patient thickness measured along the treatment beam axis.
Sievert (Sv)	The SI unit of dose equivalent and effective dose. 1 Sievert = 100 rems
Sliding Window	An IMRT delivery technique in which multileaf collimator (MLC) leaves move continuously while the radiation beam remains on.
Skin Gap	A planned gap placed between adjacent radiation fields on the skin surface to reduce overlap and minimize overdose at the junction.
Skin Sparing	The reduction of radiation dose at the skin surface characteristic of megavoltage photon beams.
Slander	Spoken defamation.
Somatic Cells	All body cells except reproductive (germ) cells.
Source to Axis Distance	The distance from the radiation source to the axis of rotation, or isocenter, of the linear accelerator.
Source to Skin Distance	The distance from the radiation source to the patient's skin surface.
Spatial Resolution	The ability of an imaging system to distinguish small objects or fine detail.
Speed of Light	3×10^8 m/sec or 3×10^{10} cm/s
Spread out Bragg Peak (SOBP)	The combination of multiple Bragg peaks at different depths to create a uniform proton dose distribution across a target volume.
Staging	The process of determining the size and extent of a tumor at the time of diagnosis.
Stenosis	Abnormal narrowing of a passage or opening.
Stereotactic Body Radiation Therapy (SBRT)	A form of radiation therapy delivering a few highly focused, high-dose treatments to tumors outside the central nervous system.
Stereotactic Radiosurgery (SRS)	A stereotactic radiation technique that delivers a high dose of radiation to a precisely defined intracranial target, typically in a single fraction.
Stereotactic Radiotherapy (SRT)	A stereotactic radiation technique that delivers precise radiation treatment to intracranial targets over multiple treatment fractions.
Target Volume	The tissue volume intended to receive a prescribed radiation dose, including the tumor and any appropriate treatment margins.
Telangiectasia	Dilation of small superficial blood vessels resulting in a fine, spider-like appearance on the skin.
Tenesmus	Painful or ineffective straining during a bowel movement.
Thimble Ionization Chamber	An ionization chamber with a small cylindrical detector volume shaped like a sewing thimble.
Three-Dimensional Conformal Radiation Therapy (3D-CRT)	A radiation therapy technique that uses three-dimensional imaging and treatment planning to conform dose distributions to the target while minimizing dose to surrounding normal tissues.
Thrombocytopenia	A decrease in the number of circulating platelets.
Time-Out	A safety procedure performed immediately prior to treatment delivery to verify critical patient and treatment information.

Tissue Air Ratio	The ratio of absorbed dose at a given depth in a phantom to the dose at the same point in free space.
Tissue Maximum Ratio	The ratio of absorbed dose at a given depth in a phantom to the absorbed dose at the depth of maximum dose (Dmax).
TLD	A solid-state radiation detector that stores absorbed radiation energy and emits light when heated. The amount of light emitted is proportional to the absorbed dose.
Tomotherapy	A radiation therapy delivery system in which the linear accelerator rotates continuously while the treatment couch moves through the gantry, producing a helical treatment pattern.
Transmission Target	A target used in megavoltage x-ray machines in which the photon beam is generated in the same direction as the electron beam.
Transverse Myelitis	Inflammation of the spinal cord which may result in neurologic symptoms such as weakness, sensory changes, or pain.
Treatment Volumes	**GTV (Gross Tumor Volume)** – the visible, palpable or demonstrable tumor. **CTV (Clinical Target Volume)** - the visible (imaged) or palpable tumor plus any margin of subclinical disease that needs to be eliminated through the treatment planning and delivery process. **ITV (Internal Target Volume)** – margin around the CTV to account for physiologic movement or changes in the shape, size or position of the CTV during the course of treatment. **PTV (Planning Target Volume)** – the volume that includes the ITV plus margin for geometric uncertainties, such as patient motion, beam penumbra, and treatment setup differences.
Tumor Dose	The prescribed radiation dose delivered to the tumor or target volume.
Urticaria	Hives
Veracity	The ethical principle of truthfulness in healthcare.
Verification	The process of confirming that the planned treatment accurately matches the intended treatment setup and target coverage prior to delivery.
Voxel	A three-dimensional volume element within a digital image dataset.
Waveguide	A metal structure within the linear accelerator that directs microwaves used to accelerate electrons.
Wedge	A beam-modifying device used to alter isodose distributions within a treatment field.
Wedge Angle	The angle formed between an isodose line and a line perpendicular to the central axis of the beam.
Wedge Factor	The ratio of the dose with a wedge to the dose without a wedge under the same conditions.
Window Level	The central CT number or brightness setting displayed within a selected window width.
Window Width	The range of CT numbers displayed on a CT image that determines image contrast.

Craniospinal Axis Fields Clinical Resource

Image courtesy of ourmedicine.com

Craniospinal axis fields allow for the treatment of the Cerebral Spinal Fluid (CSF) which surrounds the brain and spinal column. Certain CNS tumors present of risk of CSF seeding (spreading) in which case the entire axis must be treated.

The Craniospinal axis setup is a common treatment technique for several Central Nervous System tumors (often in children). The most common type of cancer that requires the craniospinal axis set up is medulloblastoma. Medulloblastoma is a posterior fossa cancer that accounts for 20-25% of all childhood brain tumors. Visit this site to learn more about Medulloblastoma:

Other CNS tumors that may employ the craniospinal axis technique are:

- Germinomas
- Pineoblastomas
- High Grade Ependymomas

Craniospinal Axis Technique:

Most often the patient is immobilized and placed in the prone position with arms down at side. Aquaplast and vac-locks are used. A supine position may be used if patient requires sedation. The two lateral opposed fields treat the whole brain and a portion of the cervical spinal cord (inferior border is often C4-5). The lateral fields have a collimator angle to match the divergence from a PA spine field which extends from C5 to C6 depending on inferior border of whole brain fields to S2. As well, when treating the brain fields there is a table kick (feet toward head of gantry) – this is to help with divergence issues.

In older children, the PA spine field may need to be divided into 2 parts due to length of the spine. A skin gap between these two fields is necessary to avoid overdosing a portion of the cord. **See page 738 in *Principles and Practices of Radiation Therapy*** book by Washington/Leaver (5th Edition). Note that the test does not demonstrate the table kick that is discussed above.

It is typical to have a skin gap between the inferior border of the brain fields and the superior border of the PA spine field. As mentioned above, if the PA spine field is divided into two parts, a skin gap will be necessary between those two fields also. During the course of treatment, the junctions between the cranial and upper spinal fields and between the two spinal fields are moved, or

"feathered," every 1,000 cGy to avoid overdosing or under dosing the spinal cord at the junction sites. Usually, the length of the cranial fields is decreased by 1cm, the upper spinal field is moved cephalad to match the cranial fields, and the lower spinal field is moved superiorly, with its length increase to match the original inferior border of the lower spinal field.

Skin Gap:

Since the photon fields are not half beam blocked, they cannot match on the skin surface. To make the fields match at the depth inside the patient, a skin gap on the surface of the patient is required. This gap prevents hot spots (overlapped area) or cold spots (an area left out of the treatment that should have been in). The skin gap is usually around 0.5-1.5cm for these setups but depend on the field lengths, SSD's and depth at which the fields should match.

The gap formula follows: $\frac{\text{Depth}}{2}\left(\frac{\text{Length 1}}{\text{SSD 1}} + \frac{\text{Length2}}{\text{SSD2}}\right)$

Collimator and Table Angles:

Another thing to consider is the divergence of the beams from each portal. The lateral brain diverge one direction and the PA spine field diverges another direction. If there is no comparison for the divergence, hot or cold spots may result.

The treatment couch is angled a few degrees on the brain fields to account for the divergence over the spinal cord. If the gantry is at the Right Lateral position (remember the patient is prone) the couch would rotate so that the feet move toward the gantry and the head moves away from the gantry. To find out how many degrees to rotate the couch, use the following formula. Do the math first then hit the 2nd or Inverse key of the calculator, then the TAN button (of course the order of buttons may differ depending on the calculator model).

$\frac{\frac{1}{2}\text{ Length 2}}{\text{SAD}} = \tan^{-1}$ (length 2 is the length of the lateral brain fields.)

The collimator of the brain fields is angled to compensate for the divergence of the spine field (see page 738, figure 35.5. When in the simulation a calculation can be done to figure how many degrees to angle the collimator on the brain fields:

$\frac{\frac{1}{2}\text{ Length 1}}{\text{SSD}} = \tan^{-1}$ (length 1 is the length of the PA spine.)

Treatment Doses:

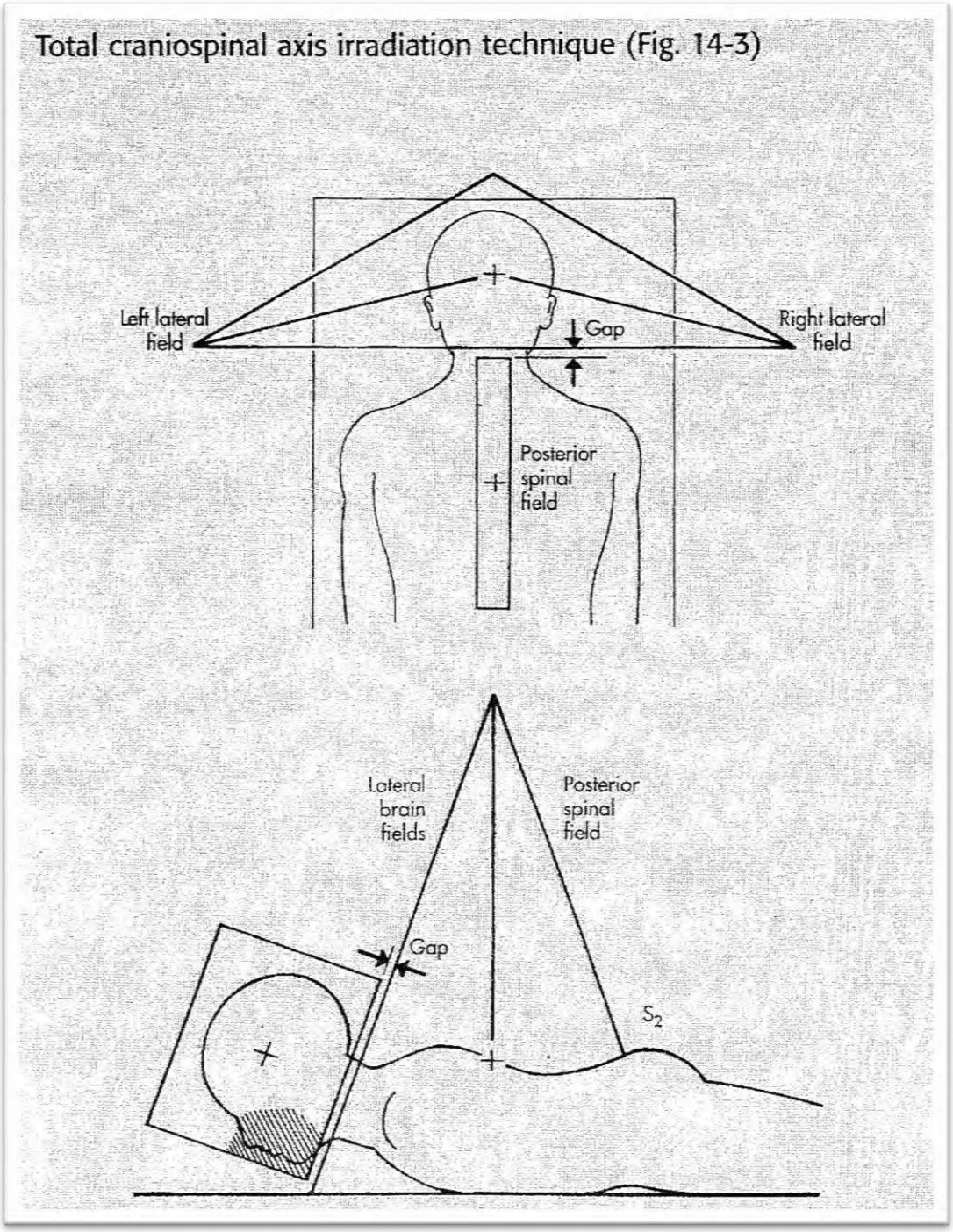
1. Lateral brain fields: 40Gy whole brain and then a boost of 10Gy (total = 50Gy)
2. PA spine field: 36Gy

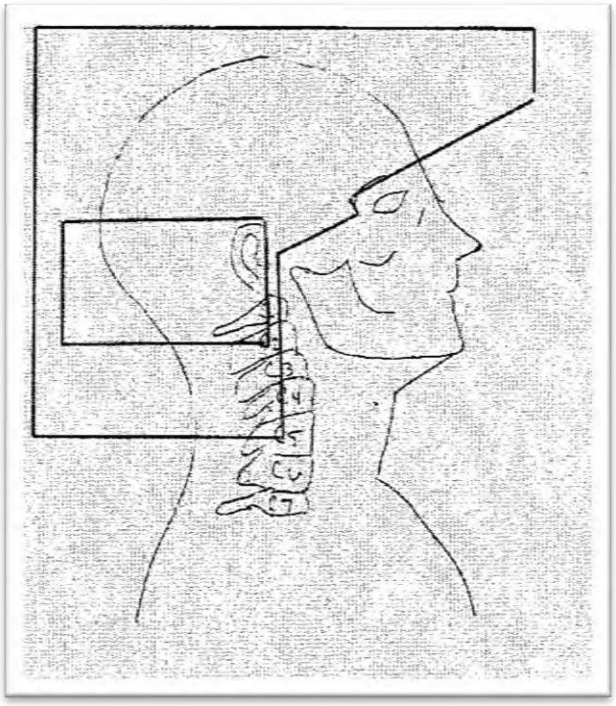
*Treatments use a 4-6MV photon beam at 150cGy – 180cGy daily fractions.

Treatment Side Effects (Sequelae):

- Decreased IQ
- Growth Retardation

- Impaired/Loss of Hearing
- Hair Loss
- Decreased Hormone Section such as growth hormone
- Secondary Malignancies





This diagram shows both the opposed lateral whole brain fields and the posterior fossa boost fields.

Notice that the inferior border for the whole brain is much lower than a traditional whole brain field (C5 in this diagram).

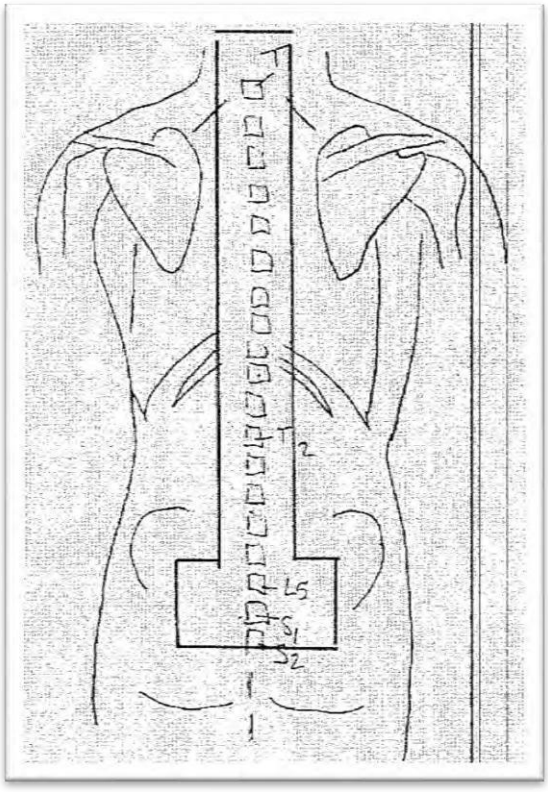
The posterior fossa boost extends to C2 inferiorly, 1cm in front of the EAM anteriorly, with flash posteriorly.

The whole brain receives 40Gy with a 4-6MV beam. The posterior fossa boost adds an additional 10Gy for a total dose of 50Gy.

This spine field is a bit different than what is shown in the textbook, but this is what I am more accustomed to seeing. Some call this a “spade” field because it widens at the bottom.

Keep in mind that for some patients (older children, young adults) the spine fields may need to be broken into two parts due to the length. Our maximum field length that can be achieved at the collimator is 40cm. An extended distance may be possible but it still may not provide the field size that is needed, so it is done in 2 parts. Of course if divided into two parts there will be another skin gap. The 1st skin gap is between the inferior border of the whole brain fields and the superior border of the spine field.

The spine field is treated to about 36Gy. Keep in mind that the tolerance dose that is typically referred to in radiation therapy is for a cord length of 10cm or less. When a larger volume of tissue is treated, the tolerance dose decreases.



Total Body Photon Irradiation Clinical Resource

Leukemia is a cancer of the **hemopoietic system**. Acute leukemia and chronic myelogenous leukemia are common forms of cancer for which Total Body Irradiation (TBI) may be employed in combination with chemotherapy as part of a preparatory cyto-reductive conditioning regimen prior to bone marrow transplantation (BMT) to eradicate tumor cells and cells with genetic disorders. The TBI helps to prevent the failure of the new marrow. Other types of diseases that may require bone marrow transplant and TBI include Lymphoma and Multiple Myeloma and Aplastic Anemia.

Leukemia is formed when cells of the blood and lymphatics are formed. Pluripotent stem cells are the most immature or primitive cells. Remember from radiobiology that stem cells divide rapidly and are able to self-populate. These stem cells eventually become either myeloid or lymphoid stem cells. The ones that become myeloid stem cells become progenitors for the blood cells (erythrocytes, neutrophils, eosinophils, basophils, monocytes, and platelets). The stem cells that become lymphoid stem cells become progenitors for lymphocytes. Leukemia results when the productions of the progenitors is uncontrolled. (Click here for more information regarding hematopoiesis).

Leukemia is broken into categories:

1. Acute Leukemia: Progress quickly, characterized by the proliferation of undifferentiated (immature) cells in the bone marrow.
2. Chronic Leukemia: Progress slowly, characterized by uncontrolled expansion of differentiated (mature) cells.
3. Myelogenous Leukemia: arise from the blood system.
4. Lymphocytic Leukemia: arise from other cells that are found within the bone marrow.

These categories lead to the 4 Subtypes of Leukemia which include….

1. Acute Lymphocytic Leukemia (ALL):
   - Condition in which the bone marrow is invaded by leukemic lymphoblasts.
   - ALL is the most common leukemia in **children**.
   - Accounts for 50% of all cases of leukemia in the U.S.
   - 80% of children with acute leukemia have ALL
   - There are about 5,400 new cases each year in the U.S.
   - +75% of the patients can experience a complete remission.
   - Symptoms include anemia, neutropenia, and thrombocytopenia; which are displayed by fatigue, epistaxis, petechiae, ecchymoses, and menorrhagia.
   - Bone pain may also be a symptom due to periosteal invasion.
   - Neck stiffness, papilledema (optic disc swelling) are indications of CNS involvement.
   - Treatment of ALL includes chemo, radiation therapy, and bone marrow transplant individually or in combination.

- Radiation is generally in the form of TBI (total body irradiation). It may be used to boost the brain or testes which are considered sanctuary sites or good hiding places.

2. Chronic Lymphocytic Leukemia (CLL):
   - A disorder of immunologically immature lymphocytes.
   - There are about 15,110 new cases of CLL each year in the U.S. accounting for about 30% of all leukemia cases. CLL is about twice as common as CML.
   - CLL incidence increases with age; the average age at diagnosis is 65 years.
   - CLL occurs twice as often in males than females.
   - CLL has not been linked to previous radiation exposure, while the other types of leukemia have a link.
   - Symptoms include a white blood count higher than 10,000/mm^3.
   - Other than the blood results, patients are often asymptomatic.
   - The treatment of choice is unknown. Chemotherapy, radiation therapy, and surgery may be employed but often palliative to manage more of the symptoms rather than the disease itself.
   - The spleen may be treated with radiation therapy for palliative treatment. The spleen is very, very radiosensitive so treatment uses low doses of 100cGy/day for 5 days to a total dose of 500cGy.

3. Acute Myelogenous Leukemia (AML):
   - Results from the uncontrolled division of defective pluripotent stem cells.
   - AML is a leukemia that tends to present in patients older than 40 years of age; median age at diagnosis of 67 years.
   - 80% of all adults with acute leukemia have AML.
   - There are about 13,290 cases of AML each year in the U.S.
   - Symptoms include fatigue, pallor, and dyspnea on exertion, petechiae, purpura, epistaxis, gingival bleeding, and neutropenia.
   - Treatment options include chemo, radiation, and bone marrow transplant in combination or alone.
   - Radiation treatment involves TBI giving 1200cGy within 3 days with b.i.d. treatments of 200cGy/treatment at a very low dose rate.

4. Chronic Myelogenous Leukemia (CML):
   - Bone marrow cells end up being replaced by myeloid cells that have uncontrolled proliferation.
   - CML accounts for 15% of all leukemia.
   - There are about 7,000 new cases of CML each year in the U.S.
   - CML is rare in childhood and uncommon before the age of 35 years, and peaks in the mid-60's.
   - 95% of patients have blood stem cells with a **"Philadelphia Chromosome"**.
   - "Blast Crisis" is one phase of CML in which the body is invaded by leukemic blast cells; the blood count may reach hundreds of thousands per cubic millimeter.
   - Treatment includes chemo, radiation, and bone marrow transplant individually or in combination. A newer drug called Gleevec has quickly become a gold standard for treating

CML. Gleevec works to inhibit a gene on the Philadelphia Chromosome which makes a poisonous protein (causing CML). By inhibiting the making of this dangerous protein, CML can be held at bay, so to speak.

- Radiation therapy's role involves TBI or treatment of the spleen.

Bone Marrow Transplant
What is a Bone Marrow Transplant?

Photo courtesy of: LSY Architects

TBI Treatment Methods: There are many methods used to deliver total body irradiation treatments: standing, seated, on a cart, lying down, AP/PA, laterals etc. All modern uses of TBI involved the use of a megavoltage photon beams (Co-60 or linear accelerator) that are generally parallel opposed. I have described 2 methods below. Be sure to review page 177 *Principles and Practices of Radiation Therapy* by Washington/Leaver (5th edition) for additional approaches. Also pages 20-19, 20-23, 20-7, in the McDermott & Orton textbook provide information and images of TBI procedures.

One method of delivering TBI is by using a Linear Accelerator. This is the method in which I am familiar. At the University of Kansas Hospital, a special TBI chair was used and the patient was treated while seated using a lateral technique. The gantry was rotated to 90 degrees to allow for appropriate distance to treat the entire body, head to toe. The patient was positioned on the chair and centered within a 40cm x 40cm field light. After the patient was treated from one side, the chair would be turned and the patient would be treated from the other side.

Prior to treatment, the patient's thickness is measured (for exp. shoulder, pelvis, ankle thickness, etc.). These measurements were then given to the physicist who used them for treatment calculations. When treating the patient, small lead pieces were placed on a Lucite tray that was attracted to the head of the gantry facing the direction of the patient. The lead pieces were used in order to distribute the desired treatment dose evenly to the patient. Each piece of lead was clinically placed by the therapist to cover the desired body region. The thickness of lead varied depending on the thickness of the patient as well as the part of the body that was being covered. (In certain cases, an extra lung shield was required and a lead piece would be placed directly on the patient's side of their chest to cover the lung.) Once all the lead was placed, a spoiler was positioned between the patient and the radiation. The treatment was delivered using a low dose rate and usually lasted about 15 minutes per side.

Another method of delivery is by using a Cobalt Unit. Cobalt machines run on time rather than on dose. This is because it is a radioactive source, its dose is the same all day long so the only thing that can be controlled is the length of time it is exposing the patient. When treating AP/PA, patients typically lie on their backs for 10-15 minutes and then onto their stomachs for 10-15 minutes. Since Cobalt is a radioactive source, the time depended on how old the source was (the source decays about 1% per month). If it is a newer source, the time is less, if it is an older source, the time is longer. FYI, the half-life of Cobalt is 5.26 years.

Bone marrow is one of the MOST radiosensitive organs. Bone marrow is affected more by the volume treated than the dose given. If a small portion of bone marrow is treated to a high dose, the effect on the bone marrow is not significant because bone marrow elsewhere in the body can make up for the loss of production. However, if a large volume of bone marrow is treated to a lower dose, the effect is greater. *50% of the bone marrow is located in the spine and pelvis.

TBI for patients with leukemia receiving a bone marrow transplant:
These patients receive intense chemotherapy 3-4 days before the transplant. As well, these patients receive TBI 3-4 days before the transplant. TBI treatment results in a rapid depletion of vital stem cells within one (1) week of exposure. The point of total body irradiation is to make the patient immunosuppressed. By depleting the body of the stem cells, the body is less likely to reject the new transplanted bone marrow, allowing the new marrow to implant and to begin proliferating.

TBI Doses:
A common regimen is to have the patients come for 3 days of radiation, twice a day. Remember that b.i.d. treatments must be separated by at least 6 hours. The total dose if 1200cGy-1400cGy. Each treatment the patient receives is 150cGy-200cGy. So 2 times a day x 200cGy x 3 days or (6) treatments = 1200cGy. The dose prescription point is commonly midpoint at the level of the umbilicus. It's necessary that the dose is uniform within +/-10%. Uniformity is achieved with bolus and compensators. The dose rate is low to spare the **late responding tissues**, such as the lungs.

Things for the therapist to consider:

1. Many of the patients are children; this requires explanation/demonstration/communication and patience. Anesthetic may need to be given; **Diprivan** is an example of a fast acting aesthetic.
2. These patients do not feel well; they have been brought to the brink of death. Their blood counts are extremely low meaning these patients are highly immunosuppressed.
3. Some sort of shielding/compensation for the lungs must be utilized otherwise the patient's lung function with be compromised due to fibrosis. Remember that the TD5/5 for whole lung leading to fibrosis is 17.5Gy. When the patient is treated in the lateral position, the humerus may serve as a lung compensator in which case transmission blocks may not be used.
4. Delivering a dose to the whole body is serious, the set-up and dose must be correct.

Patient Side Effects:

ACUTE

1. neutropenia: decrease neutrophils (wbc) Infection
2. thrombopenia: decreased platelets hemorrhage
3. anemia: decreased RBC – fatigue
4. epilation/alopecia
5. nausea/vomiting
6. erythema – blanching of the skin
7. mucositis of the mouth, pharynx, bladder, rectum

CHRONIC

1. permanent sterility/infertility
2. cataracts (easy to correct)
3. hepatic fibrosis
4. radionecrosis of genital tissue, kidney or muscle
5. development of second primary

Simulation for TBI:

Considerations in the planning of Total Body Irradiation: (See pages 20-19, 20-23, 20-7, The Physics & Technology of Radiation Therapy, 2nd edition).

1. Beam energy depends on the patient thickness and specification of the dose homogeneity.
2. Treatment position varies from facility to facility depending on their equipment and room setup; position may be supine/prone, standing AP/PA, sitting Laterals, etc. The body should be within the 98% isodose line. This position established by the department should be comfortable because the patient will have to be in that position for about 15-20 minutes, b.i.d.
3. Bolus or beam spoiler is often used to bring the skin dose to 90% of the prescribed TBI dose.
4. Goal is to achieve dose uniformity within +/-10% along the sagittal axis of the body. Compensators and bolus may be used to achieve this value if needed.
5. Lungs are commonly shielded with 1 HVL thickness to reduce the dose to this critical organ. The chest wall below the blocks can be boosted with electrons.

These websites below offer some very good visuals of the TBI procedure. One is a podcast from Barnes Jewish Hospital's Sitman Cancer Center, another is from the Barnes Jewish Hospital website and it offers information about bone marrow transplantation as well as patient videos for allogeneic and autologous transplant procedures, and the last one is a website that a TBI patient named Greg has created to chronicle his experience. Links were live at the printing of the manual; potentially they could go off-line between the printing and the beginning of the program.

Helpful Online References:

- Medulloblastoma Info - Cancer.gov
- Hematopoietic Stem Cell – NCI Dictionary
- Blood and Marrow Transplant Program (Additional info, test, and patient videos)