IMPORTANT: This syllabus form should be submitted to OAA (gsbs_academic_affairs@uth.tmc.edu) a week before the start of each semester.

NOTE to STUDENTS: If you need any accommodations related to attending/enrolling in this course, please contact one of the Graduate School's 504 Coordinator, Natalie Sirisaengtaksin, PhD. We ask that you notify GSBS in advance (preferably at least 3 days before the start of the semester) so we can make appropriate arrangements.

Term and Year: **Summer 2026**

Course Number and Course Title:
GS02 1213: Therapy Medical Physics II

Credit Hours: 3

Prerequisite: GS02 1113: Introduction to Medical Physics III: Therapy

Meeting Location: **UT MDACC Main Building**

Building/Room#: **FCT 8.5013 (in person)**

Program Required Course: No

Approval Code: Yes

(If yes, the Course Director or the Course Designee will provide the approval code.)

Audit Permitted: **No**

Classes Begin: **May 18, 2026**

Classes End: **August 7, 2026**

Final Exam Week: **August 10-13, 2026**

Class Meeting Schedule

Day	Time
Monday	**1:30-3:00 p.m.**
Wednesday	**1:30-3:00 p.m.**
Friday (as need, see schedule)	**1:30-3:00 p.m.**

Course Director:

Name and Degree: **Christopher Peeler, PhD**

Title: Associate Professor

Department: Radiaton Physics

Institution: MDACC

Email Address: CRPeeler@mdanderson.org

Contact Number: 713-792-4274

Course Co-Director:
Name and Degree: **Leonard Che Fru, PhD**

Title: Assistant Professor

Instructors:

1. **Christopher Peeler, PhD**
   Institution: MDACC
   Email Address : CRPeeler@mdanderson.org
2. **Leonard Che Fru, PhD**
   Institution: MD Anderson Cancer Center
   Email Address : LChe@mdanderson.org
3. **Jared Ohrt, PhD**
   Institution: MDACC
   Email Address Johrt@mdanderson.org

Department: Radiaton Physics Institution: MDACC Email Address: LChe@mdanderson.org Contact Number: 832-266-8245 **NOTE:** Office hours are available by request. Please email me to arrange a time to meet.	4. **Dragan Mirkovic, PhD** Institution: MDACC Email Address: DMirkovi@mdanderson.org 5. **Kristy Brock, PhD** Institution: MDACC Email Address: KKBrock@mdanderson.org 6. **Dennis Mackin, PhD** Institution: MDACC Email Address: DSMackin@mdanderson.org 7. **Rachael Martin Paulpeter, PhD** Institution: MDACC Email Address: RMMartin@mdanderson.org 8. **Ming Yang, PhD** Institution: MDACC Email Address: MYang1@mdanderson.org 9. **Yuting Li, PhD** Institution: MDACC Email Address: Yli30@mdanderson.org 10. **Peter Balter, PhD** Institution: MDACC Email Address: PBalter@mdanderson.org 11. **Emil Schueler, PhD** Institution: MDACC Email Address: ESchueler@mdanderson.org 12. **Tucker Netherton, PhD** Institution: MDACC Email Address: TNetherton@mdanderson.org 13. **Jinzhong Yang PhD**

Institution: MDACC

Email Address: Jyang4@mdanderson.org

Course Description:

This course will cover concepts and applications in “modern” radiation therapy physics. It will start with an introduction to model based planning with CT and followed with rigorous treatment of convolution based-algorithms, Monte Carlo, and deterministic algorithms. This will include further discussion of heterogeneity corrections and limitations in commercially implemented algorithms utilized in treatment planning systems. This will be followed by discussion on modern radiation therapy planning and delivery approaches including IMRT, VMAT, stereotactic, and image-guided RT principles. Proton radiation therapy will be covered in detail. The final section of the class will cover advanced RT topics including MR in RT, artificial intelligence/automation applications, and FLASH.

Textbook/Supplemental Reading Materials

- Khan, “The Physics of Radiation Therapy”
- Podgorsak, "Radiation Oncology Physics: A Handbook for Teachers and Students"
- Mayles et al. "Handbook of Radiotherapy Physics: Theory and Practice"
- Kahn, "Khan’s Lectures, Handbook of the Physics of Radiotherapy"

Course Objective/s:

Upon successful completion of this course, students will ---

***Specific Learning Objectives*:**

1. Understand and be able to describe the fundamental function of different dose calculation algorithms, the implementation of these algorithms in modern treatment planning systems, and their limitations.
2. Have a firm understanding of the physics and clinical principles of proton radiotherapy.
3. Have a broad knowledge of the various techniques and technologies utilized in a modern radiotherapy clinic for the delivery of high-quality cancer care.
4. Be familiar with the latest advances in radiation therapy and current areas of research.

Student responsibilities and expectations:

Students enrolled in this course will be expected to perform the following activities each week:

1. Participate in and contribute to course discussions during lecture, review sessions
2. Complete post-lecture review questions
3. Participate in and complete assigned lab reports
4. Prepare for and take course quizzes based on course lectures/readings
5. Prepare for and take a mid-term and final examination based on lecture and some reading material

Students are expected to complete all assigned reading material (reviews and research literature) prior to class. While you may work and discuss all course materials and assignments in groups, all writing assignments must be your own. Plagiarism and failure to properly cite scientific literature and other sources will not be tolerated and are grounds for dismissal from the course and further GSBS disciplinary action. Cheating or engaging in unethical behavior during examinations (quizzes and final) will be grounds for dismissal from the course without credit and further GSBS disciplinary action.

Grading System: **Letter Grade**

Student Assessment and Grading Criteria :

Percentage	Description
Homework (20%)	Lab reports
Quiz (20%)	
Midterm Exams (25%)	
Final Exam (25%)	
Participation and/or Attendance (10%)	Daily review questions

CLASS SCHEDULE – see attached

DATE	TIME	TOPIC	LECTURER
MON, 5/18/2026	1:30-3:00	Terminology and Introduction to Photon Dose Calculation Algorithms	Ohrt, Jared
WED, 5/20/2026	1:30-3:00	Dose Calculation Algorithms for Clinical Photon Beams I	Ohrt, Jared
MON, 5/25/2026		NO CLASS - MEMORIAL DAY - HOLIDAY	
WED, 5/27/2026	1:30-3:00	Dose Calculation Algorithms for Clinical Photon Beams II	Ohrt, Jared
FRI, 5/29/2026	1:30-3:00	Dose Calculation Algorithms for Clinical Photon/Electron Beams: Monte Carlo/Boltzman	Mirkovic, Dragan
MON, 6/1/2026	1:30-3:00	**QUIZ 1** // Intensity-Modulated Radiation Therapy	Che Fru, Leonard
WED, 6/3/2026	1:30-3:00	IGRT	Peeler, Christopher
MON, 6/8/2026	1:30-3:00	Motion Management and Surface Guided Systems	Martin, Rachael
WED, 6/10/2026	1:30-3:00	Stereotactic Body Radiation Therapy	Martin, Rachael
MON, 6/15/2026	1:30-3:00	**QUIZ 2** // Image Registration and Segmentation	Brock, Kristy
WED, 6/17/2026	1:30-3:30	IMRT Treatment Planning and Image Registration LAB	Peeler, Christopher / Che Fru, L
MON, 6/22/2026	1:30-3:00	Stereotactic Radiosurgery	Mackin, Dennis
WED, 6/24/2026	1:30-3:00	REVIEW	Peeler, Christopher / Che Fru, L
FRI, 6/26/2026	1:30-3:00	**MIDTERM**	Peeler, Christopher / Che Fru, L
MON, 6/29/2026	1:30-3:00	Proton I	Yang, Ming
WED, 7/1/2026	1:30-3:00	Proton II	Yang, Ming
MON, 7/6/2026	1:30-3:00	Proton III	Li, Yuting
WED, 7/8/2026	1:30-3:00	Proton Radiobiology and Heavy Ions	Peeler, Christopher
SAT, 7/11/2026	9:00-12:00	PROTON DEMO/LAB	Peeler, Christopher / Che Fru, L
MON, 7/13/2026	1:30-3:00	Radiation Oncology Informatics	Balter, Peter
WED, 7/15/2026		**QUIZ 3** // NO CLASS	
MON, 7/20/2026		NO CLASS - AAPM Annual Conference	
WED, 7/22/2026		NO CLASS - AAPM Annual Conference	
MON, 7/27/2026	1:30-3:00	FLASH	Schueler, Emil
WED, 7/29/2026	1:30-3:00	MR in RT I	Yang, Jinzhong
FRI, 7/31/2026	1:30-3:00	MR in RT II	Yang, Jinzhong
MON, 8/3/2026	1:30-3:00	QUIZ 4 // AI and Automation I	Netherton, Tucker
WED, 8/5/2026	1:30-3:00	AI and Automation II	Netherton, Tucker
FRI, 8/7/2026	1:30-3:00	REVIEW	Peeler, Christopher / Che Fru, L
WED, 8/12/2026	1:30-3:00	**FINAL**	Peeler, Christopher / Che Fru, L

CP/jal-05.15.26