

GS02 1113: Introduction to Medical Physics III: Therapy

Syllabus, Spring Semester 2017

Lectures: Tuesday & Thursday 1:30 – 3:00

Location: FCT8.6091

Labs: TBA

Final May 2, 1:30 – 4:30 PM, Room FCT8.6091

Course instructors:

Laurence Court, Ph.D.

Song Gao, Ph.D.

Kent Gifford, Ph.D.

Kelly Kisling, MS. (course assistant)

Adam Melancon, Ph.D. (course co-director)

Sastry Vedam, Ph.D.

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FCT8.6014

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FCT8.5076

FCT8.6013

FCT8.5082

FCT8.6008

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Reference Text: Handbook of Radiotherapy Physics: Theory and Practice or Radiation Oncology Physics: A Handbook for Teachers and Students

http://www-pub.iaea.org/MTCD/publications/PDF/Pub1196_web.pdf

Grades

Final grades will be based on the following weighting:

Quizzes and Homework 20%, Projects 25%, Lab Reports 20% and Final Exam 35%

Quizzes & Homework (20%)

Some sections of the course will include quizzes at the beginning of the class. These quizzes cover the material up to and including the previous lecture.

Projects (25%)

Students are responsible for completion of 4 computational projects for Photon, Electron and Brachytherapy sections.

Lab Reports (20%)

Labs require turning in reports that include detail explanation of procedures and answering questions related to the lab.

Final Exam (35%)

The final exam will be comprehensive.

There will be no curving or grade inflation in this class.

Students are expected to fully participate in all lectures and perform all the assignments.

Jan 10	Lec. 1	Introduction to Therapy Physics, duties, equipment, procedures, etc.	Salehpour
Jan 12	Lec. 2	Medical accelerators design I	Salehpour
Jan 17	Lec. 3	Medical accelerators design II	Salehpour
Jan 19	Lec. 4	Site & Equipment Specifications (Quiz 1)	Salehpour
Jan 24	Lec. 5	Acceptance Testing Methods	Salehpour
Jan 26	Lec. 6	Properties of the Clinical Beams	Salehpour
Jan 20	Lab. 1	Lab –Linac demonstration (2 hrs) 1PM at 2109	Melancon/Smith
Jan 31	Lec. 7	Calibration of megavoltage X-ray beams (Quiz 2)	Salehpour
Feb 02	Lec. 8	Calibration of megavoltage electron beams	Salehpour
Feb 04	Lab. 2	Lab - Calibration of megavoltage photon & electron beams (4 hrs)	Melancon/Gao
Feb 07	Lec. 9	Commissioning I	Salehpour
Feb 09	Lec. 10	Commissioning II (Quiz 3)	Salehpour
Feb 11	Lab. 3	Lab – Commissioning (4 hrs)	Melancon/Gao
Feb 14	Lec. 11	Quality assurance measurements (Quiz 4)	Melancon
Feb 16	Lec. 12	Fundamental of 2D dose calculations /Project/	Vedam
Feb 18	Lab. 4	Lab – QA(2hrs)	Melancon/Gao
Feb 21	Lec. 13	Dose calculation in heterogeneous medium	Vedam
Feb 23	Lec. 14	Photon-beams: 3D CRT I /Project/	Vedam
Feb 28	Lec. 15	Photon-beams: 3D CRT II	Vedam
Mar 02	Lec. 16	Optimization and Inverse Planning I	Vedam
Mar 07	Lec. 17	Optimization and Inverse Planning II	Vedam
Mar 09	Lec. 18	Image Guidance and Motion Management	Vedam
Mar 13-17		Spring Break	
Mar 21	Lec. 19	Electron beams: fundamentals	Gifford
Mar 23	Lec. 20	Electron-beams monitor-unit calculations: problems /Project/	Gifford
Mar 28	Lec. 21	Electron-beam dose-calculation algorithms	Gifford
Mar 30	Lec. 22	Electron beams: Special considerations	Gifford
Apr 04	Lec. 23	Lab – Treatment planning	Melancon
Apr 06	Lec. 24	External beam special procedures I	Melancon
Apr 11	Lec. 25	External beam special procedures II	Melancon
Apr 13	Lec. 26	Brachytherapy – intro, principles, sources/construction	Gifford
Apr 18	Lec. 27	Brachytherapy – dose calculation algorithms /Project/	Gifford
Apr 20	Lec. 28	Brachytherapy – Clinical implementation of Brachytherapy (LDR)	Gifford
Apr 25	Lec. 29	Brachytherapy – Clinical implementation of Brachytherapy (HDR)	Gifford
Apr 27	Lec. 30	Lab- Brachytherapy Treatment planning	Gifford
May 04		Final	Salehpour

Dates indicated in red are for labs which meet on Saturdays. However, we will make an effort to move those labs to afterhours on weeknights.