

# Medical Physics Curriculum at Duke University

## Program features

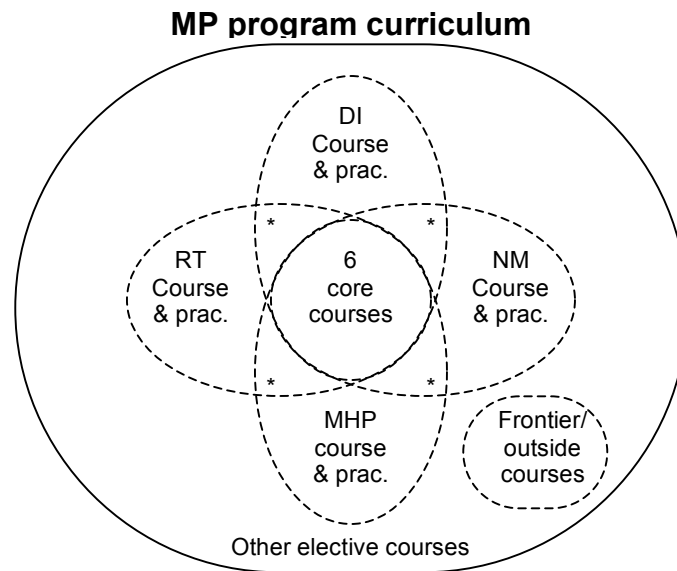
1. The Program consists of 4 training levels:
  - i) Terminal M.S.
  - ii) Ph.D.
  - iii) Post-graduate/Postdoctoral training (future offering)
  - iv) Medical Physics residency (future offering)
2. The M.S. and Ph.D. programs have 4 tracks:
  - i) Diagnostic Imaging (DI)
  - ii) Radiation Therapy (RT)
  - iii) Nuclear Medicine (NM)
  - iv) Medical Health Physics (MHP)
3. The curriculum consists of
  - i) a core component, shared by all tracks
  - ii) track-specific core courses
  - iii) electives courses
4. Each student will take a track-specific clinical practicum. The practicum will permit hands-on training using equipment involved in the practice of medical physics, and should be beneficial for students who plan on either a research or clinical career.
5. Each student elects a major track, a minor track (for PhD), and should take 1 course in frontier areas that are currently not a part of traditional Medical Physics discipline (e.g., genomics, data mining, bioinformatics, biophotonics).
6. Students are required to choose their track by the end of the first year of their program.
7. The program encourages MS students to arrange for summer practical clinical/research experiences. These are optional, but would enable the student to become acquainted with professional aspects of medical physics. There may be some help from the program in identifying suitable summer practical experiences.
8. There will be an optional mock board exam at the middle of the second year of to prepare students for board exams.

## Pre-requisites for entering the program

1. BS in Physics  
OR
2. Bachelor's degree in natural sciences, mathematics, or engineering with the following *Recommended* college-level coursework:
  - a. Mathematics: 2 semesters of calculus
  - b. Physics: 2 semesters of general physics
  - c. Modern Physics: 1 semester
  - d. Chemistry: 1 semester
  - e. Biology: 1 semester
  - f. Electronics: 1 semester
  - g. Computer science/programming: 1 semester

Students may be accepted with some deficiencies. Classes taken to overcome deficiencies, in consultation with the DGS, will be in addition to the standard Medical Physics curriculum.

# Curriculum structure



\* 1 minor-track courses for PhD (optional for MS)

## Minimum requirements for MS:

- 6 core courses
- 1 track-specific courses
- 1 track-specific practicum and shadowing course
- 1 frontier course
- 1 elective course
- 4 1 c.h. seminar courses
- 6 c.h. MS thesis
- (An optional summer practical clinical/research experience)
- (Optional minor with 1 course from another track)

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 ~ 9 courses + 1 practicum + 4 seminars + 6 thesis (40 credit hours)  
 2 yrs

## Minimum requirements for PhD:

- 6 core courses
- 1 track-specific courses
- 1 track-specific practicum and shadowing course
- 1 minor track courses
- 1 frontier course
- 2 elective courses
- A doctoral thesis
- 4 1 c.h. seminar courses

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 ~ 11 courses + 1 practicum + 4 seminars (~40 credit hours)  
 ~ 2 yrs coursework + 2-3 yrs research

## DI track

### Core courses

MP 200. Radiation physics (3 c.h.)  
MP 205. Anatomy and physiology for medical physicists (3 c.h.)  
MP 210. Radiation protection (3 c.h.)  
MP 220. Radiation therapy physics (3 c.h.)  
MP 230. Diagnostic medical physics (3 c.h.) or BME 233  
MP 341. Nuclear medicine physics (3 c.h.)

### Seminar courses

MP 251. Medical physics seminar (1 c.h.) for a minimum of 4 semesters

### Core DI courses

MP 238. Clinical practicum and shadowing (Diagnostic Imaging) (3 c.h.)  
MP 331. Advanced medical imaging physics (3 c.h.)

### Minor courses

Any course from those listed under another track in consultation with the advisor.

### Electives

Any 1 (for MS), or 2 (for PhD) courses offered at Duke selected in consultation with the advisor.

### Frontier course

Any course from the list of approved frontier courses selected in consultation with the advisor.

### Suggested course schedule

Fall yr1	CH	Spr yr1	CH	Fall yr2	CH	Spr yr2	CH
MP 200	3	MP 210	3	MP 331	3	MP 238	3
MP 205	3	MP 220	3	Elective	3	Frontier	3
MP 230	3	MP 341	3	MS: Thesis PhD: Minor	3	MS: Thesis PhD: Elective	3
MP 251	1	MP 251	1	MP 251	1	MP 251	1
	10		10		10		10

## RT track

### Core courses

MP 200. Radiation physics (3 c.h.)  
MP 205. Anatomy and physiology for medical physicists (3 c.h.)  
MP 210. Radiation protection (3 c.h.)  
MP 220. Radiation therapy physics (3 c.h.)  
MP 230. Diagnostic medical physics (3 c.h.) or BME 233  
MP 341. Nuclear medicine physics (3 c.h.)

### Seminar courses

MP 251. Medical physics seminar (1 c.h.) for a minimum of 4 semesters

### Core RT courses

MP 228. Clinical practicum and shadowing (Radiation Therapy) (3 c.h.)  
MP 322. Advanced photon beam radiation therapy (3 c.h.)

### Minor courses

Any course from those listed under another track in consultation with the advisor.

### Electives

Any 1 (for MS), or 2 (for PhD) courses offered at Duke selected in consultation with the advisor.

### Frontier course

Any course from the list of approved frontier courses selected in consultation with the advisor.

### Suggested course schedule

Fall yr1	CH	Spr yr1	CH	Fall yr2	CH	Spr yr2	CH
MP 200	3	MP 210	3	MP 322	3	MP 228	3
MP 205	3	MP 220	3	Elective	3	Frontier	3
MP 230	3	MP 341	3	MS: Thesis PhD: Minor	3	MS: Thesis PhD: Elective	3
MP 251	1	MP 251	1	MP 251	1	MP 251	1
	10		10		10		10

## NM track

### Core courses

MP 200. Radiation physics (3 c.h.)  
MP 205. Anatomy and physiology for medical physicists (3 c.h.)  
MP 210. Radiation protection (3 c.h.)  
MP 220. Radiation therapy physics (3 c.h.)  
MP 230. Diagnostic medical physics (3 c.h.) or BME 233  
MP 341. Nuclear medicine physics (3 c.h.)

### Seminar courses

MP 251. Medical physics seminar (1 c.h.) for a minimum of 4 semesters

### Core NM courses

MP 248. Clinical practicum and shadowing (Nuclear Medicine) (3 c.h.)  
MP 342. Radionuclide and radiotracer production (3 c.h.)

### Minor courses

Any course from those listed under another track in consultation with the advisor.

### Electives

Any 1 (for MS), or 2 (for PhD) courses offered at Duke selected in consultation with the advisor.

### Frontier course

Any course from the list of approved frontier courses selected in consultation with the advisor.

### Suggested course schedule

Fall yr1	CH	Spr yr1	CH	Fall yr2	CH	Spr yr2	CH
MP 200	3	MP 210	3	MP 342	3	MP 248	3
MP 205	3	MP 220	3	Elective	3	Frontier	3
MP 230	3	MP 341	3	MS: Thesis PhD: Minor	3	MS: Thesis PhD: Elective	3
MP 251	1	MP 251	1	MP 251	1	MP 251	1
	10		10		10		10

## MHP track

### Core courses

MP 200. Radiation physics (3 c.h.)  
MP 205. Anatomy and physiology for medical physicists (3 c.h.)  
MP 210. Radiation protection (3 c.h.)  
MP 220. Radiation therapy physics (3 c.h.)  
MP 230. Diagnostic medical physics (3 c.h.) or BME 233  
MP 341. Nuclear medicine physics (3 c.h.)

### Seminar courses

MP 251. Medical physics seminar (1 c.h.) for a minimum of 4 semesters OR  
MP 252. Health physics seminar (1 c.h.) for a minimum of 4 semesters

### Core MHP courses

MP 218. Clinical practicum and shadowing (Medical Health Physics) (3 c.h.)  
MP 314. Internal and external dosimetry (3 c.h.)

### Minor courses

Any course from those listed under another track in consultation with the advisor.

### Electives

Any 1 (for MS), or 2 (for PhD) courses offered at Duke selected in consultation with the advisor.

### Frontier course

Any course from the list of approved frontier courses selected in consultation with the advisor.

### Suggested course schedule

Fall yr1	CH	Spr yr1	CH	Fall yr2	CH	Spr yr2	CH
MP 200	3	MP 210	3	MP 314	3	MP 218	3
MP 205	3	MP 220	3	Elective	3	Frontier	3
MP 230	3	MP 341	3	MS: Thesis PhD: Minor	3	MS: Thesis PhD: Elective	3
MP 251/252	1	MP 251/252	1	MP 251/252	1	MP 251/252	1
	10		10		10		10