



Academic Requirements

Ron Gilman

- State of NJ
- Rutgers School of Graduate Studies
- Physics and Astronomy graduate program
- State / SGS requirements are generally pretty inflexible
- Program requirements are set by us, so we have some flexibility, if approved by Graduate Studies
 - E.g., allow an extension of time to complete Ph.D. qualifiers

- Continuous registration
- 30 course credits
- Essay
 - We have no written guidelines about what constitutes an essay.
- Comprehensive exam
 - Approval by 3 faculty
- Ph.D. students can get an M.S. with essay after passing the qualifier and earning 30 course credits.

- Continuous registration
- 24 course credits + 6 research credits (16:750:701 and 702)
- Thesis
 - We have no written guidelines about what constitutes a thesis.
- Comprehensive exam
 - Approval by 3 faculty
- What is the difference between a thesis and an essay?

- Comprehensive exam:
 - Oral presentation of work described in essay / thesis to a 4 person committee, followed by answering questions.
 - All 4 faculty sign your M.S. degree application.
- There is no ``timeline'' for an M.S. degree.
- There is no detailed course requirement, as we have for Ph.D. degree.

- New program, just approved by SAS and SGS, intending to start fall 2024
- Continuous registration
- 30 course credits + 6 research credits (16:750:701 and 702)
 - Relatively strict list of courses to be taken
- Internship component
- Thesis
- Comprehensive exam
 - Approval by 3 (4) faculty; expect to be same as before

Semester I:

- i) Quantum Mechanics I (501)
- ii) Solid State Physics I (601)
- iii) **Quantum Optics** / Computational Physics (509)

Semester II:

- i) Quantum Mechanics II (502)
- ii) **Quantum Computing I**
- iii) Solid State Physics II (602) / Machine Learning (568)

Semester III:

- i) **Quantum Computing II**
- ii) Many Body Physics I (620) / **Quantum Algorithms (CS 583)**

Semester IV:

- i) Solid State Physics III (603)
- ii) Advanced Topics (624)

New courses

- Continuous registration
- 72 credits including 24 research credits (16:750:701 and 702)
- Ph.D. qualifier / ``advancement to candidacy''
- Thesis / dissertation
- Final exam
 - Oral presentation of work described in thesis to a 4 person committee, one external member, followed by answering questions
- IDPs - individual development plans now ``required'' by SGS, especially for students after 7th year

- Brief note to Qualifier Committee Chair by Sep 1:
 - Name
 - Adviser
 - Couple sentence description
 - Allows committee to be assigned
- Generally taken by Dec 1
- After you pass, do the paperwork!
 - <https://grad.rutgers.edu/academics/forms?&location=23>
 - We do NOT have a language requirement.

- Core course requirement
 - Must pass course or challenge exam within 4 terms
- Ph.D. qualifier requirement
 - Must pass within 4 terms
- Advanced course requirement
 - Must take 2 advanced in-area and 2 advanced out-of-area courses
- Final exam
 - Oral presentation of work described in thesis to a 5 person committee, one external member, followed by answering questions

- Core course requirement
 - Physics: 501, 502, 503, 504, 507, 611
 - Astronomy 501, 503, 507, 514, 607 or 608
- Advanced course requirement
 - Astronomy: 606 Stars & Planets, 607 Galaxies, 608 Cosmology, 610 Interstellar Matter
 - Biophysics: 567 Living Matter
 - Condensed Matter: 601, 602, 603 Solid State, 620, 621 Many Body
 - General Relativity: 617
 - Subatomic Physics: 605 Nuclei, 613 Particles, 615 Overview QFT, 616 Field I, 618 Group Theory, 619 Fields II
 - Also advanced / special topics classes

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 - "Issues":
 - There are also lots of technology course that do not satisfy the in/out-of-area requirement.
 - Sometimes I allow them when for the first few years we run them.
 - There is overlap in the areas: e.g. QFT is also really in-area for some in CMT.
 - Occasionally I discuss with Grad Studies whether we should update this system... no changes so far.
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Making sure you fulfill requirements

Register each term

- Register your appointment (counts towards full / half time status, but not toward Ph.D.)
 - Fellows register for course 811, 0 credits.
 - GAs register for course 866, 6 GA credits.
 - TAs, register for course 877, 6 TA credits.
- Register for courses
- Register for research - <https://classes.rutgers.edu//soc/#courses?subject=750&semester=12024&campus=NB&level=G>
- <https://physics.rutgers.edu/academics/graduate-program/registering-for-classes-and-appointment>
- Check your health insurance is correct or waived as needed
- Wait for your tuition / fees to be paid
- Take lots of credits as TAs in 1st and 2nd year, so you need fewer later on as a GA. Nearly every year there is a student who wishes they had taken more credits earlier.

After Ph.D. qualifier

- GPD appoints a 4-person committee, usually:
 - Ph.D. adviser
 - Second faculty from your area
 - Faculty on the opposite side of experiment vs. theory
 - Faculty from other area on same side of experiment vs. theory
- Some students switch advisers - this was done by 2 4th-year students in last few months.
- Have an annual meeting with your committee - giving talks is fun!
- I try to check up on your registrations and progress in late August, January, and May, but might be too busy, and usually only email once you are ~ 4th year and are not heading towards completing requirements