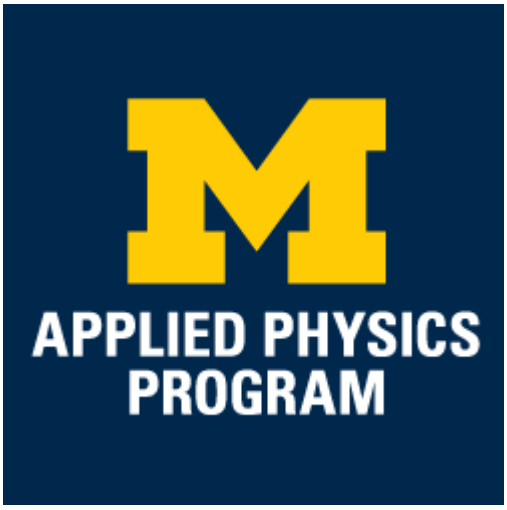


# APPLIED PHYSICS

# GRADUATE STUDENT HANDBOOK

Revised:9/11/2024

Cynthia McNabb, Applied Physics Program Manager

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# Welcome to the Applied Physics Family!

## 1. Getting Started

**The Applied Physics Staff:**
Director: Dr. Cagliyan Kurdak
Program Manager: Cynthia McNabb
Program Assistant: Sonali Shanbhag

**Your ID card, the MCard**: You can pick up your MCard at any of the designated MCard Locations. You can view ID issuing stations here: Mcard | University of Michigan Finance (umich.edu)

Your ID is essential to life at Michigan! When you first arrive on campus, your MCard is free. However, if you lose it and need it replaced, the cost is $20.

**MCard Discounts & Benefits:**

- Safety – Photo Identification (all University of Michigan students and employees are required to have a valid MCard)
- University of Michigan Library borrowing privileges
- Meal Plans & Blue Bucks
- Financial Services through UM partner PNC Bank
- Discounts at local merchants (view all discounts here: Mcard Discounts | University of Michigan Finance (umich.edu)
- Free AAATA (Ann Arbor city bus system) rides (http://www.theride.org/)
- Rental Car discounts from National & Enterprise to UM students

**Your Picture for Applied Physics**: Your picture will be taken at the Applied Physics New Student Orientation or you can send us one that you like and it will be added to our website.

**Office Assignment and Keys**: Shared office space will be provided to you by the Applied Physics Program in your first and second years of study. In your third year and beyond, you will be assigned office space by your faculty advisor.

You will receive your office assignment during the summer prior to entering your first year in the program. You will receive instructions to pick up your keys from the administration. A cash deposit ($5-$20 depending on the room/key) is required. We recommend that you give your receipt to us to put in your file so that you will have it when you want to turn in your key.

Key Requests (assigned by administration) can be picked up in 1425 Randall.

Keys are picked up (with key request and cash deposit) in the Key Office, 525 Church Street.

2. **Milestones**
   Below is a general outline of what your time in Applied Physics might look like. Every student's path varies and this should be used only as a general guide.

   - Years 1-2: Complete coursework in core requirements.
   - End of Year 1: Qualifying Examinations administered in August following your first year.
   - Year 3: Students will take their Preliminary Examination to become a candidate. Prelim committees (defense committees) are selected by the student with the advice of the advisor. Prelim exam location and date are selected by the student in coordination with their faculty advisor.
   - Year 3 and beyond: Research and any additional courses as recommended by your faculty advisor and/or Program Director
   - Thesis Defense: The defense date is chosen by the student, in conjunction with their faculty advisor, when ready to present the thesis. The student is responsible for selecting their committee members, scheduling a defense date and room, and meeting all Rackham requirements
     More information: Completing the Doctoral Degree Requirements » Rackham Graduate School: University of Michigan (umich.edu).

3. **Finance & Benefits**

**Payment Schedules:** To learn more about payment schedules and disbursements, please see Finacial Aid Module

**Direct Deposit:** Fill out the Direct Deposit form for fellowships, stipends and other student payments. Direct Deposit Authorization Form

**Health Care Coverage**: The program pays for your health care through the University's GradCare program. You can view all GradCare options here: GradCare Health Plans
Please see Program Administration to make sure you are registered in the plan that best suits your needs.

**GradCare** is a medical insurance program for GSI's, GSSA's, GSRA's and benefit-eligible fellowship holders and medical school students. It is a modified point of service medical plan administered by Blue Cross Blue Shield of Michigan via Blue Care Network Service Company.

GradCare also provides Vision and Dental care.

**University Health Services (UHS)** can provide your care. Call 734-764-8320 to schedule an appointment or talk about a health concern. UHS is located on Central Campus at 207 Fletcher. You can read about UHS here: https://www.uhs.umich.edu/

Learn how GradCare works with UHS: https://www.uhs.umich.edu/gradcare

If you are sick and need immediate or emergency care, the University of Michigan Hospital and Emergency Room are located at 1500 E. Medical Center Dr. http://www.uofmhealth.org/our-locations/emergency-room

For any life threatening emergencies, dial 911.

Urgent Care Clinics are also available throughout Ann Arbor.

**International Student Health Insurance Plan**
If you are an F-1 or J-1 international student or a J-1 visiting scholar whose Form I-20 or DS2019 was issued by the University of Michigan (Ann Arbor), you are required to have health insurance coverage for yourself and any F-2 or J-2 dependents while at the University of Michigan. You will receive grad care. If you are not receiving grad care for any reason, you will receive the International Student Health Care via Aetna, coordinated by the UM International Center.

**CAPS** University of Michigan Counseling And Psychological Services. "CAPS is committed to creating an environment based on our values of multicultural, multi-disciplinary and multi-theoretical practices that allow our diverse student body to access care, receive high quality services and take positive pathways to mental health. We also strive to find creative ways of reaching out to students and the UM community to nurture and develop a proactive, renewed sense of engagement throughout the campus."

Please don't hesitate to come to the Applied Physics office if you need assistance in scheduling an appointment with CAPS or finding the CAPS offices.

**GSRA and GSI Positions:**
The Applied Physics Program does not have GSI (Graduate Student Instructor) appointments because all of our courses are cross listed with other departments such as Physics and EECS. It is possible to teach in other departments, if positions are open and qualifications are met. The employment relationship of a GSI is governed by and subject to the provisions of a collective bargaining agreement negotiated by the Graduate Employees Organization (GEO) and the University. Membership of the Union, or payment of a service fee, is a condition of employment. Union dues and service fees are 1.15% of total employee salary.

All Applied Physics students are required to take the **GSI training** once in your graduate career, preferably in your first year. It is taught through LSA Physics in late August and early January.

**GSRA (Graduate Student Research Assistant) Appointments** are made through your research advisor's department. The GSRA is not included in the GEO collective bargaining agreement. You must register for six to nine credit hours per term as a GSRA.

Both positions, the **GSI and the GSRA** are considered University employees and thus are paid near the end of each month and subject to the background check.Graduate Students Financial Aid

You can read more about GSRA and GSI Appointments here:Academic Human Resource: Graduate Student

**Background Checks**: All students receiving payments are subject to background checks as mandated by the University. You will receive instructions from the program for fulfilling this requirement.
Background Check information

**Taxes:** Taxes are not taken out of fellowship payments but must be paid quarterly. Taxes are taken out of the Graduate Student Research Assistantship (GSRA) payments. For information on current tax legislation, international treaty exemptions or the University deduction policy, contact Financial Services or the International Center.

For additional tax forms and information:

**Forms and links to the IRS website.**

- Estimated Taxes
- IRS Publication 970 - Tax Benefits for Education
- Withholding Calculator
- Form 1040ES - Estimated Tax for Individuals
- Form 1040ES-NR - Estimated Tax for Non Resident Alien Individuals
- Form 1040EZ - Income Tax Return for Single and Joint Filers with no dependents. 1040EZ **Instructions**
- ALL IRS Forms in an easily searchable format!
- MI-1040-ES Form - Michigan Estimated Income Tax for Individuals
- Michigan State Tax Website

## 4. On-Campus Resources

**Division of Public Safety & Security (DPSS)** http://www.dpss.umich.edu/
**The University of Michigan Police Department (UMPD)** http://www.dpss.umich.edu/police/ is housed through DPSS. For any on-campus safety or security concerns, please contact UMPD. The UMPD is a full service law enforcement agency. Police officers are licensed by the Michigan Commission on Law Enforcement Standards (MCOLES), and have the authority to investigate, search, arrest and use reasonable force as necessary to protect persons and property and to enforce the laws of the State of Michigan and the Ordinance of the Regents of the University of Michigan. UMPD has a fully cooperative relationship with the Ann Arbor Police Department (AAPD) and other local, state and federal law enforcement agencies in matters of mutual concern.

For all emergencies, dial 911.

**Parking & Transportation at UM:** https://ltp.umich.edu/
For information on campus bus routes and schedules, on-campus parking and permits, UM Fleet Service vehicles and alternative campus transportation.

**After Hours Transportation** is available https://ltp.umich.edu/transit/after-hours.php
**Student Parking** Options: https://ltp.umich.edu/parking/students.php
**City of Ann Arbor Transportation** (AAATA): http://www.theride.org/

**Computer Access:** The University of Michigan will issue you your Unique Name for email. Please provide the AP administration with your unique name as soon as possible so that you can be added to appropriate AP contact lists.

Please keep your personal information (address, phone, etc) up to date in **Wolverine Access**. It does not automatically change through the university systems as you change residences. Wolverine Access is your gateway to U-M's administrative information systems (including things like direct deposit, emergency contact information, payroll and more). It is intended for members of the U-M community...students and their parents/family, prospective students, faculty, staff, alumni, retirees, and some sponsored affiliates.

**Campus Computing**: You can access computers all over campus. The closest computer lab to the AP office is the PAUL Lab located at 2416 Randall. You can view all campus computing labs here.

To access **University software** such as MatLab, Mathematica and more (without purchasing or adding it to your personal computer), use Virtual Sites. Virtual Sites is a service that allows you to log in remotely to a Campus Computing Sites Windows computer and use the licensed software on it from your own computer or mobile device. You will have access to specialized software on an as-needed basis.

Student Software Licenses are available for items such as Matlab, Windows10, Office365 and more. http://www.itcs.umich.edu/sw-info/

**CAEN Labs** are also available to Applied Physics on campus: https://caen.engin.umich.edu/computers/list/

If you need a temporary **loaner laptop**, you can borrow one from CATS (2428 Randall).

**To purchase a laptop**: UM Computer Showcase, the Apple Store in Briarwood Mall and Best Buy all offer discounts to UM students.

The Applied Physics office offers **print, copy, scan & fax** available to all AP students without fee or print release.

**Rackham Travel Grant**
If you plan to attend a scientific conference as it relates to your research, there is a Rackham Travel Grant available to assist you with your travel finances. Additional details including eligibility, deadlines, award description and application procedure can be found here:
http://www.rackham.umich.edu/funding/conference-travel-grant

**Rackham Professional Development Grant:** Intended to support Rackham doctoral students seeking careers both within and outside academia. http://www.rackham.umich.edu/funding/professional-development-grant

**Rackham Research Grant:** For research purposes (not conference travel) such as project expenses or workshops http://www.rackham.umich.edu/funding/research-grant

**Student Legal Services (SLS)** https://studentlegalservices.umich.edu/
Legal Services are available to students to advise you on legal rights and represent you, when necessary, in Washtenaw County Courts only.

**University Libraries**: https://www.lib.umich.edu/
The University of Michigan Library System is home to 13.8 million volumes (including academic papers). Your MCard provides you with borrowing privileges, access to Merlin, as well as a proxy site to access the UM libraries while you are off campus. To learn how to access articles while off campus, click here: https://www.lib.umich.edu/mlibrary-labs/proxy-server-bookmarklet

**Traveling Abroad through UM:** If you are traveling abroad for research related purposes, UM offers Travel Abroad Health Insurance through the International Center. You can find details here: https://www.uhs.umich.edu/tai

**Students of Color of Rackham (SCOR):** http://www.scor-umich.com/

**Spectrum Center:** https://spectrumcenter.umich.edu/
"The Spectrum Center at University of Michigan is a collaborative space in which all members of the University and local community are welcome. Through collaboration and partnership efforts, the Center prepares students to thrive in a diverse society and globally. The Center humbly works toward enhancing the campus climate and support services for LGBTQ+ students, staff, and faculty at the University through education, advocacy, and community building. "

**Rackham Student Life Resources:** http://www.rackham.umich.edu/students/campus-guide
Guide to Campus & Community.

**Student Business Cards:** University of Michigan graduate students can obtain student business cards to take to conferences and presentations. Please see Program Administration to place an order.

## 5. Fellowships

Fellowships are paid monthly. Please see the administrator for the schedule. Many students receive the standard Applied Physics Fellowship during the first two years in the program.

Other awards and fellowships for funding are available to Applied Physics students throughout their time at Michigan. You can find a complete list of both internal Rackham and external fellowships and awards here, with details on the application process and requirements:
http://www.rackham.umich.edu/funding/doctoral
Please note that the Rackham One-Term Dissertation Fellowship is NOT available to AP students

## 6. Resources for International Students

**English Language Institute (ELI)** https://lsa.umich.edu/eli
ELI at Michigan provides a full range of credit-bearing English for Academic Purposes courses for international graduate students. Additional ELI support services include writing and speaking clinics to provide international graduate students and GSI's with one-on-one language and academic support, Conversation Circles, counseling and advising.

**International Center** https://internationalcenter.umich.edu/
The International Center at UM is a Division of Student Life and plays a significant campus-wide role as the central administrative unit charged with providing advice and counsel on U.S. immigration regulations and compliance. IC can help guide international students through visa, immigration and other administrative measures. "The mission of the International Center is to provide services and programs for the diverse community at the University of Michigan by accomplishing its core work to SERVE the international population, FACILITATE intercultural and international education, and FOSTER a global campus community.

## 7. Ann Arbor & State of Michigan Resources

Secretary of State http://www.michigan.gov/sos/

Driver Education & Instructor listing from the State of Michigan
http://www.michigan.gov/sos/0,4670,7-127-1627_40645_48630---,00.html

Zip Cars are available in Ann Arbor and offer a discount to University of Michigan students.
http://www.zipcar.com/annarbor

## 8. Academics, Requirements & Exams

**Pre Candidate vs. Candidate:**

Per Rackham: "A student may advance to candidacy after fulfilling all departmental coursework requirements and passing prelims. " You can read more on Rackham's candidacy guidelines here: http://www.rackham.umich.edu/students/navigate-degree/candidacy-requirements

**AP 715, Supervised Research:**
This course is for up to 4 (four) credit hours and is graded. It is recommended to take 715 during Winter Term of your first year or Fall Term of your second year, depending on your research group and course work. It can be taken in other terms as well but you will need to talk to the Applied Physics Director to determine when and if you should take AP 715.

**AP 990 (Pre-Candidate):**
Prior to completing your prelim, you will register for 990, which is Pre-Candidate Research (if you have already taken the 4 credits of AP715). You must be registered for 9 (nine) credit hours per term as a pre- candidate. While you can register all nine credit hours in 990 as a pre-candidate, it is most likely that you will split your nine credit hours among courses and research.

**AP 995 (Candidate):**
After completing your prelim, Rackham will register you for 995, Candidate Research. There after, you will register for 995, which will automatically populate to 8 credit hours. As a candidate you are expected to take 8 credit hours per term. You are allowed 1 course per term as a candidate as well.

**Credit Hour Requirements**: It takes 68 credit hours to complete a PhD. Pre-candidate is 9 credit hours per term, candidate is 8 credit hours per term.

**Continuous Enrollment**: (Per Rackham Graduate School) The Dean and the Executive Board of the Rackham Graduate School have approved the adoption of a continuous enrollment requirement for Ph.D. students at the University of Michigan. Once admitted to a Ph.D. program, students will register every fall and winter term until their degree is awarded. The exception to this rule is through an official leave of absence through Rackham and Applied Physics. Students will register in spring or summer terms only when they elect courses, take preliminary examinations or defend their dissertations.

**Applied Physics Initial Requirement Summary**: The AP Program requires satisfactory progress toward the degree. As a minimum, this includes but is not limited to maintaining at least a B average in grades in AP 500-600 level courses, passing the qualifying examination and making steady progress with your research.

We encourage you to become associated with a research group during this first year, either through the supervised research course or by some other mutual arrangement. Early involvement with research is an integral part of the Applied Physics program and you will find many opportunities provided by the multidisciplinary spread of our research activities.

Please note that all Ph.D. pre-candidates are required to take a qualifying examination before their second year of study. The oral examination consists of a brief presentation of your supervised research followed by questions on standard core physics subjects.

**Core Course Equivalency**: Often students entering the Applied Physics Program will have already taken one or more courses which are considered core requirements. If you believe this might apply to your situation, please see the Program Director. For requests for courses to be considered for equivalency to satisfy Applied Physics Ph.D. core requirements, please provide the Program Director with the following information for review:

1. Course description and outline.
2. Textbook title and handouts
3. Course notes taken by the student
4. Homework assignments and the students graded solutions
5. Official transcript of the class.

**Tutoring**

- **If you need a tutor:** Please talk with the Program Director or the Applied Physics staff to arrange for tutoring with a current senior AP student.
- **If you want to become a tutor:** To become a tutor to AP students, please see the Program Director and Applied Physics Staff.
  To become a tutor to undergraduates in the Athletic Department, contact the Academic Success Program at 734-647-3709
  To become a tutor in the Physics Help Room, please see the Program Director or Physics Student Services Office.

**Dropping A Class**: The Program Director must be consulted to drop a class. All drop-add deadlines (along with the academic calendar) are posted on website of The Office of The Registrar.

**Mentoring**: The Applied Physics program takes great care to assign student mentors to incoming students. As a student mentor, you are expected to serve as a resource about graduate student life, campus life and living in Ann Arbor. Ideally, a mentor and mentee would meet on a frequent basis (and/or chat via phone, text or email). In addition, mentors are required to attend the mentor/mentee dinner at the start

of Fall Term, as well as any Mentor Meetings within the Program to discuss expectations and guidelines. Mentors are assigned during the spring or summer months.

# Applied Physics Curriculum

## FIRST YEAR STUDENTS

| FALL | WINTER |
|---|---|
| Electricity & Magnetism I (Phys 505) | Electricity & Magnetism II (Phys |
| 506) Applied Quantum Mech I (AP 540) | Applied Quantum Mech II (AP 541) |
| *Or* Quantum Mechanics I (Phys 511) | *or* Quantum Mechanics II (Phys 512) |
| Statistical Physics | Supervised Research (AP 715) or Elective |
| Seminar Attendance (AP 514) | Seminar Attendance (AP 514) |

**Responsible Conduct of Research & Scholarship is required for all PhD students prior to becoming a candidate. LSA UC415 or RCRS Engineering Workshops fulfill this requirement.**

## SECOND YEAR STUDENTS

| FALL | WINTER |
|---|---|
| Computational/Math Methods Elective (Recommended) | Elective Course |
| Elective Course | Elective Course |
| Seminar Attendance (AP 514) | Seminar Attendance (AP 514) |
| Supervised Research | Supervised Research |

**Second-year students are encouraged to take specialized courses related to their research with advice from their faculty advisor and the Program Director.**

## THIRD YEAR STUDENTS

**Seminar Attendance (AP 514) *Two Credits (2 terms)* Seminar attendance is expected for six (6) terms. We understand in your third year, you may have other commitments but we encourage attendance when possible.**

**Students are expected to reach during their third year.**

**Master's of Science Degree and Imes-Moore Fellows**

The master's degree (M.S.) may be earned as an embedded degree (while in pursuit of the Ph.D.) or as a terminal degree. Traditionally, the embedded M.S. has been awarded in Applied Physics or Electrical Engineering and Computer Science but is not limited to those two disciplines. The Imes-Moore terminal M.S. is earned by completing the core course requirements and a research project. Under certain circumstances, the terminal M.S. has been awarded when students elect to terminate their studies early and if the M.S. requirements are met. The minimum number of credits necessary for the master's degree: 30 credit hours.

Specific course requirements call for at least 20 hours of graduate-level courses from the Applied Physics core curriculum at the 500 level or higher. Some 400-level courses may be taken with the Program Directors approval. Please remember that at least a B average is necessary to satisfy the Rackham grade requirement.

Specific course requirements for the Masters Degree and MSH credits are (but not limited to)

| | |
|---|---|
| 20 Hours | 500 Level and Above |
| 10 Hours | 400 Level |
| 3 Hours | Quantum Mechanics |
| 3 Hours | Classical Mechanics |
| 3 Hours | Electromagnetism |
| 4 Hours | Supervised Research |
| 3 Hours | Statistical Mechanics |
| 3 Hours | Condensed Matter, 500-600 Level |
| 3 Hours | Computational Math Methods Elective |
| 6 Terms | Applied Physics Seminar |

Total = 30 credits

Please see Program Administration to apply for the embedded M.S. and the Program Director to discuss the best course to take for a terminal M.S.

A Masters of Science Degree Application is required by Rackham upon completion of requirements.

The Masters degree in EECS is also an option. See the AP administration to discuss the process.

**Qualifying Examinations:**

Applied Physics students are required to take the qualifying examination during their second year in the program, usually in the late summer before the third academic term begins. The Qualifying Exam is intended to evaluate your knowledge of core physics subjects. It is given to determine if other fundamental courses are needed before you proceed further in your studies and research. You will be expected to articulate various topics and concepts, to analyze problems and to synthesize solutions.

The decision to qualify a student for Ph.D. study is based on the results of the Qual Exam, academic record and performance in the AP715 supervised research project.

Oral Qualifying Exam: The qualifying exam is an oral examination. You begin with a brief oral presentation of your supervised research, followed by questions from the faculty. The major purpose of the qual exam is to identify any gaps in your foundation and academic preparation that might affect future progress in research.

The oral qualifying exam is administered by three professors and will be tailored to your general background. Most questions should assume a general knowledge of physics and need not be confined to specific courses elected. Information on core courses and the students' background is presented to the examiners. The duration of the exam varies from one to two hours.

The committee will make every effort to put you at ease; the first 15 minutes (maximum) of the exam will take the form of a brief presentation by the students of the physics of their supervised research. After the oral qual exam, each examiner will submit an individual evaluation of your performance.

Final Qualifying Decisions:

Final decisions are made by the Applied Physics Executive Committee and are based on the results from the oral exam, GPA and the grade in the supervised research project.

In some cases, students are asked to retake the oral examination. Other recommendations might be to seek a teaching assistantship; to apply as a tutor in the Physics department or a tutor in the Physics Help Room; in some cases students may be required to take additional courses.

The qualifying examination may be taken twice. The oral examination will be rescheduled usually with the same examiners the following year.

The next step for students who pass the qual exam is to finish the course requirements and to proceed to the preliminary examination for the Ph.D. dissertation research.

It is possible to earn a terminal master's degree in Applied Physics when students can choose not to complete the requirements for the Ph.D. program.

**Preliminary Examination, Dissertation & Defense**

Rules for the Preliminary Examination, Dissertation Prospectus and Composition of the Dissertation Committee

Preliminary Examination: The purpose of the Preliminary Examination is primarily to assess students' preparation and plans for Dissertation research. Passing this examination takes a student from pre-candidacy to candidacy. It is an oral examination and should consist of the following elements.

1. A brief review by the Committee of the courses taken by the student. A copy of the student's transcript (or other summary of courses and grades) should be available to each member of the committee prior to the oral exam. The discussion will most likely occur at the beginning of the examination without the student being present.
2. A presentation by the student of the plans for the dissertation research. The presentation should follow approximately the format of the Dissertation Prospectus (see below)
3. Questions asked during the Preliminary examination will be at the discretion of the committee.

The preliminary examination is expected to last 1-2 hours. There are four categories in which the committee will classify the outcome of the Preliminary Examination:

1. Passed
2. Passed with Reservations
3. Failed

If the third category is chosen, the Chair of the Committee should provide a written statement to the Program Director setting down the Committee's reservations, and recommendations (or requirements) of which the student should satisfy, with a timeline decided by the Committee. For example, the student may appear to be weak in a particular subject, which is of direct importance to the proposed research. In such a case, the Committee shall recommend (or require) that the student take additional course work, or do background reading or directed study in the area(s).

In the event the student fails the Preliminary Examination, the Chair of the Committee shall provide the Program Director with a written summary of the Committee's decision giving pertinent details. The preliminary Examination may be retaken one time only.

**Dissertation Prospectus** The student will present a copy of his/her Dissertation Prospectus to each member of the Dissertation Committee at least ten (10) days prior to the Preliminary Examination. The Prospectus should include the history of the proposed research and describe the objectives, the methods, and give examples of any preliminary results or feasible studies that are relevant to the project.

The length of your prospectus will vary by department and the requirements set by your faculty advisor. The suggested length is 10 pages.

**Composition of the Dissertation Committee:** Dissertation Committees are subject to approval by the Applied Physics program and by Rackham. The Rackham Student Handbook should be consulted for rules pertaining to general definitions and general requirements of the Rackham Graduate School that apply to Dissertation Committees in all Graduate Programs.

**Process for forms:**

There are two sets of forms: the Applied Physics Preliminary Form and the Rackham forms for candidacy. **All forms are filled out by the Applied Physics office**. Please send an email to Cynthia with your committee members' names, their roles in your committee (chair, co-chair, member), their appointment (physics professor, EECS professor, etc.) and their emails. You and your advisor will receive

an email with the prelim form to be filled out and returned to the Applied Physics office once the exam has been taken. Then, Cynthia will fill out the Rackham Recommendation for Candidacy, and Dissertation Committee forms. She will submit them to Rackham where they will change you to a candidate, and will change 990 to 995. Thereafter, you will register for 995.

**Rackham Requirements:** Rackham requires a minimum of four members to serve on a Dissertation Committee, two of which must be Applied Physics faculty. They do not require a cognate member because the program is interdisciplinary. Example Committee: Chair + three qualified members with Ph.D.'s and are of professorial rank.
Note that Rackham rules allow certain research staff to co-chair a committee but not be a sole Chair. In addition, Rackham rules require that there must be at least two faculty members from the student's home department (i.e. program). Committee members outside the university are permitted to serve upon approval. Please see Rackham's Guidelines for Dissertation Committee Service. A CV and paragraph about their expertise must be submitted to the Program Administrator prior to adding an external member to your committee.

**Applied Physics Requirements:** The Program requires **five** committee members to serve on the prelim/dissertation thesis committee, of which, two must be Applied Physics faculty. Please see the Applied Physics faculty List, however, you are not limited to the faculty on this list. Please speak to your advisor, and if necessary, the Program Director, for committee recommendations and program approval. Five are required because, when it comes time to defend, if one committee member cannot serve, you will still have 4 members that have continuity with you and your research and you can move forward with your defense without having to find a new member.

**Dissertation:** Once you have fulfilled the Program's requirements, you must complete Rackham's requirements. You can read about completing the Rackham Doctoral Requirements here: http://www.rackham.umich.edu/students/navigate-degree/completing-doctoral-degree-requirements

**Defense:** You will contact the Applied Physics representative for Rackham's Records and Dissertations to make sure that you have met the Rackham requirements. Ms. Emma Parow at eparow@umich.edu is our representative and she will guide you so that there are no surprises at the last minute. You will book the room for your defense, and schedule this meeting with your committee. You will also invite those that you want to attend. If you want an announcement to go out to the Applied Physics community, please send an announcement email to the staff.

**From Your Peers:**
We asked current Applied Physics students what advice they would give to incoming students. In their own words:

"Community is key, whether you find that in your first-year cohort, a student group, a place of worship, or anywhere else. Make sure to surround yourself with people who can pick you up when you're down. Grad school is difficult, but you don't get any bonus points for going at it alone." ~Joe Iafrate '14

"The first year is going to be the hardest. You'll have a full set of courses (including everyone's favorite: Jackson's E&M), plus you'll be trying to find a research group and trying to make some research progress, all while figuring out up from down in Ann Arbor. This can be very stressful, and there will be a temptation to lock yourself in your lab just to get all your work done. This might work in the short term, but in the long term you'll be miserable – find some healthy ways to relieve your stress. For example, consider joining a student group centered on some hobby or interest you have; just check MaizePages because a student group almost definitely already exists! Last piece of advice: since a PhD is typically a

five or six year ordeal, you could potentially save quite a bit of money by buying a property rather than renting one. If this is something you're interested in – ask around for some tips on this process. And above all, don't forget to have some fun – five or six years goes quickly!" – Brian Worthmann '13

**Applied Physics Academic Probation, retake of the Qualifying and Preliminary exams, and the Dismissal Policy**

**Rackham requires a 3.00 cumulative GPA for satisfactory academic standing**. The Program also requires 3.0 cumulative GPA for satisfactory academic standing. In situations where one is below 3.0, the student would be put on **academic probation** by both, Rackham and Applied Physics. The Program requires the student to have a plan to improve the GPA. The student will meet with the Director and devise a mutually agreed upon plan. The plan will be reviewed and approved by the Applied Physics Academic Actions Committee.

In addition to the 3.0 cumulative GPA, satisfactory progress in research is mandatory. Satisfactory progress in research is reviewed through the Annual Review process. The advisers' evaluation determines the progress in research. The student will meet with the Director and the adviser to devise a mutually agreed upon plan. The plan will be reviewed and approved by the Applied Physics Academic Actions Committee.

The Qualifying exam can be taken a second time with recommendations for improvement.

The program allows the candidacy exam (preliminary exam) to be taken a second time if the adviser recommends it. Failure will not lead to immediate dismissal. The Program will help the student to find another adviser and research where the student can be successful.

The Director meets with the student regularly to assist with this selection. If a student is without an adviser and has no plans to look for a new adviser, then there is no path for research and the student is put on academic probation. If the student continues for an additional term without an adviser, Applied Physics would ask the student to leave the program.

The Academic Actions Committee reviews the academic progress of every student annually. If there is no progress towards the degree, the student will receive a letter stating that he/she/they is on academic probation. The length of the academic probation is one to two terms determined by the progress towards the degree. It is determined through assessments, meetings and measuring the progress to see if more time is needed.

Funding for a student placed on academic probation must be maintained and at the same level as prior to academic probation. It is supplied through fellowships, GSRAs and/or GSIs.

Applied Physics has an Academic Actions committee that meets twice a year to discuss actions required. The Director may also call ad hoc meetings to discuss academic progress. All dismissal decisions must be approved by the Academic Actions committee.

It is possible for the student to appeal academic probation or dismissal by petitioning the committee.

**University of Michigan**
**Applied Physics Program**

**Oral Qualifying Exam Evaluation**

Student Name _____ Exam Date _____

Examiner's Name_____

Examiner's Signature_____

Please circle the one you feel best describes the student's performance

Passed Would benefit from another exam

Comments
:

Question
1.

Question 2.

Question 3.

Question 4.

Overall:

**Report on the Applied Physics Preliminary Examination**

**To:** Cagliyan Kurdak, Director

**From:** The Dissertation Committee for _____

**Date:** _____

We have examined the student named above as to the preparation and background knowledge for dissertation research. We find that he has:

_____ Passed

_____ Passed with reservations

_____ Recommended to retake the exam

In signing our names below, we assert our willingness to remain on the dissertation committee for this student.

| | Signature | University ID number |
|---|---|---|
| Chair: | _____ | |
| Co-Chair: | _____ | |
| Committee: | _____ | |
| | _____ | |
| | _____ | |
| | _____ | |

Allowance is made for one member of the committee to be absent from the examination. However, the member's signature is needed.

Member Name: _____ Signature: _____

If there are reservations, we ask that the Chair provide a letter summarizing the nature of the reservations and the recommended course of action.

Please return the form to the administrative staff in the Applied Physics office after all have signed or email to Cynthia McNabb at cyndia@umich.edu. Thank you.