Unofficial Grad Student Handbook

Disclaimer: This is an unofficial working document created by students for students and should never be used in place of the official documents, rules, and regulations made and set forth by the University of Illinois at Urbana-Champaign or the NPRE Department. Always consult the appropriate GSAC, faculty, or staff members for up-to-date information on your specific questions. If you have any questions on this document please contact the NPRE GSAC at npre-gsac@illinois.edu

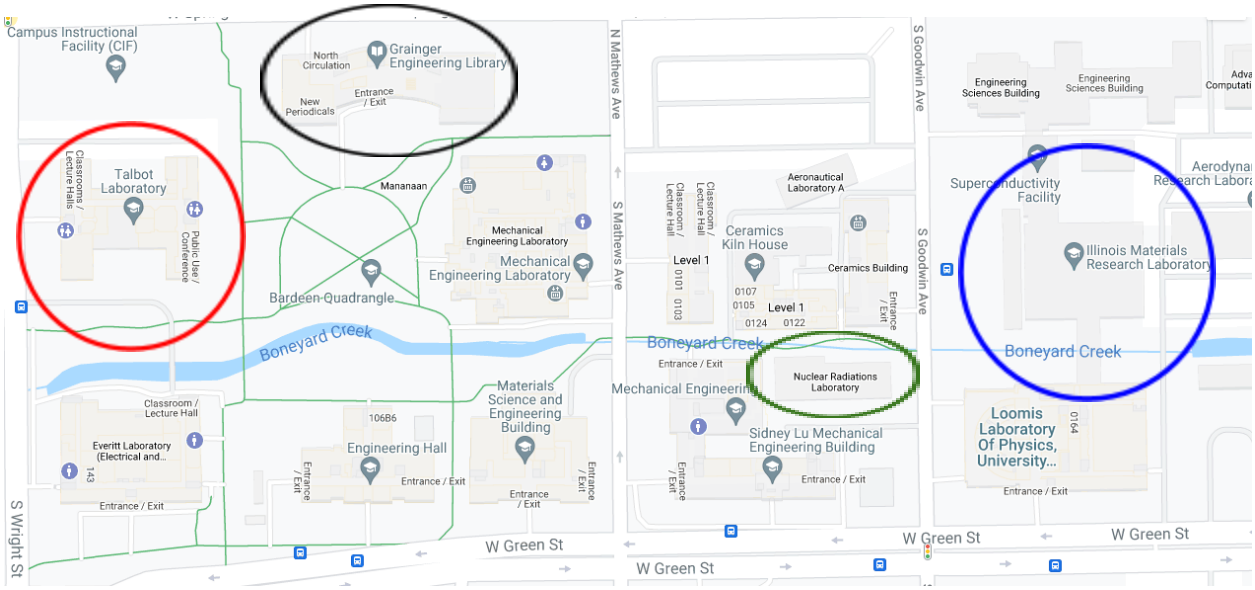
Table of Contents

Who's who of NPRE

- Director of Graduate Studies, DGS (also referred to as the Graduate Head)
    - Mohan Sankaran (rmohan@illinois.edu)
- Administrative
    - Barb & Sarah (https://npre.illinois.edu/people/profile/bjrussel, https://npre.illinois.edu/people/profile/hstites2)
        - If you have any administrative questions about the department or if you need Prof Uddin's attention on any task, Barb and Sarah are the people to go to. Examples of reasons you might need their assistance:
            - Any questions about NPRE 596, Grad Seminar; Submitting the form for replacing seminars you missed.
            - Printing flyers to advertise a departmental event.
            - Conference travel bookings if you don't want to go through the process of reimbursement … [see conference section]
            - *I need Prof. Uddin to sign this form*
            - Anything related to office space… *My office chair is wonky, and I need a new one*, * I lost my office key and need a new one*, *I locked myself out (during business hours)*
    - Kristie (https://npre.illinois.edu/people/profile/kstram20)
        - Kristie is in charge of anything administrative for the grad student program. She is the person to go to if you have any administrative questions about the qual, grad classes, internships, prelim, thesis defense and deposit, etc.
    - Becky (https://npre.illinois.edu/people/profile/bmeline)
        - Becky is in charge of anything administrative for the undergraduate student program. For a long time, Becky was in charge of both the undergrad and grad program, and so she is also a good resource for questions.
        - Fun fact: Becky is also a yoga teacher and sometimes our ANS and WiN chapters have yoga sessions with her!

- Research
    - Information about the professors and research done in the NPRE department can be found at https://npre.illinois.edu/research/areas and the webpage of individual faculty members.
- Graduate Student Advisory Committee (GSAC)
    - GSAC is a student run committee of the NPRE department that consists of both elected and nominated members. GSAC's mission encompasses many goals but in summary GSAC acts as the graduate students' point of contact to the faculty regarding any questions, comments, or concerns.
    - To find out more information about GSAC please go to the GSAC Illinoiswiki page found HERE

Where's where of NPRE



- Most of the important buildings for NPRE are located on Bardeen Quad, sometimes called the Engineering Quad, which is north of Green St., across from the Illini Union. A more detailed view can be found at: https://map.illinois.edu/view.
- Talbot Lab (redcircle)
    - Address: 104 S. Wright St., Urbana, IL 61801, on the west side of Bardeen Quad

    - This is the main building for NPRE. Many professors have their offices in this building, as well as Barb, Becky, Kristie, and Sarah. This is also where many graduate students have offices
    - Seminar is usually hosted in Talbot, and you may have some other classes here as well
- CPMI (Center for Plasma and Material Interactions) (greencircle)
    - Address: 201 S. Goodwin Ave., Urbana, IL 61801
    - Also known as Nuclear Radiation Laboratory (NRL)
    - This building is largely lab and student office spaces for those working on plasma related research
- MRL (Materials Research Lab) (bluecircle)
    - Address: 104 S. Goodwin Ave., Urbana, IL 61801
    - The MRL has a wide variety of facilities that can be used by anyone on campus. All you have to do is submit a short proposal, attend orientation, and complete a few safety trainings through the Division of Research Safety (DRS). The MRL has staff scientists/researchers that are experts on specific types of equipment and can teach you how to use that equipment as well as help you test/analyze/investigate your samples. They can help you perform/learn special techniques your samples may require and with any data processing that needs to be done after the data is collected. The current equipment at MRL as well as the equipment costs are available on the MRL website (https://mrl.illinois.edu/). The MRL has multiple different sample prep rooms and clean rooms, and the facilities at MRL can be used to characterize everything from metals and ceramics, to biomaterials, and even electronics. There are 7 core research areas: Electron Microscopy, Nanofabrication, Surface Analysis, Laser and Spectroscopy, Scanning Probe, X-Ray Analysis, and Soft Materials.
- Grainger Engineering Library (blackcircle)
    - Address: 1301 Springfield Ave., Urbana, IL 61801
    - This is the main university library for engineering students, but it is open to all students. This library offers spaces for individual or group study and houses many engineering textbooks and journals
- Beckman Institute (not shown on map)
    - Address: 405 N. Mathews Ave., Urbana, IL 61801

- This is an interdisciplinary research building at the very north end of the North Quad (north of Bardeen Quad). Profs. YZ and Mohaghegh have some research spaces in this building.

Get involved in NPRE orgs

- NPRE's GSAC (Grad Student Advisory Committee)
    - GSAC is a 5-person committee comprised of graduate students in the NPRE department. Our mission is to serve the graduate students through the following 5 goals:
        - Build a channel of communication between NPRE graduate students and faculty.
        - Identify and address NPRE graduate student concerns.
        - Improve the NPRE graduate student experience.
        - Promote a sense of community and inclusion within the NPRE department, including traditional and non-traditional, underrepresented groups (e.g., underrepresented minorities, LGBTQIA groups, students with disabilities, veterans, and other identities).
        - Provide mentorship and guidance for new NPRE graduate students.
    - GSAC holds meetings and office hours throughout the semester and is a resource to all graduate students. You can come to us with any problems you might be facing (academic or personal) and we'll do our best to help you address them. We are also a space to discuss any suggestions for improving the department, and we can communicate it to the faculty.
    - Besides the academic component, GSAC will also provide a space for NPRE grad students to get to know each other through hosting social activities. We really encourage you to come to the events and get to know others outside of a classroom/lab setting.
    - Student can contact GSAC members in person or email: npre-gsac@illinois.edu

- ANS (American Nuclear Society)
    - UIUC has a very active ANS student chapter which serves as the go-to organization within our department for community amongst NPRE students, hosting nuclear science outreach, and professional development activities.

    - Student can contact ANS members in person or email: ansc@illinois.edu

- WIN (Women in Nuclear)
    - UIUC's WIN student chapter is a close-knit community consisting of both undergraduate and graduate students. WIN provides a space for female students to get to know and uplift one another in a male-dominated field. WIN members participate in outreach, professional development, and social activities. WIN is open to students of all genders.

Choosing an Advisor

- When should I choose my advisor?
    - There is no official department rule but it is encouraged that students find an advisor as soon as possible once entering graduate school. Some students enter grad school with an advisor supporting them on a research project while others take a semester or two to decide. The initial offer given to students coming in without an advisor typically guarantees funding for the Fall and Spring semesters (check your offer letter for accurate information).
- How do I choose my advisor?
    - Hopefully before accepting your offer at UIUC, you had some professors in mind to be your advisor. If not, that is ok. One of the easiest and best ways to choose an advisor is to talk to them! Professors are the most reliable source of information to learn about funding opportunities and specific research projects. After talking with multiple advisors, working with them is the next best way to help you decide if they are the right advisor for you. This should not be a decision that is rushed, and every graduate student understands that it can be stressful. Be certain that the professors at UIUC NPRE are fantastic at what they do and want to help you succeed in every possible way. Current graduate students in your potential advisors group are another great resource to aid you in your decision.
- What if I want to switch advisors?
    - Remember that the relationship between you and your advisor is a mutual one. If you decide you want to end that relationship you have the right to
    - This happens rarely and students are highly encouraged to thoroughly think through the situation and not make any quick decisions. If you are considering

switching advisors then here are a few tips to deal with this potentially stressful situation

- Speak with your advisor and let them know that you are considering switching to another advisor and why
- If you do not wish to speak to your advisor about the situation please reach out to GSAC, Kristie, Director of Graduate Studies (Mohan), or Uddin
- Talk to other advisors and see what research projects they need students for. Without a research project, completing your dissertation is most likely going to be delayed

Getting your MS

- Whether or not you want to get a Ph.D., you will almost certainly be getting an MS from the department, unless you have been admitted to the department already having earned a master's degree in nuclear engineering or related field. (Now we do have a direct PhD track since last year. MS is an option, encouraged but not required, for those who are admitted to the direct PhD program.)
- To complete the MS, you must take at least 24 credit hours of courses and complete a thesis. NPRE 501 and 521 can count towards hours for your MS. You do not have to orally defend your thesis; it will be read and approved by your advisor, another faculty member of the department as the "thesis reader", and the department head.
- The MS consists of NPRE 501; NPRE 521; 8 credits of NPRE courses, not including NPRE 501 or NPRE 521; 8 credits of 500 level coursework, not including NPRE 501 or NPRE 521; That is 24 credits. The remaining 8 credits must include a minimum of 4 credit hours of NPRE 599, but 4 credits can be taken as an elective or NPRE 599.
- The catalog information for the MS program can be found at the following link: http://catalog.illinois.edu/graduate/engineering/nuclear-plasma-radiological-engineering-ms/#degreerequirementstext.

The Qual

https://npre.illinois.edu/academics/graduate/qualifying-examination

- What is this?
    - "Qual" is short for "Qualifying Exam" and is required for all students pursuing a Ph.D. in the US and many parts of the world. The Qual is given twice a year, the

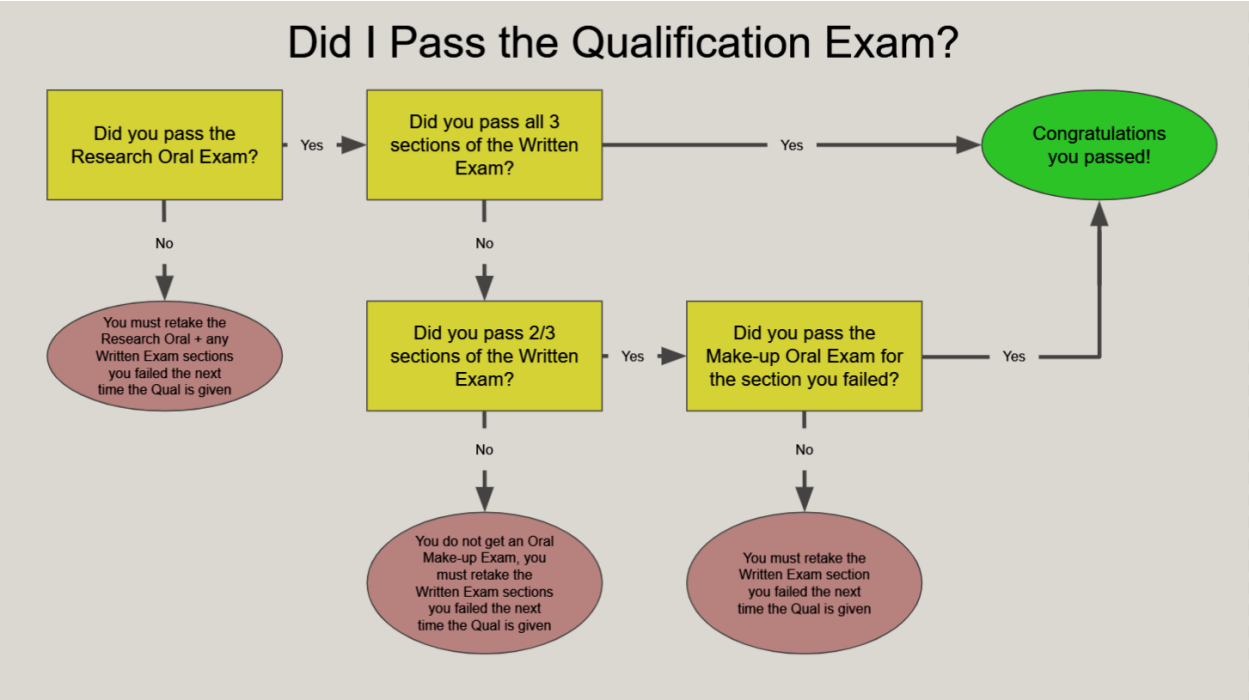
written portion being given on the Friday before the start of the Fall and Spring semesters and the oral portion taking place one week later.
    - When you are required to take the Qual varies based on your academic history. The link provided explains the deadline for when you must take the exam. Most students prefer to take it after their second semester, because the information they are tested on is fresh in their minds.
    - The Qual can be stressful to students, and that is why we are trying to provide the materials you need to help you prepare. Taking time off of research to study for this exam is common in the weeks leading up to it. Please communicate with your advisor and find a research/study schedule that reduces stress and sets you up for success.
- How does the exam work? What will be on it?
    - The official format is included in the link but here's a summary. There's two parts of the Qual: Written and Oral. Written is given on the Friday before the semester starts and the Oral is given on the Thursday and Friday of the first week of classes. The Monday directly following (6th class day), is held in case it is needed due to limited faculty or room availability.
    - **Written:** 3 Topic Questions based on NPRE 501, 521, and your Research Technical Area. Each topic question can have multiple questions with multiple parts for each question. Professors switch off the responsibility of writing the Qual question each year, so one professor will write the 501 question, another will write the 521 question, and finally another professor (or a mix of professors) will write the Technical Area question. The professors chosen to write the question are typically the most recent professor to teach the class, but that is not always the case.
    - **Oral:** A 30-minute presentation on a published research paper that is related to your research technical area, but unrelated to your direct research. The oral portion is independent of the written portion. The main goal of the presentation is to prove to the committee (3 professors total, 2 in your research technical area, if possible, and 1 outside) that you understood the paper, are able to critique it, and then expand on the work that is presented. The presentation is followed by a Q&A that is 20-30 minutes long on average, but this is completely dependent on the committee. You will be given a rubric for the Oral presentation.

        - *Show your understanding*: You can summarize the paper with elaboration, not regurgitation, on the technical details the paper is based on. You are able to provide a concise summary focusing on the main points of the research paper. Your committee will have read the paper and have questions prepared.
        - *Critique the Paper:* The committee will expect you to identify any flaws in the paper and for you to be able to discuss why they are wrong and possible solutions to the flaws if applicable (i.e. the method they used to solve this problem ignores factors X, Y, and Z that have a significant impact on the final result).
        - *Expand on the Work:* This is the part that students usually have the most difficult time with and the part the committee is most interested in. The committee wants to see that you can take the paper's theory/results and create something that will further the work. This can come in the form of designing an experiment or introducing a different approach to verify the data. 2-3 extensions are typical. YOU DO NOT ACTUALLY HAVE TO CARRY OUT THE EXTENSION, IT IS DISCOURAGED TO DO SO AND MOST LIKELY IMPOSSIBLE. You should be able to talk in-depth about the extension regarding why you chose it and how it will advance the work. It is suggested that the extensions take up 10-15 minutes of your presentation time.
            - This can be really hard to do, especially if your paper is 3 pages long. Don't worry, it's ok to have one thought out extension. Your committee will understand as well. GSAC has talked to YZ about trying to avoid papers that lead into this problem.
- Where to get help?
    - **Other students taking the Qual are your best resource.** 66% of the written test is the same for everyone and the majority of you will have taken the classes together or under the same professor.
    - **Talk to students in your research group who have taken the Qual,** and ask them how they prepared and if they have any advice.
    - **Review old homeworks and tests; we can't stress this enough.** 501 and 521 questions will cover the exact same concepts that were taught in class. If you

understand (not memorize) the material, you will do great. The research technical area is a bit harder because it covers multiple classes. Our best advice is to list out and prioritize the material you think is most important to understanding the classes and study those concepts. Some people learn from reading textbooks. That is a valid approach, but it's much harder to prepare effectively due to the sheer amount of information that has to be consumed.

- **GSAC is here to help in any way we can.** We will have a Q&A for students in the Summer and will be available to help wherever we can.

- How do I pass the Qual?



- Make-up Oral
    - Once the exam has been graded you will be notified if you have passed or not. If you have passed 2/3 sections on the written exam you will be required to do a make-up oral on the section you have failed. The make-up oral consists of a committee of professors (usually 3, sometimes different from your oral presentation committee) asking you questions about the missed section for 30-60 minutes. Each make-up oral is different and your make-up oral committee is the determining factor if you have passed. Before the make-up oral you will have the opportunity to look over your exam and take any notes about what you have

missed so come prepared to explain what the answer should have been! You will not be allowed to take any exam materials home with you. Committees typically ask additional questions beyond the exam question itself but still within the scope of the topic area which they believe you should be knowledgeable in.

Preliminary Exam

- What is this?
    - This is a preliminary presentation on a proposal for your Ph.D. research. The presentation lasts around 2 hours. You spend an hour giving a presentation and another hour answering questions from your committee. Your committee will consist of at least 4 members, 3 of which must be from NPRE.
- When does this happen?
    - TBC
- How do I prepare?
    - You must do three things for the prelim: choose your committee, prepare the prelim document, and have the 2 hour presentation.
    - Your committee should consist of a minimum of 4 UIUC faculty, with 3 being from the NPRE department, and 1 member from outside the department. 2 out of 4 should be tenured. More information can be found in the graduate college handbook: https://grad.illinois.edu/sites/grad.illinois.edu/files/pdfs/handbook.pdf#doctoral-degree-requirements
    - You MUST pass your prelim by the end of the 4th or 5th year (depending on your status upon admittance to the program) or else you will be placed on academic probation.
    - If more than five years elapse between a doctoral student's preliminary and final examinations, the student is required to demonstrate that their broad knowledge of the field is current by passing a second preliminary examination.
    - You must be registered for the entire semester in which you take your prelim exam.
    - Different professors in our department have different expectations for the length and content of the prelim document. On a high level, the document should include some background about your dissertation topic and a proposal of what novel work you plan to do over the next year before your defense. Your committee

will evaluate your proposal to determine if it has sufficient depth and breadth for a Ph.D. and give suggestions on how to improve it. The work agreed upon in the prelim document and presentation acts as a "contract" between you and your committee. If you complete the work you promise during your prelim and present it at your defense, you get a Ph.D.! Your advisor is the best source of more detailed information.

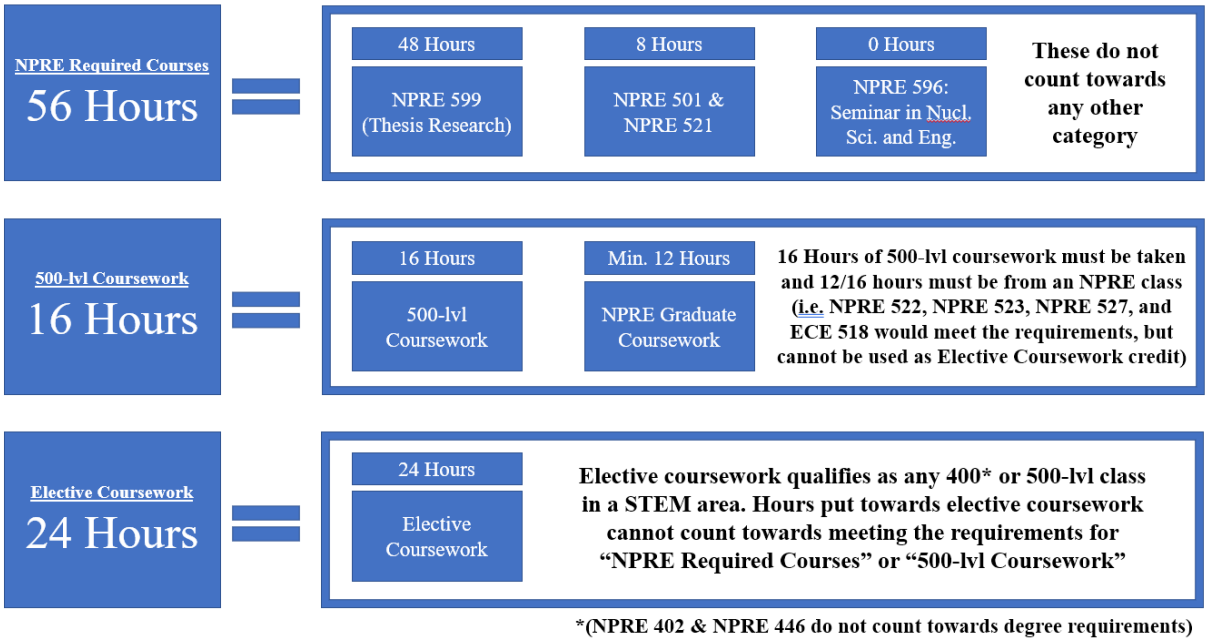
Thesis Defense

- What is this?
    - This is the final presentation on your Ph.D. research to your committee. It is a public event that friends, family, and colleagues are invited to attend. Typically, your written thesis has been completed and approved by your committee, but this differs between advisors. It's one last opportunity for your committee to ask you questions about your research before welcoming you into the community as an official Ph.D.!
- When does this happen?
    - After passing your preliminary exam. The specific timetable is decided by talking with your advisor and committee.
    - You MUST be registered for the entire semester in which you defend.
- How do I prepare?
    - The feedback from your Prelim will provide you with what changes need to be completed for your defense. Expanding on your Prelim presentation, submitting any outstanding publications, continuing to develop your code, and collecting more research data are all ways to prepare.
    - Your advisor is the best source of information.

Grad Classes

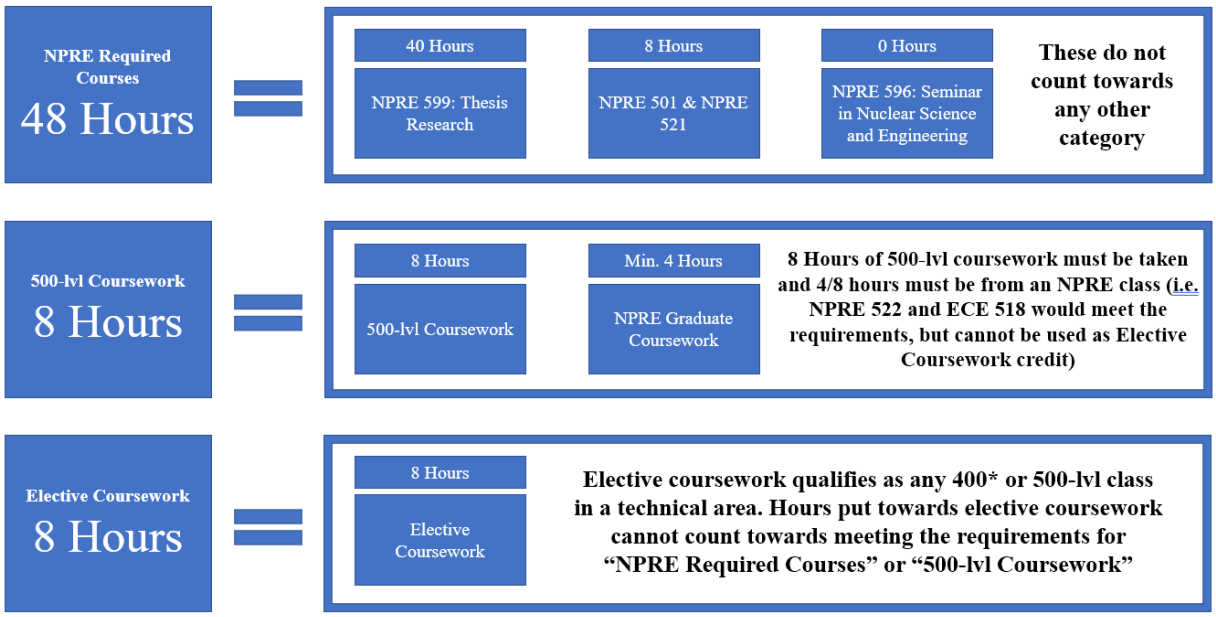
- The catalog information for the Ph.D. Program can be found at the following link: http://catalog.illinois.edu/graduate/engineering/nuclear-plasma-radiological-engineering-phd/#degreerequirementstext

Coursework Requirements for MS + PhD Route



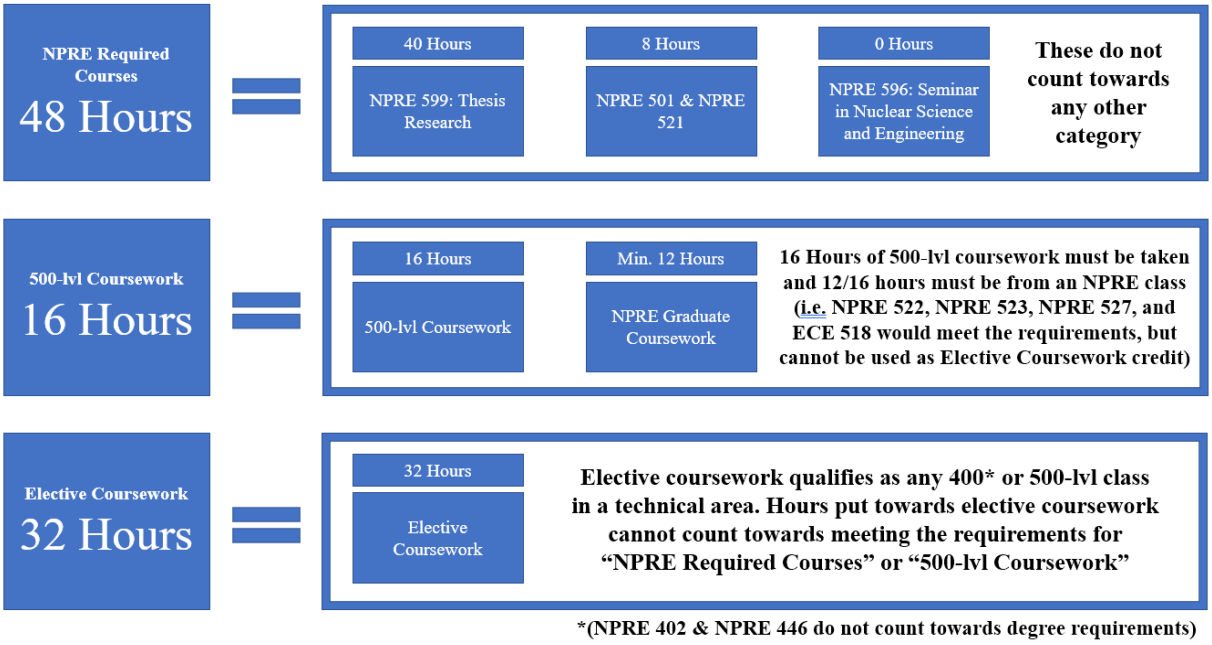
*(NPRE 402 & NPRE 446 do not count towards degree requirements)

Coursework Requirements for PhD Route (Entering w/ MS)



*(NPRE 402 & NPRE 446 do not count towards degree requirements)

Coursework Requirements for Direct PhD Route (No MS)



***(NPRE 402 & NPRE 446 do not count towards degree requirements)**

- Common NPRE Classes
  - Required:
    - NPRE 501: Fundamentals of Nuclear Engineering
      - This course covers heat transfer, fluid flow, and other thermal hydraulics topics, as well as methods to solve partial differential equations, such as separation of variables, integral transform methods, and eigenvalue problems. It is usually taught by Professor Uddin.
      - This class is one of the first classes you will take as a graduate student in the NPRE department, it's a great place to meet other new NPRE graduate students. Many students say that it's the place they met their first friends in grad school.
      - Material from this class is found on the qual.
    - NPRE 521: Radiation Interactions with Matter II
      - The name of this course is misleading, it's really a quantum mechanics course. This course covers topics such as solving the Schrodinger Equation for various potentials, spin, angular momentum, and cross sections. Prof YZ pretty closely follows the 3rd edition of Griffiths's *Introduction to Quantum Mechanics*, and

you will need to get at least an electronic copy of the book. A hard copy and an electronic copy are available through the university library.
        - Material from this class is found on the qual.
- Reactor Physics (Thermal Hydraulics and Neutronics)
    - NPRE 455: Neutron Diffusion and Transport
        - This course covers neutron migration, neutron slowing down and thermalization; neutron continuity equation, multigroup diffusion theory, homogeneous and heterogeneous medium, thermal and fast assemblies; numerical methods for multigroup diffusion equations; reactor dynamics perturbation theory; reactivity coefficients. It is usually taught by Professor Uddin or Professor Kozlowski in the spring semester.
        - Material from this class is found on the qual for reactor physics topic. Students taking the reactor physics topic are encouraged to take the class before the qual (especially students who did a non-nuclear undergrad).
    - NPRE 555: Reactor Theory I
        - This course covers the neutron transport equation, related topics, and ways to solve the neutron transport equation, including Monte Carlo and discrete ordinates methods. This class incorporates how to solve the neutron transport equation through programming. Experience with programming is recommended, but not required. Resources are provided by the instructor on how to code with python.
        - Despite the name, there is not a Reactor Theory II course offered by the department anymore.
        - This course is meant to be taught every other fall semester, but may not be that frequent with Prof. Huff on leave to DOE.
        - Meets elective requirement for CSE Concentration.
    - NPRE 560: Reactor Kinetics and Dynamics
        - This course covers the neutron diffusion and transport equations with respect to reactor kinetics and dynamics, such as the point

reactor kinetics equations and their analytical and numerical solutions, space-dependent multigroup reactor kinetics, and reactivity measurements. This class includes how to solve reactor kinetics problems via computer programming. Experience with programming is recommended but not required.
        - This course is meant to be taught every other fall semester, but may not be that frequent with Prof. Huff on leave to DOE.
        - Meets elective requirement for CSE Concentration.
- Materials and Nuclear Materials
    - NPRE 330: Materials in Nuclear Engineering
        - This course covers many of the basics of materials science and the concepts important to nuclear engineering. Topics range from simple materials science concepts to radiation damage. If you have taken very few materials courses in undergrad, I definitely recommend taking this course. The concepts covered in this course are complimented well by the lab course, NPRE 432.
    - NPRE 432: Nuclear Engineering Materials Lab
        - This lab course goes well with NPRE 330 and the labs are very relevant to the NPRE 431 course material. You will get hands-on experience performing various tests and experiments. Topics range from electrochemical cells, heat treatments and their effects, various microstructures, tensile and compression testing, hardness testing, fatigue testing, etc.
    - NPRE 531: Nuclear Materials
        - This course dives more into the concepts behind radiation damage and the equations used to model radiation damage. Typically, there is a class project every semester where you will get hands-on experience using equipment that is used to characterize radiation damage. If your class gets enough done during the semester, you may even get a journal publication out of it. Professor Heuser teaches this course. This is the course needed for the technical portion of Nuclear Materials qualifying.

- Health Physics, Radiation Detection Physics, Radiological Applications
    - NPRE 451: Radiation Laboratory
        - A very important course taught by Professor Di Fulvio for creating experimental setups using radiation detectors. This course is also very important for the Qual exam in the radiation detection field. This course helps to teach about many types of instrumentation used in the radiation detection field, as well as expanding on many radiation physics topics from NPRE 446. Weekly lab reports are done for most of the semester.
    - NPRE 435: Radiological Imaging
        - Taught by Professor Meng, teaches about how many imaging techniques are performed using radiation. This course expands on topics in NPRE 446 through how aspects of radioactive decay can be used to gather information. This course will teach about each radiological imaging technique and the advantages and disadvantages of each. Additionally, this course will teach about some computational techniques such as filtered back-projection and other image reconstruction techniques.
        - Only offered in Fall semesters.
    - NPRE 441: Radiation Protection
        - Taught by Professor Meng, this course teaches about many sources of radiation and how energy is being deposited in materials. Mainly expands on radiation principles taught in NPRE 446 with an emphasis on ionizing radiation and its interaction with shielding materials and biological materials. This course teaches about principles of radiation exposure, dosimetry, biological impacts and limits, and shielding calculations.
        - Only offered in Spring semesters.
- Fusion and Plasma Physics
    - NPRE 421: Introduction to Plasma Physics
        - If you come from a non-plasma background it is suggested you take this course to familiarize yourself with the basic concepts of

plasma physics. The Qual has taken questions from this class' content before.
    - Curreli has taught this class in the past and has used Chen's *Introduction to Plasma Physics and Controlled Fusion* as a guide for the course.
- NPRE 423: Plasma Lab
    - Professor Ruzic established this class when he arrived at UIUC and is arguably one of the most important classes to take if you are interested in plasmas, regardless if you're computational or experimental.
    - Professor Sankaran recently took over teaching this class and has made some changes. However, the class still demands a lot of work out of its students. This is the most demanding class in terms of hours spent working in the labs and lab reports (30+ hrs/wk).
    - Qual questions have been given related to the labs in this class.
- NPRE 429: Plasma Engineering
    - An introduction to plasma material interactions, important PMI derivations, plasma processing, and plasma diagnostics.
    - Instructor has been variable for this course but this content is fair game for the Qual.
- NPRE 522: Controlled Fusion Systems
    - This course is offered every 2 years by Curreli and goes over fusion reactor designs, critical components, and plasma physics concepts that directly relate to fusion systems
- NPRE 523: Plasma Waves
    - This course covers the fundamentals of plasma waves and plasma heating, including an overview of the techniques and technologies used in thermonuclear fusion reactors for heating and current drive. The first part of the semester covers the linear theory of plasma waves, including: the cold plasma tensor, cold dispersion relation, normal modes, frequency plots, Clemmow-Mullaly-Allis diagram, acoustic modes, kinetic theory of plasma waves, hot tensor, Bernstein modes, electrostatic damping, cyclotron modes.

The course then offers an introduction to non-linearities, with major emphasis on the quasi-linear theory as a natural extension from the kinetic theory of plasma waves. The final portion of the course provides a qualitative and quantitative description of the major techniques used to deliver energy and momentum to a plasma (heating and current drive), namely ion cyclotron heating, electron cyclotron, lower hybrid, electron Bernstein, and neutral beam injection. Examples of heating technologies are provided for both thermonuclear and industrial applications. The course comprises simple analytical and computational homework assignments.

    - This course is offered every 2 years by Curreli.

- NPRE 526: Plasma-Material Interactions
    - Class was previously taught by JP Allain and took a deep dive into PMI and PMI diagnostics.
- NPRE 527: Plasma Technology of Gaseous Electronics
    - This class is taught by Ruzic and looks into Low Temperature Plasmas and their applications. Ruzic leans on his experience in the field to describe the journey from theory to final commercial product for plasma processes.
    - In this course, students will build upon that foundation to develop more advanced theoretical models for LTP dynamics, including electron collisions, plasma transport, sheath dynamics, and plasma and surface chemistry. Students will be able to apply this advanced LTP theory for the design of systems for etching, advanced deposition, and others important in modern materials processing applications.
- NPRE 598: Computational Plasma Physics
    - This course will cover computational methods and codes used to describe matter in the state of plasma. The course will include hands-on computational examples and projects. Topics will include: particle models such as initial value problems, finite-difference schemes in time, error quantification, Von

Neumann stability analysis for particles in electric and magnetic fields. Methods for collisional processes in plasmas and for plasma-surface interactions. Fluid plasma models: diffusion-advection-reaction problems, plasma chemistry problems. Kinetic methods: particle-in-cells, Vlasov solvers, Boltzmann solvers.

- Risk and Policy
    - NPRE 461: Probabilistic Risk Assessment (PRA)
        - This class covers multidisciplinary theories and techniques of risk, safety, and reliability of complex systems. This class is usually taught by Professor Mohaghegh.
        - Material from this class is found on the qual for risk and policy topic.
    - NPRE 561
        - This class is an advanced version of NPRE 461, going more in-depth into PRA topics. This class is usually taught by Professor Mohaghegh.
- Sign up for seminar!
    - NPRE 596: Seminar in Nuclear Sci & Engrg
        - Seminar is required for every semester you are enrolled in NPRE, whether you are taking classes or research hours only.
    - NPRE 595: Student Research Seminar
        - This is a 1 credit hour seminar that allows students to practice their presentation skills, which is very helpful when preparing for a conference or another major presentation. The only requirements are to show up and to present once during the semester. This can be used towards thesis requirements.
- Thesis research hours
    - Research hours are a requirement of the MS and PhD Programs
    - Thesis Research is under NPRE 599
        - You can register for 0-16 hours per semester
        - Each advisor has a unique Course Registration Number (CRN) for 599 so make sure to get that from Kristie.

- Independent Study (What is it? How does the class work?)
    - You can reach out to a professor and ask them if you can set up an independent study with them for a semester. This is treated like a class and the amount of credit hours is decided by you and the professor. The work product should justify the credit hours and be clearly documented and ready for audit by the grad committee. The requirements and deliverables for the class are also decided between you and the professor. If the professor is not the adviser of the student, the student also needs to ask their adviser for approval. Once these details are agreed upon, documentation must be sent to the department for approval. **If you are considering taking an independent study please reach out to Kristie first for more details.** Independent studies are dealt with by the department on a case by case basis and you want to ensure that you will be receiving credit for the course. It may not count towards thesis requirements (Check with department).
- Technical Writing
    - NPRE 481: Writing on Technology and Security
        - Taught by Prof. Roy, this course details the different writing skills that are needed for both industry and academia. This class also teaches proper formatting and the proper language to use in professional writing. This class is a good mix of writing practice and teaching about many smaller topics such as arms control and waste management.

- Non-NPRE Classes
    - These Non-NPRE classes are common ones students have taken in the past.
    - Computational: CSE Concentration
        - Quite a number of students from computational groups in our department have taken this concentration (Research groups: Prof. Huff's, Prof. Curreli's, Prof. Kozlowski's, Prof. YZ's). The concentration requires taking 4 classes, more information can be found here: https://cse.illinois.edu/cse-educational-programs/graduate-concentration/

        - You must apply and be admitted to the concentration before any classes can count towards the concentration. If you take any classes before being admitted to the concentration the classes won't count.
        - CS/CSE450: Numerical Analysis
            - This class is an option for the concentration's core coursework component. Many students in our department have chosen to do this class over other ones because it equips you with fundamental knowledge about numerical methods that is a great building block for other computational classes and knowledge that is valuable for any computational researcher.
            - This is a difficult class, there are ~6 exams, weekly online quizzes, and homeworks. It takes up around as much time as 2 classes. This class is a lot of effort, but you will also learn a lot.
        - CSE 408 Applied Parallel Programming
            - This class is helpful to take if you're interested in learning about GPU systems.
        - CSE 560/TAM 570 Computational Fluid Mechanics
            - Students from Professor Huff's and Kozlowski's groups have taken this class. It's a very challenging class, both computationally and mathematically. This class is usually taught by Professor Paul Fischer.
- Plasma: ECE Classes
    - ECE 444: IC & Device Theory
        - This is the undergraduate FabLab course and is highly recommended for students interested in the semiconductor industry. You'll gain clean room experience and understand the basics of semiconductor chip manufacturing. There is a classroom lecture in addition to the lab.
    - ECE 455: Optical Electronics
        - This class was previously taught by Professor Gary Eden and focused on lasers and laser systems. You will learn the components of different laser systems and how to calculate specific parameters of those systems. This course is recommended

for anyone interested in taking higher level courses focused on specific laser systems.

- ECE 481: Nanotechnology
    - You will learn the fundamental physical properties of nanoscale systems. Nanofabrication techniques, semiconductor nanotechnology, molecular and biomolecular nanotechnology, carbon nanotechnology (nanotubes and graphene), nanowires, and nanoscale architectures and systems. You will get to use the ECE NanoFabLab which is an awesome experience. You are much more hands on trying new things in this lab than ECE 444.
- ECE 518: Advanced Nanotechnology
    - This is the graduate level extension of ECE 481 and delves into semiconductor nanotechnology from the formation and characterization of low-dimensional structures to device applications. Compound semiconductors, epitaxial growth, quantum dots, nanowires, membranes, strain effect, quantum confinement, surface states, 3D transistors, nanolasers, multijunction tandem solar cells, and nanowire thermoelectrics. Handouts are supplemented with papers from the research literature. Critical literature review assignments, research proposals in National Science Foundation format, and oral presentations are required. In the lab you come up with your own project and are able to use the NanoFabLab resources at your disposal.
- ECE 520: EM Waves & Radiating Systems
    - Fundamental electromagnetic theory with applications to plane waves, waveguides, cavities, antennas, and scattering; electromagnetic principles and theorems; and solution of electromagnetic boundary-value problems.

- Materials and Nuclear Materials: MatSE Courses
    - There are many great MatSE courses. Below is a list of some of the courses we have taken that were helpful. There are many other good

MatSE courses to take depending on the specific area you are interested in (e.g. metals, polymers, etc.).

- MSE 500: Statistical Thermodyn of Matls
    - This is the only required course for MatSE grads.
- MSE 404: Lab Studies in MatSE
    - These courses are 1.5 credit hours and are only for half a semester. They change every semester, so checking which labs are offered each semester is a good thing to do.
- MSE 440: Mechanical Behavior of Metals
    - Super awesome course for understanding metals, deformation, and a variety of related topics. Highly recommend this course, it was great and I learned a lot.
- MSE 443: Design of Engineering Alloys
    - Also a very great course. Very helpful for understanding various types of alloys as well as alloy design.
- MSE 445: Corrosion of Metals
    - Very helpful course for understanding corrosion.
- MSE 481: Electron Microscopy
    - This course covers a lot of the theory behind electron microscopy. It does not teach you how to use the microscope specifically. You probably don't want to take this course unless you're very interested in the topic and theory. The trainings you do at MRL to use the electron microscopes cover everything you need to know, or you can look at the Williams and Carter, Transmission Electron Microscopy book to get the same info.
- MSE 487: Materials for Nanotechnology
    - This course teaches you how to look at and evaluate journal articles. You will get better at reading journal articles if you take this course.
- MSE 489: Materials Selection for Sustainability
    - Very interesting course with a great professor.
- MSE 584: Point and Line Defects

        - Very helpful course for understanding defects (which is very relevant to nuclear engineers). This course is a very different course though and can be very tough; you will spend a decent amount of time learning on your own.
    - MSE 498/598: Special Topics
        - Some of the special topics courses are very good.
- PHYS 598 PEN: Communicating Physics Research
    - Awesome writing course, Lance Cooper and Cecilia Leal are both great professors. You will learn a lot about technical writing and how to communicate more clearly and efficiently. Very graduate student oriented, focuses on topics graduate students would need for technical writing.
- 498/598 Courses: Special Topics
    - I recommend each semester looking at the special topics courses being offered in various engineering areas as well as physics and TAM (theoretical and applied mechanics). There are many great courses that professors develop and so these courses are constantly changing and new ones pop up all the time.
- We advise you to talk to professors about waiving pre-reqs. Most of the time pre-reqs are already waived, but you may need to get a waiver for courses that are only for students in that specific department.

Graduate Student Pay (This section is being edited by Andrew 10/5, potentially will become its own document)

- A full stipend is offered as a 50% appointment by the department. Sometimes stipends can be split and be 25% TA, 25% RA. In some cases stipend appointments can be greater than 50%. Figuring out what is available to you is a conversation to have with your advisor and the department
- Graduate students have a variety of funding sources for pay throughout the year. These options include Teaching Assistantships (TAs), Research Assistantships (RAs), and Fellowships.
    - Teaching Assistantship (TA): Being a TA is one way to receive a stipend. If a student is offered a 50% appointment they can

- Illinois has competitive stipends paired with a low-cost of living which means more money in your pocket
- If accepted into the PhD program you are guaranteed funding, for no reason should you have to pay out of pocket for your tuition and should always receive a stipend
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Conference Reimbursement / Travel Booking

- One must submit a travel request form (my.npre => HR => travel) and get approved before making any travel arrangements.
- The department has two ways to cover travel expenses: they can purchase and reserve travel for you in advance of the conference or you can pay for it all upfront and be reimbursed after the conference.
- Having the department pay for your travel upfront means you don't have to cover that balance yourself. However, booking the travel yourself and being reimbursed allows you to accrue miles/hotel points for yourself to use on a later (hopefully personal) trip.
- This is the guide from the ARFC (Prof. Huff's and Dr. Munk's group) website on how to handle travel requests http://arfc.github.io/manual/guides/travel
- NPRE Admins (Barb) have a great cheat sheet to help you fill out the travel requests too.
    - This can be found in the NPRE Lounge in Talbot, next to the door to the kitchen.
- When in doubt, talk to Barb/Sarah and your advisor.

Purchasing Equipment / Machine Shops on Campus/User Facilities

- Purchasing Equipment for Research
    - You need an active CFOP if you want to purchase something through the purchasing portal. CFOPs are assigned to each project and they are how the University keeps track of expenses.
    - Go to my.npre.illinois.edu and login to your student account.
    - Under the "Finance" tab select "Purchasing."
    - The new window that pops up will show you your past orders organized by fiscal year.

- Follow the instructions for each section and fill in the necessary information. Below are important things to note when filling out each section:
    - *Personal Information*: Putting your phone number is not mandatory but if a delivery person is looking where to drop a package off, they'll have your contact information to call you
    - *Account Information*: This is where you enter the CFOP # and you can even split the purchase between two CFOPs. Make sure to note if the equipment you are ordering is fabricated or not. If so, you will need an Activity number of the project it is being fabricated for
    - *Vendor Information:* Choose from the list of vendors provided. If the vendor you are ordering from is not on the list you will have to add their information. **Each purchase order can only have items from a single vendor. If you need to purchase items from multiple vendors, you will need multiple purchase orders.**
    - *Items:* Fill out the information it tells you to provide. The quantity and price fields can be confusing. As an example, if you want to purchase 3 hammers and each hammer costs $15 then you would put "3" for the quantity and put "15" for the price. If you put "45" and then add it, then the system will think each hammer is $45 and say the 3 hammers together cost $135. In addition, if the item you are purchasing is specifically quoted or over a certain amount of money, then you will need to upload a quote from the vendor.
    - *Delivery Information:* If you decide not to ship the item to NPRE that is ok, but you will have to take a picture of the packaging slip and send it to Sarah Drum at sdrum@illinois.edu so the purchase order can be completed.
    - *Review & Submit:* Review everything on the order and make sure the information is correct. You have to complete a business justification section that is there for you to explain why you are purchasing the items on the order. Then you can submit!
- Machine Shops
    - UIUC machine shops are typically faster and cheaper than outside vendors and as a benefit you can meet the machinists and discuss your

project with them face to face. Each machine shop has different tools and fabrication possibilities. The best way to find out what is best for your project is to either visit the shop in person or send them an email.

- Machine Shops
    - ECE
    - Aerospace
    - MEL
    - SCS
    - Physics

Where to live

- On-campus vs. off-campus benefits
    - **On-Campus:** On-campus housing puts you close to the many campus buildings involved with the NPRE department. These buildings are considered to be in the "north" part of campus, as they are north of the Union building. The main engineering quad is directly north of the Union building, with Talbot Laboratory being on the west side of Bardeen Quad. With that being said, housing to the west of Bardeen Quad (west of Wright St.) often allows for quick traveling to and from Talbot lab. Living on the west side of campus places you close to many of the town's bars and restaurants along Green Street. Living to the east of campus places you in Urbana, which is an option many students choose as it remains close to campus. The east side of campus is closer to laboratories such as CPMI, NRL, and the MRL. Living in these locations often reduces the need for car use as many buildings remain walkable, bikeable, or are very close to the many MTD bus stops.
    - **On-Campus:** Another option that is very popular among graduate students and their families is the Orchard Downs apartment center, near the University Arboretum, about a mile southeast from the center of campus. Offering both furnished and unfurnished options, these university-run apartments are some of the most affordable options this close to campus. With rent that includes all amenities, including parking, as well as access to MTD bus stops, these apartments are easily accessible from the main sections of campus. More

information about these apartments, including rent rates and floor plans, can be found here: https://housing.illinois.edu/living-options/apartments/orchard-downs

- **On-Campus:** Due to the large population of engineering students and many companies choosing to upgrade these buildings, these housing options are often the more expensive ones. Additionally, these options tend to fill up quickly as they are also the most desirable for undergraduate students. They are in the most student-dense area and contain much of the campus social life.
- **Off-Campus:** Off campus is considered housing that is not on campustown. There are apartment complexes and houses available in the Champaign and Urbana areas. Many grad students who can find roommates to live with choose renting a house because it is typically a cheaper option, has more space than an apartment, and less worry of having annoying roommates. Having a car is preferable for some off-campus housing, but many options can reach campus quickly by bike or bus. Talk with your fellow grad students to get their opinions on the best places to live if you're considering living off campus. Consider safety when choosing off-campus housing.
- **Tenants Union/Leasing agency and landlord review**
    - UIUC has a tenant's union you can use to learn about which rental companies to beware of and to help look over your lease before you sign it: http://www.cutenantunion.org/

Out of state student tips

- If you are coming to UIUC from another state, you may want to look into becoming an IL resident, especially if you intend to stay in IL after graduation. This can be done by changing your driver's license to IL, registering to vote in IL, and registering your vehicle in IL. Depending on which state you are coming from, you may not have to change your residency as a full time student.
- Check with the Student Legal Services Office on campus (see below) for more information
- If in need of financial assistance with moving or traveling costs, especially before your first paycheck is received, please contact the Office of Student Financial Aid. Additionally, take a look at the "**Short Term Loans**" category in the "**Important Resources available to UIUC students**" section of this handbook.

International student tips

- I-20
    - When you accept the offer to join the NPRE program, if you are eligible for a F-1 visa, you will receive an I-20 from the university. This is the main document for starting the visa process. More information about the F-1-visa and other visa types can be found at: https://grad.illinois.edu/admissions/instructions/04e
- CPT (Curricular Practical Training)
    - International students must apply for CPT to participate in summer internships. More information can be found at: https://isss.illinois.edu/students/employment/f1cpt.html , https://grainger.illinois.edu/academics/graduate/cpt
    - While you are at your summer internship, you must sign up for either NPRE 599 or ENG 510, depending on how related your internship is to your research. Before selecting which course to sign up for, check with your advisor and Kristie for more information.
    - Previous advice for national lab internships is to sign up for NPRE 599 (but still double check with your advisor and Kristie). There will be CPT paperwork the department has to complete, so making sure you and Kristie are on the same page is helpful.
- SSN (Social Security Number)
    - If you are an international student with an assistantship, you will be considered an employee of the university. If you would like to receive a SSN, please see Beth Rutledge in 203C1 Engineering Hall to request documentation of your employment. This can be taken to the local Social Security Office where you can apply for a SSN.
- Oral English Assessment Interview (OEAI): https://linguistics.illinois.edu/testing/oeai

Things to do on campus/around town

- Registered Student Organizations (RSOs)

    - Quad Day is held on the Sunday before the first day of Fall semester and consists of over 600 RSOs. This is the absolute best place to see what UIUC has to offer
- Athletics
    - Urbana Boulders: Rock Climbing
    - Football tickets are sold on a season ticket basis, and you will get emails about it from the Athletics Department. Check Facebook for if other students are selling individual game tickets. Season tickets are roughly $85. There are also family packs sold for particular games. If you and friends go in together, the prices are very affordable.
    - You also have to reserve tickets for men's and women's basketball and volleyball games.
- Commonly visited places
    - Harvest Moon Drive-In Theatre (in Gibson City).
    - Downtown Champaign, Downtown Urbana, Downtown Savoy.
    - Farmer's Markets in Urbana and Champaign. See online for the schedule.
    - Champaign-Urbana Adventures in Time and Space.
    - Curtis Apple Orchard: Apple and pumpkin picking.
    - Plant Nurseries: Prairie Gardens and Country Arbors.
    - Prairie Fruits Farm and Creamery.
- Local Grocery Stores
    - County Market: convenient grocery store very close to campus. It tends to be more expensive.
    - Meijer: Has nearly every non-specialty item, similar to Walmart. Relatively affordable but a drive or bus ride away from campus.
    - Schnucks.
    - Common Ground Co-op: awesome local goods/produce as well as other organic goods; great salad bar and pre-made deli/food items.
    - Harvest Market: A higher end grocery store with organic and local goods. It's kind of a bigger version of common ground.
    - Green Onion: Nice small grocery store for Korean items .
    - AM-KO
    - Aldi.
    - Fresh International Market: Biggest and clean asian grocery store.

    - Annapoorna: small grocery store for Indian food items.
    - Old Time Meat and Deli
    - World Harvest (International and Gourmet Food that has a wide selection of international foods including Halal products from around the world)
    - Meat lab
    - Target on Green: Small grocery section, can find some essential items. Convenient location on-campus
- Nice Nature spots in the area
    - UIUC's Arboretum and Japan house
    - Meadowbrook Park
    - Busey Woods
    - Allerton Park
    - Kankakee State Park: Kayak rental
    - Turkey Run Park (in IN)
    - Buffalo Trace Prairie

Important Resources available to UIUC students

- Surplus
    - One important resource many grad students use is the surplus warehouse located near the Orchard-Downs housing facilities. This warehouse contains many different second-hand materials from the university, including desktop computers, laptops, printers, monitors, projectors, TVs, desks, chairs, tables, and file cabinets. These materials can be taken and used for system use for free, except for any needed transportation costs, but they cannot be for the purpose of personal use. More information about the location, hours, contact information, as well as information about scheduling an appointment for warehouse shopping can be found at the following link:
        - https://www.obfs.uillinois.edu/equipment-management/surplus-warehouse-operations/
- Free software
    - We would encourage you to look at the following link for a variety of downloadable software for any UIUC student. Each of the items listed on this webpage can be downloaded for free as a graduate student at the university. Some

notable ones include Office 365, Mathematica, and Adobe Creative Cloud. In addition, many other services, such as Box, can be accessed by signing in through a university account with your NETID and password.
    - https://webstore.illinois.edu/shop/category.aspx?zcid=129
- Health, dental, and vision care
    - As part of the tuition package for the university, the university provides a form of health and mental health insurance. As a graduate student, you also have the option to pay an additional amount for dental and vision insurance. Waiver-generating appointments allow these to be added to your insurance plan at no additional cost. More specific details, including cost and benefits, can be found at the following link:
        - https://si.illinois.edu/faqs
    - McKinley Health Center is the on-campus location for many health services, including radiology, immunizations, and many others. Booking appointments at McKinley can be done through their online portal or by calling their office at 217-333-2700. More information regarding specific services and what is offered can be found at the following link:
        - https://www.mckinley.illinois.edu/ .
- Counseling and Mental Health Services
    - In addition to physical health care, the university offers time-limited counseling to all students through the Counseling Center. The Counseling Center offers a variety of clinical services, with individual counseling being the most commonly used service. After a number of sessions the center may refer you to alternate providers to continue your care. The Counseling Center also provides a number of prevention and mental health care services, including educational programs, mental health screenings, and outreach programs. More information about the many different services provided, as well as information about scheduling a counseling appointment, can be found at the following link:
        - http://www.counselingcenter.illinois.edu/
- VMock
    - VMock is a service that provides instant resume feedback in an online platform by using algorithms and data science. This service can be useful for improving your resume with targeted feedback that can easily be modified and resubmitted

for further changes. More information about getting started with VMock can be found at the following link:

    - https://ecs.engineering.illinois.edu/vmock/ .

- Champaign Buses
    - Champaign-Urbana Mass Transit District (CUMTD) runs all of the buses on campus, which are free to use for UIUC students. There are a variety of routes that run around campus and the surrounding areas. Many routes travel off campus to various popular locations, such as the Illinois Terminal and to grocery stores. Knowing this information can be useful for determining the most efficient route to travel across campus between your home and your office/lab. More detailed information about specific bus routes and their stops can be found at the following link:
        - https://mtd.org/maps-and-schedules/ .
    - The bus system has been integrated into a variety of different mobile applications, with some listed below, most of which detail all the bus stops and routes across the Champaign area. Trip planning features allow for you to choose a destination, along with your current location. The application will find the closest stop to your current location that has a line traveling in the direction you need to go. If there is not a bus traveling directly to your intended location, the app will recommend multiple stop routes to transfer buses. Some applications also have semi-live updates on the location of the buses as they travel along the routes as well as an estimated time to reach each stop.
    - Recommended apps: Transit, CU Bus, CU Transit, Illini Bus.
- Career services
    - The Career Center at UIUC and Engineering Career Services provides numerous services to graduate students to help with their individual career path. Events such as career fairs, resume reviews, and mock interviews can be very useful for securing your desired career position post-graduation. Large career fairs occur during both the fall and spring semesters, with individual companies often coming to campus at separate times for recruitment. These resources are available at no additional cost to UIUC students, so utilizing them as much as needed is recommended. More information on specific services can be found at the following link:

        - https://www.careercenter.illinois.edu/# .
- Scopus
    - Scopus is an advanced system for searching cited references from domestic and international publishers. Advanced search parameters can be added and Scopus will search through the largest abstract and citation database to give you optimized results. This service is highly recommended when finding references for publication and thesis writing. Further information on using the Scopus database can be found at the following link:
        - https://guides.library.illinois.edu/c.php?g=669899&p=4713045 .
- UIUC library website
    - In addition to Scopus, the University Library website can be extremely useful for searching the Illinois library database for relevant journal articles and references. The library also offers a number of services in addition to reference searching, such as lending out materials as well as providing a number of research services. More information on the library's services and the search engine can be found at the following link:
        - https://www.library.illinois.edu/ .
- Student Legal Services
    - If in need of legal assistance with a variety of different topics, the University offers legal services to all students who have been assessed the Urbana campus Service Fee. Some examples of commonly used services include tenant and housing issues, misdemeanor charges, traffic tickets, and notary services. Some notable services that are NOT included are tax or income tax issues, passport and visa issues, and claims against the university. A full list of included and excluded services, along with additional information and resources can be found at the link below:
        - https://odos.illinois.edu/sls/services/eligibility-and-services/
- Short Term Loans
    - Another type of aid that the university can offer to students in need is Short Term Loans provided by the Office of Student Financial Aid (OSFA). These loans are meant to provide temporary funds to students for things such as living expenses, supplies, emergencies, and any other expenses you may need to pay by a deadline. These can be extremely helpful for graduate students that may be traveling to

campus and have not yet received their first payment from the university for their appointment. These loans can be up to $1000, with the due date being the 28th of the following month. There is no interest on these loans if they are paid by the due date, and after the due date a 1.5% interest rate is accrued per month. If interested, please contact the OSFA first for assistance in receiving these. More information about the loans can be found at the following link below:

- https://osfa.illinois.edu/types-of-aid/loans/types-of-loans/short-term-loans/

Traveling to Chicagoland and Off-Campus

- Buses
    - Buses provide a simple means to get from many areas around the university and up to Chicago and the surrounding area. One such bus company is Peoria Charter, which offers bus service to Union Station, O'Hare Airport , and many malls in the Chicago suburb area. Peoria Charter has many buses every day that travel between campus and Chicagoland, with many more being added to the schedule around Fall, Winter, and Spring breaks. Another bus company that provides a similar service is Greyhound, which offers buses to a few different locations in Chicago. Similar to Peoria Charter, these buses can be booked as one way tickets with buses traveling nearly every day. Greyhound tickets tend to be more affordable, but with fewer time options and fewer stop options. These two services can be found at their respective websites here:
        - https://peoriacharter.com/schedule
        - https://www.greyhound.com/en-us/bus-from-champaign-to-chicago
- Train (Amtrak)
    - Another option for easy travel to Chicago is taking the Amtrak train from Champaign to Union Station in Chicago. These trains usually take about 2-3 hours and usually occur at least once a day in both directions. These tickets are often less than $20 in one direction for basic seating. Once at Union Station, many more trains are available to the surrounding Chicago area and suburbs. More information and exact train times can be found here:
        - https://www.amtrak.com/home.html
- Rideshare groups
    - A number of rideshare groups can be found online for the Champaign-Urbana area, which allow for carpooling to different areas around Illinois or neighboring

states. Many of these groups work as follows: Someone driving or wanting a ride to a specific area will make a post either offering to drive or requesting a ride on a specific leave and return date. These groups are somewhat active, with a few posts every day total. These groups offer easy ways to travel to locations relatively cheap and quick, with the main requested cost being paying for gas. While a cheap and often easy option when the opportunity comes up, a backup option should be chosen since a ride to a specific area might not always be available. One such Facebook group that tends to be active is listed below:

    - https://www.facebook.com/groups/310817208948579/
    - We recommend that, as always, you should use caution when getting in the car with anyone that you do not know.

- Car Rental Services
    - A number of different car rental options are available in the Champaign-Urbana area, with some offering specific benefits to UIUC students. One option is services like Zipcar, where you can join as a UIUC student and free gas will be included in your rental. These types of services must be scheduled in advance with a valid driver's license and other varying types of documentation. Companies such as Enterprise and National both have contracts with the University system to provide benefits to those associated with the University. While car rental is a flexible option and provides you with nearly unlimited car use for the rental time, this is often the most expensive option for traveling off campus. While many more options are available in this category, some links to information on a few of these services are included below:
        - https://www.zipcar.com/universities/university-of-illinois-champaign-urbana
        - https://www.obfs.uillinois.edu/travel/car-rental/
        - https://turo.com/us/en/car-rental/united-states/champaign-il

Credits

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