

Chemical Engineering PhD Student Handbook

2019-2020

Dear Chemical Engineering Ph.D. Students:

It is our great pleasure to welcome you to a new year at Stanford, and for those of you joining us for the first time, we want to begin with some information for getting started. At Stanford University, the essential codes of conduct for students are the Fundamental Standard and the Honor Code. As a condition of enrollment, you are expected to be familiar with them, and for their guidelines to be an integral component of your decision-making.

The Fundamental Standard, which is the University's basic statement on behavioral expectations, was articulated in 1896 by Stanford's first President, David Starr Jordan, as follows:

Students are expected to show both within and without the University such respect for order, morality, personal honor, and the rights of others as are demanded of good citizens. Failure to do this will be sufficient cause for removal from the University.

The Honor Code is the University's statement on academic integrity. It is essentially the application of the Fundamental Standard to academic matters. Provisions of the Honor Code date from 1921, when the honor system was established by the faculty on the Academic Council, at the request of the student body and with the approval of the University President. The Honor Code reads:

The Honor Code is an undertaking of the students, individually and collectively:

- that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading.
- that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.

The faculty, on its part, manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

Further details can be found at <http://judicialaffairs.stanford.edu>.

The principal publication of the University is the [*Stanford Bulletin*](#). The *Bulletin* is the University's official catalog and the governing guidelines for your degree as well as University policies and procedures.

This ***Chemical Engineering Ph.D. Student Handbook*** primarily is a compendium of department-specific policies, guidelines, and information. It discusses various University and departmental requirements, rules, procedures, and practices as they apply to chemical engineering graduate students. It is revised annually with both the first-year Ph.D. student and the more advanced Ph.D. candidate in mind. The

information in these handbooks is supplementary to official university publications, which take precedence unless explicitly noted in this text or unless a particular set of circumstances is adjudicated by the faculty chair of the department or by a consensus of the department's faculty or by an appropriate university official. Furthermore, students are expected to be aware of departmental policies, degree requirements and milestones, and deadlines. Degree progress and conferral involves students, faculty and staff, and, ultimately, the University Registrar.

Official university communications: The University sends official communications via email; all students are responsible for monitoring their Stanford email account. Students with questions and issues normally start with our Student Services staff in Chemical Engineering departmental office, Shriram Center, room 129. Student affairs staff at the Student Services Center on the second floor of the Tresidder Union can assist with central office inquiries.

Registration: All Chemical Engineering Ph.D. students, regardless of registration status (e.g. full graduate engineering tuition, 8-9-10 unit graduate engineering tuition, TGR, one-time Graduation Quarter tuition) should file a study list in Axxess each quarter. Our Ph.D. program is predicated on continuous, year-round research, and thus Ph.D. students are enrolled all four quarters, including Summer Quarter, (or have an approved reduced load or leave of absence), until all pending degrees are conferred. For the first 14 quarters, Preliminary graduate study lists of at least 8 units must be filed in Axxess no later than the first day of classes *each quarter*. See the [Study List Composition and Priorities](#) section for more details. International students should always discuss potential decisions for non-enrollment with both the department's faculty advisors and ChemE Student Services as well as advisors at the Bechtel International Center before making final plans.

Required courses must be taken for a letter grade if this grading basis is available. The phrase "units toward degree" refers to completed units for courses taken that are germane to an advanced degree in this discipline (135 total units required). Units for upper division undergraduate courses in science or engineering may count toward the department's graduate degree requirements if approved by both the graduate program chair/research advisor and the department chair. Ph.D. students already admitted to doctoral candidacy who are planning to take courses in non-degree related areas should discuss their plans in advance with their advisors. Courses, which are not fulfilling a course requirement for a degree in chemical engineering, may be taken with advisor approval and with any available choice of grading basis.

Degree Milestones: PhD students are expected to meet a set of milestones in order to maintain good degree progress.

- Advancement to Candidacy - At the end of the 4th quarter of the student's time in the program, students are expected to take their Qualifying Exam - consisting of a 20 minute presentation followed by 20 minutes of questions from department faculty. In order to Advance to Candidacy, the student must have obtained an advisor. Students who fail to secure an advisor may be subject to a degree program change at the discretion of the Director of Graduate Studies and the Department Chair.
- Reading Committees - By the end of the 2nd year, each student should have a Reading Committee assembled and should begin holding annual meetings with all members of the committee present or attending via video or phone call.
- In the Spring quarter of the 3rd year, the department holds an annual symposium and lecture series known as the Mason Lectures. Third Year students present during a reception poster session to department faculty, friends, and alumni.

- Students are expected to serve as Teaching Assistants for 2 quarters during their tenure in the department for Chemical Engineering courses. This may occur at any time beginning in the 2nd year.

Some Further Resources For Graduate Students

Gateway for New Graduate Students The Office of the Vice Provost for Graduate Education has created a one-page index to many key resources at: <https://vpge.stanford.edu/gradgateway>

Student Services Center (SSC) - Tressider Union, 2nd Floor

The Student Services Center (SSC) is on the second floor of Tressider Union, at the eastern end of the building. At the SSC there are representatives for many of the central offices, such as the Office of the University Registrar, the ID Card Office, Student Financial Services, and Financial Aid to address your concern and/or work in coordination with the appropriate university department or office. The Payroll Department has moved off campus, but a representative is at the Cashier's Office next to the SSC.

Graduate Life Office (GLO)

GLO is a division within the office of the Vice Provost of Student Affairs. GLO is a central resource for information and advice regarding all aspects of graduate student life outside the classroom. They administer residence programs for graduate students and work closely with students and student organizations to provide advice about event planning.

Furthermore, they help students who experience difficulties by helping to problem solve and connecting them with other resources on campus. Staff members are available 25/7 by calling 650-723-7288 and at the prompt enter Pager ID 25085. At the second prompt, enter the number from which you are calling and staff will return your call.

Wellness at Stanford.

Go to <http://wellness.stanford.edu>. It's an online connection to 182 resources which include immediate help + communities of support + health and wellness

Student Activities - Religious Life & Housing Student Activities and Leadership and the Office of Religious Life are housed in the Old Union, which is next to Tressider and across White Plaza from the Bookstore and the U.S. Post Office. Housing Assignment Services is on Serra Street, in the modular buildings located to the east of Encina Hall.

Student Health

For health issues go to Vaden Health Center: <https://vaden.stanford.edu/> or online 24/7: <http://wellness.stanford.edu>. Enrolled students are eligible for Stanford's student health insurance, Cardinal Care. For graduate students, the cost is subsidized by the University at 50% of the cost per quarter. If a student opts into Cardinal Care for any academic quarter (Autumn, Winter, or Spring), coverage during the Summer is included.

Sexual Assault Support & Resources

If you have experienced any form of sexual or relationship violence, confidential counseling, emergency response and medical support are available to assist you, 24 hours a day. You can choose the resources you're most comfortable contacting. Visit <https://notalone.stanford.edu/>

Issues with Facilities

For an urgent Land & Facilities issue after hours (e.g. overflowing toilet) call 650-723-2281. To summon the police from a campus phone, dial 9-911.

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First Year Of Graduate Study

For Ph.D. students, your primary goals during the first six months are (a) to become more familiar with the nature of doctoral research, by participating in two research rotations and presenting posters detailing their research investigations under the supervision of faculty, (b) to acquire the necessary background in a spectrum of core graduate level courses, in order to be prepared to begin a doctoral research investigation. (c) to work with the faculty advisors in developing and writing research proposals for fellowship applications; (d) to become more familiar with many ChemE faculty members, their research areas and projects, and the more advanced students in their research groups; and (e) to seek out opportunities, such as individual faculty research talks. All these together should enable the new Ph.D. student to make well-informed decisions.

One essential goal for a Ph.D. student is to secure by the end of the second quarter their acceptance into a research group along with the faculty research advisor's commitment to providing on-going support at the 50% assistantship level for as long as the student is making satisfactory progress toward their doctoral degree. Acceptance by a billeted chemical engineering faculty member automatically includes an affirmation of this commitment. Students considering other faculty members as research advisors need to include this support guarantee in their negotiations. Additionally, Ph.D. students with other advisors are required to secure a billeted ChemE faculty member as a co-advisor. Finalized arrangements must be conveyed to the ChemE Student Services per the department's end of Winter quarter timeline and form.

All ChemE Ph.D. students register for 10 units total per quarter, year round (including summer quarters) during the first 2 quarters; this means three classes of 3 units each plus CHEMENG 399, "Graduate Research Rotation in Chemical Engineering" (1 unit). The composition of the 10-unit quarter study lists in subsequent quarters should be determined in consultation with the Ph.D. student's research advisor and if applicable, ChemE co-advisor. Co-advised students enroll in either their main advisor's research section or the co-advisor's section(s) of CHEMENG 600 "Graduate Research in Chemical Engineering" and their CHEMENG 5xx "Special Topics" seminar. Students can also consult with departmental student services, Shriram 129 and see <http://cheme.stanford.edu>.

M.S. DEGREE REQUIREMENTS

University Degree Requirements — Master's Degree

Students pursuing a M.S. must fulfill the University's unit-based residency requirement of completing a minimum of 45 units of Stanford course work and apply for degree within the three-year candidacy period. Honors Coop M.S. students have a longer, five-year, candidacy period. See the *Stanford Bulletin*.

Chemical Engineering Degree Requirements — Terminal M.S. Program

In summary, the requirements for a Master of Science degree in chemical engineering are

- Propose a focused course of study within the degree requirements
- Submit a “*Program Proposal for a Master's Degree*” form by the first week of November
- Complete at least four (4) of the CHEMENG 300-level graduate core courses
- An additional four (4) Chemical Engineering graduate-level lecture courses. May not use CHEMENG 699 Colloquium or any CHEMENG 500-level course.
- Complete at least three (3) CHEMENG 699 “Colloquium” seminars
 - HCP students may use any of the following to satisfy this requirement:
 - Three (3) units of a seminar/speaker series in engineering, science, or math.
 - A three-unit graduate course in engineering, science, or math.
- Complete an additional 18 units of science and engineering graduate lecture courses
- All courses taken for degree requirements must be taken for a letter grade, if offered
- Maintain a GPA of 3.0 or above
- Submit M.S. degree progress forms, approved by advisor and chair, in a timely manner

Plus fulfilling any other applicable university and departmental requirements.

For a complete discussion of all requirements, consult the *Stanford Bulletin* and discuss administrative degree progress components with ChemE Student Services, Chemical Engineering faculty advisors, and as needed, the Registrar's office representative at the Student Services Center, Tresidder Union.

All M.S. programs must be reviewed and given final approval by the M.S. advisor and the Chemical Engineering Graduate Program Committee chair *no later than the quarter prior to degree conferral*, in order to permit amendment of the final quarter's study list if the faculty deem this necessary. Students with questions should contact ChemE Student Services, Shriram Center, room 129.

Minimum Grade Requirement: Any course used to satisfy the 45-unit minimum for the M.S. degree must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

Chemical Engineering M.S. Degree Requirements — for Ph. D. Students

The University's general policy is that units are applicable toward only one degree; thus in most instances units may not be double-counted toward the residency requirement for more than one degree. An exception is that up to 45 units completed at Stanford toward a master's degree **or** up to 45

units accepted as transfer residency credit may be applied toward the required 135 completed units for a doctoral degree. If units are transferred and a Master's degree conferred, the total units required for both degrees becomes 180 units. Refer to the *Stanford Bulletin* for a complete description of the M.S. degree requirements, which are not identical with the course requirements for the Ph.D. degree.

PH.D. DEGREE REQUIREMENTS

In summary, the departmental requirements for a doctoral degree in Chemical Engineering are:

- Complete CHEMENG 300, 310, 320, 340, 345, 355, plus two CHEMENG 400 level courses. At least 5 of these 6 graduate core courses (300 level) must be taken in the first year.
- Participate in CHEMENG 699 "Colloquium" each quarter while pursuing doctoral work
- Become familiar with ChemE faculty and research projects (e.g. research. talks, group meetings)
- Secure a doctoral research advisor(s) by end of 2nd quarter. Secure a ChemE co-advisor if a research advisor outside of the department of Chemical Engineering is chosen.
 - Concurrently, if applicable, secure guarantee of on-going support
 - Plan to work year round; note vacation policy and advance communication of vacation plans
 - Work on and develop your own research project during the second half of the first year
- Maintain a GPA above the university minimum of 3.0; courses to be taken for letter grade if offered. GPA must be 3.0 or higher at end of 4th qtr to be eligible to take the qualifying exam for Ph.D. candidacy
- Prepare for and pass the oral qualifying examination for admission to Ph.D. candidacy; submit a completed "Application for Candidacy for Doctoral Degree" form in the same quarter
- In the 2nd year: Establish your 3-4 member Reading Committee, a cohort of mentors whose role is to provide you with guidance as you refine and progress with your research project
 - Submit a completed "Reading Committee" form to ChemE Student Services, Shriram room 129
 - Meet with full Reading Committee (or latest, first quarter of third year)
 - Degree Progress: Report meeting date(s) with Reading Committee to student services
- Assist faculty with teaching two CHEMENG courses
- Spring quarter 3rd year: Present your research at Mason Lectures' Research Poster Session
- Autumn quarter 4th year: Determine degree progress with regard to lecture courses and potential for TGR status
- Successfully defend work in an oral examination
- Complete an approved doctoral dissertation; obtain certification from university registrar

Plus fulfilling any other applicable university and departmental requirements.

Chemical Engineering Advanced Degree Core Courses (18 units)

CHEMENG 300 – Applied Mathematics in the Chemical and Biological Sciences

CHEMENG 310 – Microhydrodynamics

CHEMENG 320 – Chemical Kinetics and Reaction Engineering

CHEMENG 340 – Molecular Thermodynamics

CHEMENG 345 – Fundamentals and Applications of Spectroscopy

CHEMENG 355 – Advanced Biochemical Engineering

If a student thinks that a Core Course (listed above) would repeat material covered in a previously completed graduate-level course, he or she should discuss the content of previous work with the Graduate Program Chair. A student may submit a petition to waive a required core course to ChemE student services, for evaluation by the Chemical Engineering Graduate Program Committee and/or Department Chair. Approval of this type of petition means that the student will be granted a waiver from a specific core course requirement. However, departmental approval will not translate into a decrease in the number of lecture course units required for a degree, but it will allow the student greater flexibility in course selection.

Colloquia

CHEMENG 699 – Chemical Engineering Colloquium (1 unit) offered Aut, Win, & Spr. quarters. Students need to enroll in the course at 3 times during their tenure but are expected to participate regardless of current enrollment in the course.

Each M.S. and Ph.D. Chemical Engineering graduate student is expected to participate in the departmental colloquia throughout the entire time he or she is pursuing his or her advanced degree.

One of the purposes of the departmental colloquia is to provide opportunities for the ChemE community of students and faculty to come together on a regular basis and to learn about research activities in industry, at other universities, and in research groups within the department. Speakers include outside researchers, Stanford faculty, and advanced doctoral students. This seminar series provides ever widening exposure to the breath that is chemical engineering and excellent opportunities for strengthening professional networks. Regular attendance is expected of all graduate students, regardless of year of study. These seminars are held during the academic year, and all should reserve Monday at 4:00 p.m. for this purpose. Check the current schedule via the [ChemE Colloquia](#) webpage

Chemical Engineering Courses

A current list of courses being offered by the Chemical Engineering department can be found on [Explore Courses](#) and the [Chemical Engineering Bulletin](#)

Ph.D. Students are expected to TA two times during their tenure at Stanford. Any waivers for less than this should be approved by the Department Chair and ChemE Student Services. Approval to TA more than the required two times should be approved by the Department Chair, the student's advisor, and ChemE Student Services.

Academic Advising

For a statement of University policy on graduate advising, see the "[Graduate Advising](#)" section of the bulletin.

Master's Student Advising

The Department of Chemical Engineering is committed to providing academic advising in support of our M.S. students' education and professional development. When most effective, this advising relationship entails collaborative engagement by both the advisor and the advisee. As a best practice,

advising expectations should be discussed and reviewed to ensure mutual understanding. Both the advisor and the advisee are expected to maintain professionalism and integrity.

At the start of graduate study, normally at the beginning of the Fall quarter, each student is assigned a master's program advisor: a member of our faculty who will provide guidance in course selection and in exploring academic opportunities and professional pathways. The department's graduate handbook provides information and suggested timelines for advising meetings. Usually, the same faculty member serves as program advisor for the duration of master's study, but the handbook does describe a process for formal advisor changes.

In addition, the Director of Graduate Studies (DGS) and the Graduate Committee meets with all the master's students at the start of the first year, and are available during the academic year by email and during office hours.

Our department's student services office is also an important part of the master's advising team. They inform students and advisors about university and department requirements, procedures, and opportunities, and they maintain the official records of advising assignments and approvals.

Finally, graduate students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program.

For a statement of University policy on graduate advising, see the "[Graduate Advising](#)" section of this bulletin.

Ph.D. Student Advising

The Department of Chemical Engineering is committed to providing academic advising in support of doctoral student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the advisor and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the advisor and the advisee are expected to maintain professionalism and integrity.

Faculty advisors guide students in key areas such as selecting courses, designing and conducting research, developing of teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways. The department's graduate handbook provides information and suggested timelines for advising meetings in the different stages of the doctoral program.

Ph.D. students are initially assigned a program advisor at the outset of their matriculation at Stanford. This faculty member will provide initial guidance in course selection, in exploring academic opportunities and professional pathways, and in identifying doctoral research opportunities. The department does require formal lab rotations during two quarters prior to selecting a doctoral research/thesis advisor.

Graduate students are expected to select a thesis advisor by the start of the 3rd quarter of the program. Students are encouraged to work collaboratively with their advisor to establish a dissertation project and form a Dissertation Reading Committee. Advancement to doctoral candidacy is expected to

occur prior to the end of the fourth quarter of the program. The research supervisor assumes primary responsibility for the future direction of the student, taking on the roles previously filled by the program advisor, and will ultimately direct the student's dissertation. Most students find an advisor from among the primary faculty members of our department. However, the research advisor may be a faculty member from another Stanford department who is familiar with supervising doctoral students and able to provide both advising and funding for the duration of the doctoral program. When the research advisor is from outside our department, the student will also identify a program advisor from our primary faculty, to provide guidance on departmental requirements and opportunities. Thesis advisors are expected to meet with graduate students at least once each year to discuss and help develop the student's program plan. Additionally, advisors and students should meet on a regular basis throughout the year to discuss the student's professional development in key areas such as selecting courses, designing and conducting research, developing teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways.

The Director of Graduate Studies (DGS) meets with all of the doctoral students at the start of the first year, and is available during the academic year by email and during office hours. Our department's student services office is also an important part of the doctoral advising team: they inform students and advisors about university and department requirements, procedures, and opportunities, and they maintain the official records of advising assignments and approvals. Students are encouraged to talk with the DGS and the student services office as they consider advisor selection, or for guidance in working with their advisor(s).

Our doctoral students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program.

Suggested Electives

Beyond the required chemical engineering core lecture courses, the remaining lecture courses to fulfill the minimum 42 unit course requirement may be chosen, with advisor approval, from the graduate level science and engineering courses in any department and, by petition to the Chair of the Department of Chemical Engineering, from upper-division undergraduate courses in science and engineering.

M.S. students need to select 18 units of graduate electives in science and engineering that contribute to the thematic focus of their M.S. program proposal as well as planning for at least four (4) graduate core CHEMENG 300 level courses, at least four (4) Chemical Engineering graduate-level lecture courses, and three (3) quarters of CHEMENG 699 "Colloquium."

Ph.D. students should take and successfully complete at least five of the required six 300 level core graduate courses in their first year of Ph.D. studies. For their elective lecture courses, students should seek out science and engineering electives that help define or support their research interests.

The following is a partial list of courses and electives which students in the ChemE department have found interesting and useful in the past. The list is divided into five thematic categories. This list is by no means exhaustive. Students are encouraged to follow their own interests and goals in selecting their elective courses from a wide variety of graduate classes offered at Stanford. Look for courses designated by the departments as "graduate courses." In general, they are numbered at the 200 level

or above. For more information, search in Explore Courses for course descriptions, instructors, and year and quarter offered, as well as days, times, and locations. These courses may not be offered every year so be sure to confirm quarter and year offered via Explore Courses.

Biochemistry and Bioengineering

CHEMENG 281 – Biochemistry I
CHEMENG 274 – Environmental Microbiology
CHEMENG 283 – Biochemistry II
CHEMENG 450 – Advances in Biotechnology
CHEMENG 454 – Metabolic Engineering Method Applications
CHEMENG 456 – Microbial Bioenergy Systems
CHEMENG 459 – Frontiers in Interdisciplinary Biosciences (1 unit)
CHEMENG 468 – Advanced Transport Topics in Complex Fluids and Biological Systems
BIOPHYS 228 – Computational Structural Biology
BIOPHYS 241 – Biological Macromolecules
BIOSCI 203 – Advanced Genetics (human)
BIOC 133 – Genetics of Prokaryotes
BIOE 331 – Protein Engineering
BIO 217 – Neuronal Biophysics
BIO 230 – Molecular and Cellular Immunology (4 or 5 units)
CBIO 241 – Molecular, Cellular, and Genetic Basis of Cancer
MCP 256 – How Cells Work: Energetics, Compartments, and Coupling in Cell Biology (4 units)
MPHA 210 – Signal Transduction Pathways and Networks (4 units)
MPHA 240 – Drug Discovery (4 units)
MPHA 260 – Quantitative Chemical Biology (4 units)
SBIO 228 – Computational Structural Biology
SBIO 241 – Biological Macromolecules

Microelectronics

AA 218 – Introduction to Symmetry Analysis
EE 212 – Integrated Circuit Fabrication Processes
EE 216 – Principles and Models of semiconductor Devices
EE 228 – Basic Physics for Solid State Electronics
EE 311 – Advanced Integrated Circuit Fabrication Processes
CME 200 – Linear Algebra with Application to Engineering Computations
CME 204 – Partial Differential Equations in Engineering
CME 206 – Introduction to Numerical Methods for Engineering
CME 212 – Introduction to Large-Scale Computing in Engineering
CME 332 – Computational Methods for Scientific Reasoning and Discovery
CME 340 – Computational Methods in Data Mining
ME 338A – Continuum Mechanics
ME 351A – Fluid Mechanics
ME 457 – Fluid Flow in Microdevices
ME 469A – Computational Methods in Fluid Mechanics

Fluid Mechanics, Applied Mathematics, and Numerical Analysis

CHEMENG 462 – Dynamics of Complex Liquids
CHEMENG 468 – Advanced Transport Topics in Complex Fluids and Biological Systems

AA 218 – Introduction to Symmetry Analysis
CME 200 – Linear Algebra with Application to Engineering Computations
CME 204 – Partial Differential Equations in Engineering
CME 206 – Introduction to Numerical Methods for Engineering
CME 208 – Mathematical Programming and Combinatorial Optimization
CME 210 – Multiscale Methods in Engineering
CME 212 – Introduction to Large-Scale Computing in Engineering
CME 332 – Computational Methods for Scientific Reasoning and Discovery
CME 340 – Computational Methods in Data Mining
ME 338A – Continuum Mechanics
ME 351A – Fluid Mechanics
ME 457 – Fluid Flow in Microdevices
ME 469A – Computational Methods in Fluid Mechanics

Materials Science

CHEMENG 260 – Polymer Science and Engineering
CHEMENG 442 – Structure and Reactivity of Solid Surfaces
CHEMENG 444 – Quantum Simulations of Molecules and Materials
CHEMENG 460 – Polymer Surfaces and Interfaces
CHEMENG 461 – Polymeric Materials in Medical Devices
CHEMENG 464 – Polymer Chemistry
CHEMENG 466 – Polymer Physics
MATSCI 210 – Organic Materials
MATSCI 251 – Microstructure and Mechanical Properties
MATSCI 316 – Nanoscale Science, Engineering, and Technology
MATSCI 320 – Nanocharacterization of Materials
MATSCI 323 – Thin Film and Interface Microanalysis
MATSCI 343 – Organic Semiconductors for Electronics and Photonics
MATSCI 380 – Molecular Biomaterials

General Interest

APPPHYS 207 – Laboratory Electronics
CHEM 221 – Advanced Organic Chemistry
CHEM 271 – Advanced Physical Chemistry (Quantum Mechanics)
CHEM 273 – Advanced Physical Chemistry (Angular Momentum, etc.)
EE 261 – The Fourier Transform and its Applications
EE 268 – Introduction to Modern Optics
MS&E 234 – Organizations and Information Systems (4 units)
STATS 200 – Introduction to Statistical Inference

Study List Composition & Priorities

The University requires that all students who are not U.S. citizens or permanent residents maintain a visa status that permits registration as a student. All international students should be extremely careful to maintain 'full-time' student status. This is documented by the number of units on your study list. Therefore, it is critical that a preliminary study list for at least 8 units is submitted in *Axess* by the first day of the quarter.

Courses: Courses used to fulfill the 42 unit requirement should be **lecture based**. Any courses taken that are not lecture based will still count toward the 135 total required units for the PhD, just not toward the 42 lecture-based units. The CHEMENG 300 courses and 400 courses do count toward the 42 lecture unit requirement – these 42 units are not IN ADDITION.

- 24 units CHEMENG 300-level & 400-level courses
- 18 units elective “science/engineering, graduate level” lecture-based course
- = 42 lecture-based units that are required

Quarterly Enrollment: Please be sure to enroll. Every. Single. Quarter. Each quarter, first enroll in the courses chosen. Up to 10 units.

- If there are any units left, first enroll under the advisor’s research course. Any students under advisors outside of ChemE who haven’t confirmed with ChemE Student Services which units to enroll in, please get in touch.
- Each student must enroll in CHEMENG 699 at least 3 times during their tenure as a PhD student.
- After that, enroll in the advisor’s group meeting section.
- Be sure to only enroll in 10 units by the Final Study List deadline

Under normal circumstances, it is expected a Ph.D. student will complete all of the requirements for the Doctor of Philosophy degree in chemical engineering, including the submission of a completed dissertation, within five calendar years of being advanced to Ph.D. candidacy.

The student is responsible for the timeliness and accuracy of his or her study lists. Missed deadlines and inaccurate study lists can result in very serious consequences. All students seeking a degree, including those with TGR (Terminal Graduate Registration) or Graduation Quarter status, need to register in a timely manner *each quarter*, including the quarter of degree conferral. Matriculated students register by filing study lists online in Axxess for the total number of units that is equal to the level of tuition paid, awarded or allowed. Axxess does not add up your unit total, so check carefully that your tuition allowance and the unit total are congruent. Coterminal degree students need to tally both study lists for their sum.

Any student with administrative questions should talk with the ChemE Student Services, Shriram 129, the *first* week of the quarter.

Axxess

Axxess is a portal that allows students, faculty, and staff to access portions of the online PeopleSoft Student Administration system. Through Axxess students can file their study lists, view and print an unofficial transcript, order an official transcript, apply for housing, update personal information, view their financial aid and university bill, apply to graduate, and more.

Once you and your advisor have determined your program, you register for courses by submitting a study list via Stanford's online registration system Axxess. Axxess may be reached at <http://axess.stanford.edu>.

Note: An "independent study" course is one with one catalog/course number and multiple instructors, each of whom is independently responsible for the students they are mentoring (e.g. CHEMENG 399

and CHEMENG 600). Students must ensure that they sign up for the correct instructor because it is time consuming or impossible for the student to obtain approval from the Registrar to change instructors after the quarter's deadline for study list submission.

Degree Progress for Ph. D. Students

Units & Course Requirements

Ph.D. students must complete a minimum of 135 units in order to satisfy the university's residency requirement. This should pose no issues for candidates in this department. For departmental unit and course requirements, see the *Stanford Bulletin*. For further clarification and policy questions, see ChemE Student Services, Shriram 129.

Negotiating a Research Advisor(s) & Ph.D. Student Match

First-year Ph.D. students are required to negotiate successful research advisor matches by the end of the second quarter in the Ph.D. program, starting with participating in research rotations in both Autumn and Winter quarters. **Put CHEMENG 399 "Graduate Research Rotation in Chemical Engineering" (1 unit) on your study list** each of these two quarters. The purpose of these rotations is to introduce students to current research topics through significant participation in the research work, to teach students how to present their results in a poster session at the end of each quarter, and to encourage them to gain a depth of familiarity with faculty, more advanced doctoral students, and the workings and culture of multiple research groups.

Participation in CHEMENG 399 is graded, and performance in this course comprises part of the mandatory evaluation for pre-candidacy standing and suitability to continue in the chemical engineering Ph.D. program.

In addition to the exposure provided by these research rotations, Ph.D. students are expected to acquaint themselves with the research projects going on in other chemical engineering research groups by

1. Sitting in on the Oral Examinations of students completing their doctorates
2. Participating in research group meetings held by other engineering research labs
3. Engaging in informal discussions with faculty and graduate students, and others
4. Attending faculty talks about their research during Autumn and early Winter quarter
5. Seeking out other ways to be proactive in their choice of research advisor.

By the end of Winter quarter, each first-year Ph.D. student must be accepted by one or more faculty advisors into their research group. The ChemE faculty advisors will be the student's new academic program advisor as well as their research advisor. Students will work with their new research advisors to develop appropriate research topics, which they will work on over the next two quarters in preparation for the qualifying examinations for Ph.D. candidacy at the end of the fourth quarter.

Second Half of the 1st Year - Delineating your own research direction

The end of Winter quarter and beginning of Spring quarter is a time of transition:

- You will start your own doctoral research
- Your ChemE faculty research advisor is also your Ph.D program advisor

- You should plan your Spring quarter study list with your advisor. You are required to take at least 5 of the 6 ChemE core graduate courses by the end of spring quarter; however, instead of further lecture courses at this time, your research advisor may advise you to complete your study list with research units and the Special Topics seminar for the research group.
- Enroll full-time during summer quarter
- Prepare for Quals; participate in informational and practice sessions
- Your financial support may change from fellowship stipend to assistantship salary. For further information, see <http://cheme.stanford.edu>. Go the bottom left “Information for...” box and click on “Current Ph.D. Students” and “Financial Support for PhD Students. And check-in with ChemE Student Services, Shriram 129.

Qualifying for Ph.D. Candidacy

Ph.D. students are asked to demonstrate their scientific and analytical aptitude in an oral examination before a committee of chemical engineering faculty members. Students present and defend their own research work and also are expected to demonstrate a strong command of the chemical engineering fundamentals underpinning their area of research.

The Qualifying Examination for Ph.D. Candidacy - “Quals” - End of the First Year: Normally Wednesday through Friday of the week before classes begin in Autumn quarter)

After two quarters of work on their own research projects, students present their thinking and any results; the examining committees comprise chemical engineering faculty and any other research advisors. The format of this examination consists of three parts: (a) preparation of a concisely written summary of the student’s presentation; (b) an oral presentation that includes a demonstration of depth of thinking about one’s research and indications as to where it is leading, as well as a mastery of the fundamental chemical, physical, and biological concepts that govern the molecular behavior of the system being studied; (c) responses to faculty questions that confirm a student’s fundamental understanding of the general area of research and the specifics of his or her project. Detailed guidelines and instructions are given at the time of the examination.

Results:

- Students passing their qualifying examination are advanced to Ph.D. Candidacy upon submission of a signed *Application for Candidacy for Doctoral Degree* form. And successful candidates are instructed to assemble their doctoral dissertation reading committee and submit a completed *Doctoral Dissertation Reading Committee* form to the ChemE Student Services, Shriram 129.
- If the faculty deems a student’s performance on the qualifying examination to be unsatisfactory, there are two possible outcomes:
 - The student is asked to leave the Ph.D. program.
 - The student is given an opportunity to retake the examination after further preparation, (in approximately 6 months). If, after a second Ph.D. qualifying examination, a student’s performance is still deemed unsatisfactory, the student will not be admitted to Ph.D. candidacy nor permitted to continue work on Ph.D. research.

Ph.D. Candidacy

It is expected that all students in the Chemical Engineering Ph.D. program will successfully complete their qualifying examinations at the end of their first year, and almost all do. Upon completion candidates should submit their *Application for Candidacy for Doctoral Degree* and *Doctoral Dissertation Reading Committee* forms to the ChemE Student Services during Autumn quarter of the second year, or in the quarter immediately following the successful examination. If there are subsequent revisions, a fresh *Application for Candidacy for Doctoral Degree* form should be completed and approved; it will be marked 'revised' and retained in the student's departmental file with student services. Do not use the university's *Academic Program Revision* form as it does not permit the full display of a student's complete program of lecture courses on one form. If there is a subsequent revision in the composition of the Reading Committee, see student services for the appropriate form. **Accurate forms must be on file in a timely manner with student services in order to ensure that the student's official record of degree progress and completion of degree milestones is timely and accurate.** All degree progress forms are available with Chemical Engineering Student Services (Shriram 129) or on the Registrar's website.

Ph.D Reading Committee & Committee Meetings

Upon successful completion of the qualifying examination for Ph.D. candidacy, each student discusses with their research advisor the composition of a dissertation reading committee, which consists of a minimum of three members; all three committee members may be Chemical Engineering faculty; one must be, e.g.: a principal dissertation advisor plus two readers or two dissertation advisors plus one reader. Any student with a non-ChemE faculty research advisor must have their ChemE co-research advisor as one of the members of the reading committee. Normally, all are members of the Stanford Academic Council; however, in some instances the advisor(s) and student may recommend, and the department chair may approve, the appointment of a reader who is a non-member if that person is particularly well-qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree. A reading committee may comprise three, four, or more members.

In the second year, as soon as the members of a student's Dissertation Reading Committee have been determined, a *Doctoral Dissertation Reading Committee* form with the signatures of the committee members should be submitted to ChemE Student Services. If the student proposes a non-Academic Council member, that person's complete CV and a *Petition for Doctoral Committee Members* form should be submitted as well.

The primary purposes of the efforts of the faculty members on the student's Reading Committee are: (a) to assist the student to define and to refine the scope of his or her work; (b) to promote an informal atmosphere conducive to informal discourse; (c) to develop suggestions for future research directions; and (d) to assist with other professional support. Ideally, each member of the reading committee provides on-going assistance and support with the dissertation work in the times between committee meetings.

As envisioned by the Chemical Engineering faculty, reading committee meetings with the full committee present and participating should start in the second year and ideally continue at least annually with the full committee meeting with the candidate at least once a year. To help promote informed and relaxed exchanges, students also are expected to be proactive in meeting more

frequently on an individual basis with their committee members, in order to keep members up-to-date with the direction of current dissertation work.

Policy for Second Year Reading Committee meetings for Ph.D. candidates in Chemical Engineering

- All members (three or more) of the reading committee must be present.
- The Ph.D. candidate should prepare and give a research talk of 20-30 minutes in length.
- Talk should focus primarily on the research accomplished to date and also should include a few slides at the end regarding future work and goals for the Ph.D. dissertation.

It is the joint responsibility of the faculty advisor and the Ph.D. candidate to call the meetings of the reading committee. Faculty members are expected to make Reading Committee meetings a priority. Students are responsible for emailing the dates of their reading committee meetings to ChemE Student Services. This meeting information is noted on each student's *Candidacy for Doctoral Degree* form that documents progress toward degree.

Research Poster Presentation In Third Year, During Mason Lectures Week

All third year Ph.D. students should prepare a poster about their research and be available to present it to the chemical engineering community during the spring quarter Mason Lectures week.

Ph.D. Degree Teaching Requirement

Each Ph.D. candidate, regardless of source of financial support is required to assist ChemE faculty with the teaching of two courses offered by the Department of Chemical Engineering. Teaching experience is an important component of the Ph.D. curriculum. Service as a Course Assistant is a valuable and enriching aspect of the pre-doctoral experience, for it allows doctoral students to work closely in a teaching capacity with one or more faculty members and to explore the relationships between research, teaching and learning, thereby gaining new perspectives.

Before assuming their teaching assistant duties, all chemical engineering teaching or course assistants are required to participate in ChemE TA training (department-centric). The Vice Provost for Teaching and Learning (VPTL) also runs a TA training that should be attended if possible. .

Course Assistant Duties

While the exact duties of a course assistant (CA) vary depending on the teaching methodology of the instructor and the course topics, generally the duties involve some (or all) of the following: grade problem sets; grade reports; lead recitation sections/tutorials; hold office hours; plan and supervise laboratory experiments; administer examinations.

Although Course Assistants in the School of Engineering generally do not lead lectures, they occasionally may be asked to do so. Similarly, while CAs may grade portions of examinations, they should not be responsible for grading the entire final exam or any material that constitutes the majority of work necessary to give a final grade. In addition, they should not be asked to assign final grades.

TA assignments for the upcoming academic year are made during summer quarter. Students generally start their CA duties sometime during their second or third year. Students should expect to devote approximately 20 hours per week on the average to CA duties. Any extreme discrepancy from this norm should be brought to the attention of the instructor, the ChemE Department Chair, the TA trainer, and/or ChemE Student Services. The ChemE Course Assistantship appointment provides the same level of financial support as a Research Assistantship appointment for ChemE Ph.D. students.

University Oral Examination

The purpose of the oral examination is to confirm the candidate's fitness for scholarly pursuits by

- evaluating his or her command of the field of study and understanding of the research performed
- determining his or her unique contribution to the existing body of knowledge. Examiners may ask general questions about the area of specialization, even if they fall beyond the scope of the dissertation itself.

A University Oral Examination Committee consists of at least five Stanford faculty members: a committee chair and four examiners. The candidate should consult with his or her advisor and ChemE Student Services regarding the composition of the committee. The student is responsible for assembling the committee and making logistical arrangements for the examination. All members must be Stanford Academic Council members (unless a specific waiver is requested and approved by the ChemE Department Chair). Typically, the examination committee includes a chair, the members of the candidate's Dissertation Reading Committee, and a non-reader. The chair of an oral examination committee may not have a full or joint appointment in the same department as the candidate or the research advisor [See [Stanford Bulletin](#)]. There is no restriction with regard to the non-reader's home department.

Preparation:

- The *University Oral Examination Schedule* form must be submitted to the ChemE Student Services three or more weeks prior to the proposed examination date
- the candidate is responsible for submitting an abstract in Word format to ChemE Student Services at least three weeks prior to the examination, in order for preparing an email announcement for dissemination to the entire department. The candidate is responsible for sending the same announcement to his or her committee members and anyone else whom he or she wishes to invite to the public portion of the examination.
- Submit a working draft of their dissertation to their Orals Committee members at least 3 weeks in advance of the date of the University Oral Examination. Copies of the dissertation must be in the readers' hands an absolute minimum of 2 weeks before the oral examination unless the involved faculty specifically approves other arrangements.

ChemE Student Services prepares an orals folder for the chair of the orals committee, containing the approved *University Oral Examination Schedule* form, the student's abstract, and other materials related to the examination. The student should check in with ChemE Student Services three or four workdays before the exam date to ensure all information is correct and up-to-date.

The oral examination itself consists of two parts. The first, which is open to the public, begins with a presentation by the doctoral candidate and clarifying questions from the audience. There is a short recess before the second portion of the examination, which is a closed session with only the candidate

and the members of the Oral Examination Committee. Detailed questions are asked of the candidate and a determination is made as to whether the candidate has successfully passed the examination. The entire examination period may not exceed three hours in length.

Five members present and voting constitute a quorum. The candidate passes the examination if the examining committee casts four out of five or six favorable votes, or five votes out of seven, or six votes out of eight. Consult the *Stanford Bulletin* for policy information about the examination and reporting procedures. Talk with ChemE Student Services to clarify any details. Note: the student must be registered in the quarter in which they take the university oral examination. Ph.D. candidacy must be valid.

Doctoral Dissertation Requirement

A dissertation based on a successful investigation of a fundamental problem in chemical engineering is required. Furthermore, the Stanford University requires the dissertation to be "a contribution to knowledge and the result of independent work, expressed in satisfactory form." There is no set of rules, or any fixed timeline beyond the period of doctoral candidacy, for the completion of such a task. The burden of responsibility is on the student and his or her advisor, with the input of the members of the Reading Committee, to determine the direction of research and to set goals that, when achieved, constitute "a successful investigation."

Before preparing their dissertation manuscripts, students should carefully review the [guidelines for submission](#) on the Registrar's Website. This document outlines the University's requirements for the preparation of doctoral dissertations. Go to the Student Services Center in Tresidder Union and ask for clarification if you are unsure of any of the instructions.

Dissertation Submission

Well in advance, all candidates should discuss with their advisor(s) the format(s) of the dissertation (paper and/or electronic) and any disclosure or embargo conditions to be specified at the time of submission. Guidelines for formatting can be found via the [Registrar's Office Website](#).

Students with questions should submit a [SNOW ticket](#) to get advice from the Student Services Center.

The dissertation is certified and ready for final submission when each member of the Reading Committee signs the appropriate signature page(s), certifying that the work is of acceptable scope and quality. At least one member of the candidate's Reading Committee must read the dissertation in its final form and certify on the *Certificate of Final Reading* form online that departmental and University requirements have been met.

The candidate must be registered in the term (quarter) in which the dissertation is submitted. An Application to Graduate must be on file in Axess, all of the departmental requirements completed, and candidacy must be valid (see the *Stanford Bulletin* for further details). There is a fee for submitting a dissertation.

Conferral Of Degrees

Students pursuing a Master of Science degree have a three-year candidacy period in which to complete their degree requirements. Ph.D. students have a five-year candidacy period, which starts once they have been advanced to candidacy. For Chemical Engineering Ph.D. students this normally is at the beginning of the second year of graduate study. For the ChemE doctoral student, it is expected under normal circumstances that they will have completed all requirements for the Ph.D. degree, including submission of a completed dissertation, within this period. A degree candidate should contact ChemE Student Services before the expiration of their candidacy if they anticipate a need to petition for an extension of candidacy.

It is the student's responsibility to notify both ChemE Student Services and the University Registrar in a timely manner that they wish to have a degree conferred. If there is a reasonable likelihood that a student will complete their degree requirements by the end of a particular quarter, student should go ahead and apply in Axess to graduate that quarter before the deadline. There is no penalty for withdrawing an application to graduate in the last weeks or days of the quarter.

For the department: schedule an appointment with ChemE Student Services in the quarter prior to the quarter at the end of which the degree is to be conferred, in order to verify that all departmental requirements could be met. Any revised degree programs and degree progress forms will need the appropriate faculty and staff approvals.

To notify the Registrar: in Axess submit an *Application to Graduate for Advanced Degrees* online. See the University's academic calendar for application deadlines. After the application deadline, the Registrar will forward to the department the quarter's *Recommendation for Conferral of Degree* lists with everyone who has applied for a degree. If the student has satisfied all departmental degree requirements, the faculty recommends degree conferral. If the student has not completed all degree requirements by the end of the quarter for which application was made, conferral is denied and the student's application is not carried over to any subsequent quarter. The student must re-apply in Axess when ready.

Certification Of Completion Of Degree Requirements

If a student needs to prove that they have completed all degree requirements (in last quarter and before the official degree conferral date at the beginning of the following quarter), contact the Registrar's Office, e.g., if proof of completion is necessary in order to assume a postdoctoral appointment at another institution.

After degree is officially conferred, typically one to two weeks into the following quarter, the date will be on the student's Stanford transcript. There is no cost associated with requesting Stanford transcripts as students pay a one-time, life-long document fee when first enrolled. Alums can order transcripts through Axess for the first five years after the last quarter of attendance. Thereafter, a transcript request form is available at <http://registrar.stanford.edu>

Degree verification has been outsourced to the National Student Clearinghouse and is available at www.degreeverify.org. Any party (employer, insurance company, etc.) may request confirmation of degree conferral.

Registration Status

Some M.S. students register at the 11-18-unit tuition rate. Registration is quarter by quarter, and M.S. students can change their level of enrollment from quarter to quarter. In addition, M.S. students in their final quarter may petition to register for less than a full-time load and pay a lower tuition; see ChemE Student Services. International students are advised to talk with the International Center in advance.

Most graduate students are registered at the 8-10 unit tuition rate (all ChemE Ph.D. students).

The University requires that all students who are not U.S. citizens or permanent residents maintain a visa status that permits registration as a student. All international students should be extremely careful to maintain 'full-time' student status. This is documented by the number of units on the study list. Therefore, it is critical that a preliminary study list for at least 8 units is submitted in Axxess by the first day of the quarter.

All students must be enrolled in the quarter (including Summer Quarter) in which they are submitting a thesis or dissertation and/or having a degree conferred, regardless of the applicability of "non-enrollment policies during Summer Quarter" at other points of degree progress.

Ph.D. students who have completed their University residency requirement and all their coursework and other degree requirements (except the oral examination and a dissertation submission) may have two other registration statuses: Terminal Graduate Registration (TGR) and Graduation Quarter Registration.

Neither of these two is required for degree conferral; however, the former is recommended when the student is eligible and the latter when more time is needed following the oral examination in which to complete the dissertation or other publications with their advisor.

Terminal Graduate Registration Status — "TGR"

Ph.D. students must fulfill the University's residency requirement before requesting Terminal Graduate Registration status. The full requirements for TGR status are:

- Admission to Ph.D. candidacy
- Completion of the *Doctoral Dissertation Reading Committee* form
- Completion of Doctoral Dissertation Reading Committee meeting(s)
- Completion of a minimum of 135 units
- Completion of all university and departmental degree requirements, except the oral examination and dissertation submission.

This status is not linked to nor is it a prerequisite for the conferral of the Ph.D. degree; however, this registration status is desirable when appropriate as TGR status reduces tuition costs considerably. Once a student has TGR status, they continue with this status until Ph.D. degree conferral (with the possible exception of a final quarter, one-time per degree "Graduation Quarter" status). Students obtain TGR status by completing a TGR form requesting this status and filing a TGR study list. **A TGR study list must have CHEMENG 802 "TGR Dissertation" (zero units).**

Once a student has gone on TGR status, they may enroll in up to 3 units total (CHEMENG 802 is 0 units). It is not necessary to continue enrolling in research units or group meeting units. Students may use these 3 units to take a course of personal interest or enroll in a sport/athletics course.

TGR status has no effect on salary rates. TGR students are considered full-time graduate students for all purposes. TGR status entitles students access to all the usual student benefits (eg, health insurance coverage and subsidy, library use, sports facilities, etc.). If a TGR student wants or needs to take more than 3 units per quarter, someone will need to pay for the difference in tuition between the TGR tuition and the amount required for the units taken.

Preparation: The quarter before, eligible students should start a *Request for TGR Status* form (available through Axxess, in the Student tab under eForms). ChemE Student Services will process and send to the Registrar's Office for final approval. Upon University approval, the student will receive an email. Students should be sure to enroll in CHEMENG 802 prior to submitting the TGR request form.

Graduation Quarter Status

All degree candidates must be registered in the term in which they submit a dissertation and/or have a degree conferred. Students who only remaining degree requirement is the submission of a thesis/dissertation (and who also meet certain other conditions) are eligible for Graduation Quarter registration, for which tuition is reduced to \$150/quarter. Students need to petition for this status in advance of the quarter of use. Put only CHEMENG 802 on a Graduation Quarter study list.

Students on Graduation quarter are registered at Stanford, are certified as full-time students for the quarter, and therefore, have the rights, privileges, and obligations of registered students. Graduate students may have this special status only once per degree. Contact ChemE Student Services for further information.

Leave of Absence

Per University policy, all students are expected to be enrolled continuously, full time each quarter during each academic year, or to have an approved leave of absence, until all pending degrees are conferred. This policy applies to both undergraduate and graduate students. Before requesting and taking a leave of absence, all students should consult with faculty advisors and ChemE Student Services as appropriate and additionally, all international students should review their potential request with staff at the Bechtel International Center. Students in the Master's program planning not to enroll summer quarter should notify the ChemE Student Services in advance. Students in the Ph.D. program should enroll year round, including summer quarter.

Any requests granted for a leave of absence after the beginning of the quarter will result in a bill for prorated tuition for the number of days beyond the start date of the quarter. This bill must be paid before the student can resume studies. Any time taken for a leave of absence does not extend the candidacy timeline for an advanced degree. Faculty, at their discretion, may approve an extension of candidacy.

Ph.D. Financial Support

Ph.D. students join a faculty member's research group upon successful completion of negotiations for a faculty + student match by the end of the second quarter. The Department of Chemical Engineering's policy is each primary research advisor is responsible for the management of the financial support of the members of his or her research group. All candidates who are making satisfactory progress toward degree and being advised by billeted Chemical Engineering faculty members can assume an on-going faculty commitment to financial assistance at the level of a 50% assistantship in the absence of other awards.

Under normal circumstances, the department faculty members anticipate that pre-doctoral students will complete the requirements for the Ph.D. degree within five years of being advanced to candidacy, or before the end of the summer quarter of the sixth year in residence. The decision to terminate a student for insufficient degree progress will rest with the advisor, but the advice of the faculty members of a student's Reading Committee or other appropriate faculty members will be sought when an early termination of a student already admitted to candidacy is being considered. Those students who are joining a non-chemical engineering faculty research group must ensure the accepting non-ChemE faculty member is aware of this until-degree-conferral commitment and obtain written acceptance. A 50% assistantship appointment provides a salary at the ChemE department wide annual rate and a job benefit of a tuition allowance for 10 units per quarter.

Fellowship Awards and Research & Teaching Assistantship Jobs

It is important that students monitor their university bills and the timely receipt and amount of their fellowship awards and assistantship job pay. If concerns arise about your university bill, credits, or dispersals, please get in touch with ChemE Student services right away. .

Fellowship stipend funds are available at the beginning of the quarter. The quarterly stipend funds from fellowship aid sources first are allocated to pay the tuition, then non-tuition charges on the students' bills — such as, housing and ASSU fees— and then any remaining funds are deposited directly into the student's bank account, if the student has set up direct deposit authorization. Alternatively, a few days later a "refund" check is sent to the student's local mailing address, as listed in Axess. It is strongly recommended that a student set up/authorize direct deposit to a bank account.

No taxes are withheld from stipends for US citizens and permanent residents. In general, taxes are withheld for international students (see *TAXATION*). In the latter case, sometimes there is a tax treaty between the U.S. and the student's home country.

Research Assistants and Teaching/Course Assistants are considered student employees. Complete and current employment paperwork is a prerequisite for paychecks. Assistantship salary paychecks are issued twice monthly throughout the quarter. We strongly recommend that students authorize Stanford Payroll to deposit their net pay directly into their bank accounts. This can be done online in Axess.

National Science Foundation (NSF) fellowships are supplemented by the student's advisor to reach the minimum salary level in the department. Information pertaining to this supplement can be found via the [ChemE Intranet](#) (SUNet login required).

Mid-year Change In Disbursement Of Financial Support For Some 1st Year Ph.D. Students.

Some first-year ChemE Ph.D. students will be supported by Chemical Engineering fellowship stipends for the first two quarters and then by research assistantship salaries for subsequent quarters. In this instance, it is particularly important that the student understand the differences between these two forms of support. Stipend funds for entire quarter (with no taxes withheld for U.S. and Permanent Residents) are available to the student at the beginning of the quarter. A salary paycheck is disbursed six times per quarter and taxes are withheld. This combination of first stipend and then salary means the transition from support by a stipend award to support by a salary check can entail a gap of almost four months.

The good news is that when a student is paid a salary, they can set up payroll deductions in Axess and thus avoid late fees while her/his bill is paid off from each paycheck.

Paperwork — Employment Eligibility, Identity, Visa Status, and Tax Withholding

All employees, including matriculated students, paid a salary by the university payroll system must complete an Employment Eligibility Verification form (I-9) with Student Services.

Students should complete this paperwork with ChemE Student Services. This document requires copies of specific documents:

- U.S. citizens should bring either a U.S. passport or both a driver's license (or state ID card) and their Social Security card.
- U.S. Permanent Residents need to bring their permanent resident card.
- International students must bring their valid passports, U.S. student visas, I-94, I-20 or DS-2019 and any other immigration documents, for copying.

All international students are strongly encouraged to pay attention to and to take advantage of the various informational and service offerings of the Bechtel International Center. International students should consult with Bechtel before visiting U.S. government offices. Confer with ChemE Student Services and the Bechtel International Center staff as questions arise.

Work Outside Ph.D. Support

It is the policy of the Department of Chemical Engineering that all Ph.D. students will devote their efforts full time to their Ph.D. studies and work; that every effort is made to maintain a reasonable student stipend/salary level; and that students will be employed as Research Assistants by individual faculty members if they are not supported sufficiently by fellowships. In the case of an internship, the student should obtain the support advisor and each should have an understanding of the expectations as well as finite timeline.

Vacation Time

M.S. students should use the breaks between quarters in the academic calendar when scheduling their vacations.

Chemical Engineering's graduate student vacation policy:

For graduate students pursuing their Ph.D. in Chemical Engineering and for university Ph.D. students working in Chemical Engineering's faculty research laboratories, the policy is Ph.D. students are entitled to 20 business days of vacation time each year, i.e. 20 week days, Monday through Friday, including of all University closure dates or breaks in the academic calendar, but excluding U.S. federal holidays. Ph.D. students should discuss any projected vacation plans with their faculty advisor and obtain approval in advance for time away. The Chemical Engineering Ph.D. program is a year round program, and doctoral students work on projects for which there is an expectation of and commitment to continuous effort. Mutually acceptable arrangements should be made in advance for the coverage of any critical functions and/or leaves in excess of this allocation. Leaves in excess of this allocation may be with an adjustment in financial support.

Expenses Related to the Pursuit of Your Degree

In the process of pursuing your graduate degree, there often are degree-related expenses, such as:

- Travel expenses in conjunction with research or participation in conferences
- Purchase of equipment for a project
- Purchase materials or supplies for research use
- Production costs associated with presentations of research results.

Students should discuss potential expenses with their advisors and obtain appropriate approvals. There are general university policies regulating purchases and reimbursements. Students should be aware that the specific budget associated with a project and the type of funds covering the expense can further define allowable purchases and methods of purchase. Thus, there is no departmental-wide policy regarding these types of expenses and reimbursements. Each faculty or staff member has their own portfolio of accounts, grants, and contracts and their budget considerations. Each faculty member sets policy as to how funds will be dispersed within his or her research group.

Note: it is not recommended that students purchase equipment or supplies with a personal check or their own credit cards, but if they do so, the total expense including taxes and other charges such as shipping must be under \$2,500. Per university policy, purchases which exceed \$2,500 made with personal funds, may not be reimbursed from university funds.

Laboratory Safety

A list of all Safety Chiefs is posted by each lab.

The Department of Chemical Engineering is committed to providing all of the necessary information, support, and facilities to make your research environment a safe and productive one. Concern for personal safety is foremost, and most policies are directed towards preventing conditions that may be health-threatening. Also of concern are the safety of laboratory facilities and the consequences of unsafe activities. It is each individual's responsibility to create a safe working environment.

As guidelines to help ensure safe practices, the department has several safety policies:

- Faculty Safety Chief responsible for overseeing all aspects of health and safety in the throughout the chemical engineering department.
- Faculty Safety Chiefs are responsible for health and safety in the chemical engineering laboratories. Check the safety box with each lab. Notify them immediately of any incidents.

- Student Safety Chief in each research group. It is their responsibility to coordinate the safety-related activities within the group. If you plan to do any research in a ChemE laboratory, you are required to know who the safety chiefs are and how to contact him/her in an emergency. If you have routine questions or comments, discuss them with your group's Student Safety Chief.
- If you are not associated with a research group, contact the department's Faculty Safety Chief.
- The department holds periodic safety-training meetings. Completion of appropriate training is *mandatory* for all graduate students, postdocs, faculty, and staff who work in the department. If you are unable to attend one of these meetings, it is your responsibility to complete any required online training program.
- The department has periodic safety tours/inspections when the Safety Chiefs from all research groups gather together and go through all laboratories associated with Chemical Engineering faculty.
- The Stanford University Fire Marshall and other representatives of regulatory agencies conduct periodic inspections of all laboratories, offices, and public spaces in the department. Everyone is expected to cooperate with and facilitate these visits and any corrective action indicated in their reports.