ROLAND FALLER, DEPARTMENT CHAIR  
Chemical Engineering Graduate Program  

KAREN MCDONALD, PROGRAM CHAIR  
Chemical Engineering Graduate Program  

RE: Chemical Engineering Degree Requirements  

Enclosed is a copy of the Chemical Engineering graduate degree requirements as approved by Graduate Council on October 30, 2018. These degree requirements are now the official requirements for the Chemical Engineering Graduate Program and will be posted on the Office of Graduate Studies program webpage:  

https://grad.ucdavis.edu/programs/gech  

Thank you for your efforts on behalf of graduate education.  

Sincerely,  

Carlee Arnett, Chair  
Graduate Council  

CC: Amanda Kimball, Graduate Studies Analyst  
    Grace Woods, Graduate Program Coordinator
CHEMICAL ENGINEERING GRADUATE PROGRAM  
Ph.D., M.S. AND M. ENGR. DEGREE REQUIREMENTS  
Revised: March 1999  
Graduate Council Approval: October 30, 2018

MASTER’S DEGREE REQUIREMENTS

1) Admissions requirements: Consideration for program admission requires a bachelor’s degree, three letters of recommendation, official transcripts, GRE General Test scores, iBT TOEFL score of at least 100 or IELTS score of at least 7.0 (if applicable) and an Office of Graduate Studies online application with fee by the stated admission deadline. A minimum GPA of 3.0 is required. Most successful applicants have a GRE Verbal Reasoning score at or above the 60th percentile, a GRE Quantitative Reasoning score at or above the 80th percentile and an Analytical Writing score at or above the 50th percentile. However, admission decisions are made in a holistic manner and on a case-by-case basis. Meeting some or all of these criteria does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies will be made by the Program Admissions Committee on the basis of available space and the competitiveness of applicants compared to the eligible pool.

Applicants are encouraged to communicate with potential research advisers (major professors) prior to admission to the program. Through such communications, the faculty in the Chemical Engineering Department and the Chemical Engineering Graduate Program can inform the prospective students regarding current research directions and availability of projects and future prospects. It would be beneficial if this process of communicating with potential major professors begins prior to the relevant applications deadline. While formal acceptance into a research group cannot occur prior to admission, contacts developed as such would facilitate the assignment of students to research labs/major professors in the beginning of the Winter Quarter of the students’ first year.

a) Prerequisites: The admission into the Chemical Engineering Graduate Program requires a bachelor’s degree in chemical engineering or an equivalent field. It is expected that the applicant’s undergraduate training should have prepared him or her to succeed in the graduate level coursework.

b) Deficiencies: Any coursework deficiencies and insufficient training will be recognized prior to admission and, if appropriate, addressed by the graduate adviser if the student is admitted. On a case-by-case basis, a plan may be put in place to resolve any deficiencies by the end of the first academic year. If the graduate adviser recommends that a student take coursework at UC Davis to make up any deficiency, the student must earn a letter grade of “B” or better in such courses.
2) M.S., Plan I and M. Engr

M.S., Plan I
This plan requires a minimum of 33 units of graduate and upper division courses (100 and 200 series), of which at least 23 must be graduate work in the major field. In addition, a research thesis is required. The research thesis serves as the capstone requirement.

This plan requires more units than the UC Davis minimum, which is stated as: 30 units of graduate and upper division courses (100 and 200 series), at least 12 of which must be graduate work in the major field.

M. Engr.
This plan requires a minimum of 36 units of graduate and upper division courses, of which at least 12 units must be letter-graded graduate courses in the major field. At least 3 units but not more than 9 units of research (299 or equivalent) may be used to satisfy the remaining 24 unit requirement. A comprehensive final examination in the major subject is required of each candidate. No thesis is required. The comprehensive final examination capstone requirement is fulfilled by a written engineering report on an appropriately comprehensive topic at the end of year 1.

This plan requires more units than the UC Davis minimum, which is stated as: 36 units of graduate and upper division courses (100 and 200 series), at least 18 of which must be graduate work in the major field. Not more than 9 units of research (299 or equivalent) may be used to satisfy the 18-unit requirement.

3) Course Requirements

Course Requirements for M.S., Plan I – Core and Elective (33 units)

a) Core Courses (21 units)
   ECH 252 Statistical Thermodynamics 4 units
   ECH 253A Advanced Fluid Mechanics 4 units
   ECH 253C Advanced Mass Transfer 4 units
   ECH 256 Chemical Kinetics and Reaction Engineering 4 units
   ECH 259 Advanced Engineering Mathematics 4 units
   ECH 298* Preparing for Graduate Student Success 1 unit
   *Course will be re-classified to ECH 200.

b) Elective Courses (12 units)
   ECH 290 Seminar 1 unit

ECH 290 should be taken twice, for a total of 2 units. The remaining 10 elective units should be comprised of letter-graded upper-division and graduate level courses (100 and 200 series) chosen in consultation with the approval of the major professor/thesis chair and graduate adviser.
c) **Summary**: 20 units of core graduate chemical engineering coursework, 1 unit of graduate research preparation, 2 units of participatory graduate seminars, and 10 units of letter-graded (unless the course is normally graded S/U) upper-division or graduate level course electives (100 or 200 series) are required for a total of 33 units.

Full-time students must enroll for 12 units per quarter, including research, academic, and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once course requirements are completed, students may take additional classes as needed, although the 12 units per quarter are generally fulfilled with a research class (299) and perhaps seminars. Per UC regulations, students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

**Course Requirements for M. Engr. – Core and Electives (36 units)**

a) **Core Courses (13 units)**
   Students should select any combination of 12 units from the following courses:
   - ECH 252 Statistical Thermodynamics 4 units
   - ECH 253A Advanced Fluid Mechanics 4 units
   - ECH 253C Advanced Mass Transfer 4 units
   - ECH 256 Chemical Kinetics and Reaction Engineering 4 units
   - ECH 259 Advanced Engineering Mathematics 4 units

   In addition, students should take:
   - ECH 298* Preparing for Graduate Student Success 1 unit
   *Course will be re-classified as ECH 200

b) **Elective Courses (23 units)**
   - ECH 290 Seminar 1 unit

   ECH 290 can be taken twice, for a total of 2 units. To fulfill the elective requirement, students should take at least 3 units but no more than 9 units total of ECH 299 research, and additional letter-graded upper-division or graduate level courses (100 or 200 level) chosen with approval of the Graduate Adviser.

c) **Summary**: 12 units of letter-graded graduate level (200 series) chemical engineering courses, 1 unit of graduate research preparation, and 23 units of letter-graded (unless the course is normally graded S/U) upper-division or graduate level (100 or 200 series) courses are required for a total of 36 units. Students should take at least 3 units of ECH 299 research, but no more than 9 units of research (ECH 299) to fulfill the 24 unit elective requirement.

Full-time students must enroll for 12 units per quarter, including research, academic, and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once course requirements are completed, students may take additional classes as needed, although the 12 units per
quarter are generally fulfilled with a research class (299) and perhaps seminars. Per UC regulations, students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

4) Special requirements: Per Graduate Council policy (GC-2018-02), all international graduate students who do not meet one of the below conditions are required to enroll in an English language course (UWP 225 or UWP 226 or equivalent) during their first academic year. Students do not have to take an English language course if they fall into one of these categories:

1. The student has an undergraduate or graduate degree from an approved English-medium institution as confirmed by UC Davis Graduate Studies;
2. Or the student has a TOEFL (iBT) score of 105 or higher or IELTS score of 7.5 or higher;
3. Or the student scored 25 or higher on the TOEFL (iBT) writing and 23 or higher on the TOEFL (iBT) speaking portion of the test.

Master of Science and Master of Engineering students must fulfill this requirement prior to advancing to candidacy.

5) Committees:

a) Admissions Committee: For both M.S., Plan I and M. Engr. degree objectives, once the completed online application, supporting materials, and the application fee have been received, the application will be routed to the Admission Committee (Graduate Affairs Committee). The Admissions Committee consists of 5 graduate program faculty nominated by the Department Chair. Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by the Office of Graduate Studies. For guaranteed review, applications should be submitted by January 15th of the year for the upcoming Fall. Depending on space availability, applications received until April 1 may also be reviewed.

b) Course Guidance or Advising Committee: None. Upon entering the program, each incoming cohort of students is assigned a faculty Graduate Adviser. Students should prepare a Program of Study in consultation with the major professor (if applicable) and the Graduate Adviser assigned to the cohort. For the M.S. degree objective, this Program of Study should be submitted to the graduate program coordinator by the end of the first year of study, prior to advancement to candidacy. For M. Engr. degree objective, students should submit the Program of Study to the graduate program coordinator by the end of the second quarter of study and also include the nomination of faculty to serve on the comprehensive exam/capstone report committee.
c) **Thesis Committee, M.S., Plan I:** The student, in consultation with his or her major professor and the Graduate Adviser assigned to the cohort, nominates 3 faculty to serve on the Thesis Committee. These nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The major professor serves as chair of the committee.

d) **Comprehensive Examination Committee, M. Engr.:** The student, in consultation with the Graduate Adviser, selects 3 faculty to serve on the comprehensive examination/capstone report committee. At least one member of this committee must be a member of the graduate program. The Graduate Adviser will determine who will chair the committee from amongst the three selected faculty. These nominations are submitted to the graduate coordinator as part of the Program of Study by the end of the second quarter of study and prior to Advancement to Candidacy.

6) Advising Structure and Mentoring:

The **Major Professor** is the faculty member who supervises the student’s research. In the M.S., Plan I degree objective, the major professor serves as the Chair of the Thesis Committee. Major Professors are assigned by the end of the first quarter of study, usually Fall Quarter through the ECH 200: Preparing for Graduate Success course. This course guides students in the selection of three or more choices for major professors. These selections are then reviewed by the department chair, the graduate program chair and the graduate coordinator and compared to the prospective major professor’s preferences and availability of project funding. Prior to the end of Fall Quarter, students are notified of their major professor assignment. In the rare case that a match is unable to be made through this process, the graduate program chair will serve as the interim major professor until a match is made. In the M. Engr. degree objective, there is no formal major professor assigned to the student. The **Graduate Adviser**, who is appointed by Graduate Studies, is assigned to each incoming cohort and is a resource for information on academic requirements and identifying a major professor (if applicable). For the M. Engr. degree objective, the Graduate Adviser assumes most of the roles that the Major Professor does in the M.S. Plan I degree objective. The **Graduate Program Coordinator** assists students with policies and procedures, identifying employment opportunities, registration information, and general university policies. The **Mentoring Guidelines** may be found online at [https://che.engineering.ucdavis.edu/wp-content/uploads/2014/06/mentoring.pdf](https://che.engineering.ucdavis.edu/wp-content/uploads/2014/06/mentoring.pdf)

7) Advancement to Candidacy:

For the M.S. Plan I degree, students are expected to advance to candidacy by the end of the third quarter of study or the end of first year. For the M. Engr. degree, students are expected to advance to candidacy by the end of their second quarter of study.

Every student must file an official application for Candidacy for the Degree of Master of Science or for the Degree of Master of Engineering and pay the candidacy fee after completing one-half of their course requirements and at least one quarter before completing all degree requirements. The Candidacy for the Degree of Master form can be found online at [http://www.grad.ucdavis.edu/forms/](http://www.grad.ucdavis.edu/forms/). A completed form includes a list of courses the student will
take to complete degree requirements. If changes must be made to the student’s course plan after they have advanced to candidacy, the Graduate Adviser must recommend these changes to the Office of Graduate Studies. Students must have their Graduate Adviser and Committee Chair sign the candidacy form before it can be submitted to the Office of Graduate Studies. If the candidacy is approved, the Office of Graduate Studies will send a copy to the appropriate Graduate Program Coordinator and the student; the Thesis/Exam Committee Chair will also receive a copy, if applicable. If the Office of Graduate Studies determines that a student is not eligible for advancement, the program and the student will be told the reasons for the application’s deferral. Some reasons for deferring an application include: grade point average below 3.0, outstanding “I” grades, or insufficient units.

8) Thesis Requirements or Comprehensive Examination:

a) Thesis Requirements (M.S., Plan I): By the end of the first quarter of study, the student will be matched with a major professor as outlined above. Once the student is assigned a major professor, the major professor and student should meet at least once a year with the other members of the Thesis Committee to discuss progress and any changes in research objectives.

Research for the Master’s thesis is to be carried out under the supervision of a faculty member of the program and must represent an original contribution to knowledge in the field. The thesis research must be conducted while the student is enrolled in the program. The thesis is submitted to the thesis committee at least one month before the student plans to make requested revisions. All committee members must approve the thesis and sign the title page before the thesis is submitted to the Office of Graduate Studies for final approval. Should the committee determine that the thesis is unacceptable, even with substantial revisions, the program may recommend to the Dean of Graduate Studies that the student be disqualified from the program.

The thesis must be filed in a quarter in which the student is registered or on filing fee. Instruction on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from the Office of Graduate Studies; the dates are also printed in the UC Davis General Catalog. A student must have a GPA of 3.0 for the M.S. degree to be awarded.

b) Comprehensive Examination (M. Engr.) The Comprehensive Examination is administered in the form of a written report reviewed by a committee of program faculty members. The report should address a current topic in the general area of chemical engineering and offer a comprehensive review of the literature, clearly articulating open research directions and challenges that still remain to be tackled. The report can be viewed as a preliminary literature survey for a potential NSF proposal submission and should demonstrate the student’s understanding of the fundamental concepts and his or her critical thinking ability. The results of the Comprehensive Examination must be reported to the Office of Graduate Studies using the Master’s Report Form, which can be
found at http://www.gradstudies.ucdavis.edu/forms/. Students must be registered or in a current filing fee status in order to take the exam.

i. **Timing**: The Comprehensive Examination consists of a capstone report and its fulfillment is the final requirement to receiving the M. Engr. degree. A student may complete the Comprehensive Examination capstone report once they have advanced to candidacy. However, it is important that the capstone requirement be completed at or near the end of the coursework for the M. Engr. degree; for most students, the report is submitted by the end of the 3rd quarter. Faculty have two weeks to review and read the report.

ii. **Outcome**: The Examination Committee’s unanimous vote is required to pass a student on the examination. If a student does not pass the examination, the Examination Committee may recommend that the student be allowed to resubmit/be re-examined a second time. The second examination must take place within 30 days of the student’s notification of the result of the first examination. The format of the second examination is the same as the first examination. The examination may not be repeated more than twice. The Examination Committee will determine if the student will revise or rewrite the report depending on the outcome of the examination. A student who does not pass on the second attempt is subject to disqualification from further graduate work in the program.

9) **Normative Time to Degree:**

a. **M.S., Plan I**: The Normative Time to Degree is six quarters or two years. Normative Time to Advancement to Candidacy is three quarters, and the Normative Time in Candidacy is three quarters.

b. **M. Engr.**: The Normative Time to Degree is one year. Normative Time to Advancement to Candidacy is two quarters, and the Normative Time in Candidacy is one quarter.

10) **Typical Timeline and Sequence of Events**

a. **M.S., Plan I**

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<thead>
<tr>
<th>Year One</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring (Advance to Candidacy)</th>
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<tbody>
<tr>
<td></td>
<td>252: Stat. Thermodynamics (4 units)</td>
<td>253C: Adv. Mass Transfer (4 units)</td>
<td>299: Research (4-6 units)</td>
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<tr>
<td></td>
<td>253A: Advanced Fluid Mechanics (4 units)</td>
<td>256: Chemical Kinetics &amp; Reaction Eng. (4 units)</td>
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<tr>
<td></td>
<td>259: Adv. Engineering Math (4 units)</td>
<td>290: Seminar (1 unit)</td>
<td>200 or 100 Elective (3-4 units)</td>
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<tr>
<td></td>
<td>298: Steps to Grad Student Success (1 unit)</td>
<td>299: Research (3 units)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>290: Seminar (1 unit)</td>
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<tr>
<td>Year Two</td>
<td>Fall</td>
<td>Winter</td>
<td>Spring (File Thesis)</td>
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<td></td>
<td>299: Research (8-9 units)</td>
<td>299: Research (8-9 units)</td>
<td>299: Research (12 units)</td>
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<tr>
<td></td>
<td>200 or 100 Elective (3-4 units)</td>
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b. M. Engr.

<table>
<thead>
<tr>
<th>Year One</th>
<th>Fall</th>
<th>Winter (Advance to Candidacy)</th>
<th>Spring (Comprehensive Exam Completed)</th>
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<tr>
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11) Sources of Funding:

Both M.S., Plan I and M. Engr. students may seek employment as a Teaching Assistant (TA) or reader both within and outside of the Department of Chemical Engineering. In some cases, depending on the availability of funding, M.S., Plan I and M. Engr. students may be hired as Graduate Student Researchers.

12) PELP, In Absentia, and Filing Fee Status

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: [http://www.gradstudies.ucdavis.edu/publications/](http://www.gradstudies.ucdavis.edu/publications/)
PH.D. DEGREE REQUIREMENTS

1) Admission Requirements: Consideration for program admission requires a bachelor’s degree, three letters of recommendation, official transcripts, GRE scores, TOEFL or IELTS scores (international students only), and the Office of Graduate Studies online application with fee by the stated admissions deadline. The minimum score required on the iBT TOEFL is 100 or a minimum score of 7.0 (if applicable) is required on the IELTS. The minimum GPA for admission is 3.0. Most successful applicants have a GPA of at least 3.25 and have a GRE Verbal Reasoning score at or above the 60th percentile, a GRE Quantitative Reasoning score at or above the 80th percentile, and an Analytical Writing score at or above the 50th percentile. However, admission decisions are made in a holistic manner and on a case-by-case basis. Meeting some or all of these criteria does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies will be made by the Graduate Admissions Committee on the basis of available space and the competitiveness of applicants compared to the eligible pool.

Applicants are encouraged to communicate with potential research advisers (major professors) prior to admission to the program. Through such communications, the faculty in the Chemical Engineering Department and the Chemical Engineering Graduate Program can inform the prospective students regarding current research directions and availability of projects and future prospects. It would be beneficial if this process of communicating with potential major professors begins prior to the relevant application deadline. While formal acceptance into a research group cannot occur prior to admission, contacts developed as such would facilitate the assignment of students to research labs/major professors in the beginning of the Winter Quarter of the students’ first year.

a. Prerequisites: The admission into the Chemical Engineering Graduate Program requires a bachelor’s degree in chemical engineering or an equivalent field. It is expected that the applicant’s undergraduate training should have prepared him or her to succeed in the graduate level coursework.

b. Deficiencies: Any coursework deficiencies and insufficient training will be recognized prior to admission and, if appropriate, addressed by the graduate adviser if the student is admitted. On a case-by-case basis, a plan may be put in place to resolve any deficiencies by the end of the first academic year. If the graduate adviser recommends that a student take coursework at UC Davis to make up any deficiency, the student must earn a letter grade of “B” or better in such courses.

2) Dissertation Plan: The Department of Chemical Engineering uses “Plan B,” which specifies a three member (minimum) Dissertation Committee and an Exit Seminar.
3) **Course Requirements:**
  
a) **Core Courses (21 units)**

- ECH 252  Statistical Thermodynamics  4 units
- ECH 253A  Advanced Fluid Mechanics  4 units
- ECH 253C  Advanced Mass Transfer  4 units
- ECH 256  Chemical Kinetics & Reaction Engineering  4 units
- ECH 259  Advanced Engineering Mathematics  4 units
- ECH 298*  Preparing for Graduate Student Success  1 unit

*Course will be re-classified as ECH 200

b) **Elective Courses (16 units)**

- ECH 290  Seminar  1 unit

ECH 290 should be repeated four times for a total of 4 units. The remaining 12 units of elective courses should be chosen in consultation with the Major Professor and Graduate Adviser and should be taken for a letter grade. A maximum of 4 of the 12 units can be 100 level course(s).

d) **Summary:** Twenty units of core graduate chemical engineering coursework, 1 unit of preparing for graduate student success (ECH 298), 4 units of participatory graduate seminars (ECH 290), and 12 units of letter-graded upper-division or graduate level course electives (100 or 200 series) are required for a total of 37 units. Of the 12 elective units, only 4 units can be upper-division (100 level) courses.

Full-time students must enroll for 12 units per quarter, including research, academic, and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once course requirements are completed, students may take additional classes as needed, although the 12 units per quarter are generally fulfilled with a research class (299) and perhaps seminars. Per UC regulations, students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

Coursework taken at other academic institutions is not transferred to a student’s UC Davis graduate record. However, coursework may be applied towards a student’s degree requirements. Generally, doctoral students are required to complete a minimum of 30 units at UC Davis. Students entering with an M.S. degree or equivalent, may transfer an additional 6 units from another institution with the permission of the Graduate Adviser and the Graduate Program Chair. Units will not be accepted if they were used in satisfaction of bachelor’s degree requirements. In addition, a major consideration in application of units towards the degree will be the course content and mastery of the materials. If a student has obtained a Master of Science degree in Chemical Engineering at UC Davis, all core courses and letter-graded elective courses of passing quality (B-grade or better) will be credited towards the completion of the Ph.D. degree requirements.
4) **Special Requirements:** Students are required to serve as teaching assistants for chemical engineering courses at least three times during their academic career at UC Davis. While serving as a teaching assistant for the first time, students should enroll in ECH 390: Teaching in Chemical Engineering. Students may repeat this course once for credit.

Per Graduate Council policy (GC-2018-02), all international graduate students who do not meet one of the below conditions are required to enroll in an English language course (UWP 225 or UWP 226 or equivalent) during their first academic year. Students do not have to take an English language course if they fall into one of these categories:

1. The student has an undergraduate or graduate degree from an approved English-medium institution as confirmed by UC Davis Graduate Studies;
2. Or the student has a TOEFL (iBT) score of 105 or higher or IELTS score of 7.5 or higher;
3. Or the student scored 25 or higher on the TOEFL (iBT) writing and 23 or higher on the TOEFL (iBT) speaking portion of the test.

Doctoral students must fulfill this requirement prior to taking the qualifying examination.

5) **Committees:**

a. **Admissions Committee:** Once the completed online application, supporting materials, and the application fee have been received, the application will be routed to the Admissions Committee (Graduate Affairs Committee). The Admissions Committee consists of 5 graduate program faculty nominated by the Department Chair. Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. The recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by the Office of Graduate Studies. For guaranteed review, applications should be submitted by January 15th of the year for the upcoming Fall. Depending on space availability, applications received until April 1 can also be reviewed.

b. **Course Guidance or Advising Committee:** None. Upon entering the program, each incoming cohort of students is assigned a faculty Graduate Adviser. Students should prepare a Program of Study in consultation with the Major Professor and the Graduate Adviser assigned to the cohort. This Program of Study should be submitted to the Graduate Program Coordinator by the end of the first year of study.

c. **Preliminary Examination Committee:** A forum of at least five faculty members is required for the oral Preliminary Examination. Faculty members are selected from the pool of graduate program members and based upon availability. When possible, faculty members with related research interests to the student should be selected to serve. The graduate program coordinator prepares the initial schedule and committee list for each student, which is then reviewed by both the department chair and the graduate program chair. Each committee may be
different for each student depending on research interests and faculty availability. The Major Professor may be included as part of this committee. In the case of a re-examination, this committee consists of at least three faculty members.

d. **Qualifying Examination Committee:** The student, in consultation with their Major Professor and Graduate Adviser, nominates five faculty to serve on the Qualifying Examination Committee. These nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The Chair of the Committee should be a faculty member in the Department of Chemical Engineering and is selected by the student in consultation with the Major Professor. The Major Professor does not serve on the committee. In accordance with UC Davis Graduate Council policy (GC2005-02), at least one member of the Qualifying Exam Committee should be external to the student’s graduate program. The Qualifying Examination Committee conducts the examination and submits results to the Office of Graduate Studies.

e. **Dissertation Reading Committee:** The Dissertation Reading Committee is a three-member committee identified by the student, in consultation with the Major Professor. The majority of the committee should be members of the graduate program. The composition of the Dissertation Reading Committee is entered on the Advancement to Candidacy Form and submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The role of the Dissertation Reading Committee is to advise the doctoral student on the research topic and methods, and then to review the final completed dissertation for acceptance. The Dissertation Committee Chair (usually the Major Professor) should consider the desires of the committee members regarding assistance with the research and dissertation review at the time the Dissertation Reading Committee is constituted. Students are expected to meet with the Dissertation Reading Committee Chair regularly. Dissertation Reading Committee members are expected to read and comment on the dissertation within four weeks from its submission. This time limit policy does not apply to summer periods for faculty holding nine-month appointments. The student and faculty will coordinate a timeline for the student to present the thesis to the Dissertation Reading Committee. This timeline must allow all Dissertation Reading Committee members enough time to fulfill their responsibilities within the four-week deadline.

6) **Advising Structure and Mentoring:** The Major Professor is the faculty member who supervises the student’s research and serves as the Dissertation Committee Chair. Major professors are assigned by the end of the first quarter of study, usually Fall Quarter through the ECH 200: Preparing for Graduate Success course. This course guides students in the selection of three or more choices for major professors. These selections are then reviewed by the department chairs, the graduate program chairs, and the graduate coordinator and compared to the prospective major professor’s preferences and availability of project funding. Prior to the end of Fall Quarter, students are notified of
their major professor assignment. In the rare case that a match is unable to be made through this process, the graduate program chair will serve as the interim major professor and the department will provide the student funding until a match is made. The Graduate Adviser, who is appointed by the Office of Graduate Studies, is assigned to each incoming cohort and is a resource for information on academic requirements and identifying a Major Professor. The Graduate Program Coordinator assists students with policies and procedures, identifying employment opportunities, registration information, and general university policies. The Mentoring Guidelines may be found online at https://che.engineering.ucdavis.edu/wp-content/uploads/2014/06/mentoring.pdf

7) **Advancement to Candidacy:** Before advancing to candidacy for a doctoral degree, students must have satisfied all requirements set by the graduate program, must have maintained a minimum GPA of 3.25 in all coursework undertaken (except those courses graded S/U), and must have passed a Qualifying Examination before a committee appointed to administer that examination. Normally, students are expected to advance to candidacy by the end of their 6th quarter. The student must file the appropriate paperwork with the Office of Graduate Studies and pay the Candidacy Fee in order to be officially promoted to Ph.D. Candidacy. Refer to the Graduate Council website for additional details regarding the Doctoral Qualifying Examination at: https://grad.ucdavis.edu/sites/default/files/upload/files/grad-council/qe_policy_approved_4-1-2011.pdf

8) **Preliminary Examination, Qualifying Examination and Dissertation Requirements**

a) **Preliminary Examination:** During the Spring Quarter of the first year, the student is required to make an oral presentation of their proposed research project and prepare a 1000 word written summary of their work.

i. **Eligibility:** To be eligible to take the Preliminary Examination, students must have a UC Davis GPA of 3.25 or higher. Students with a GPA between 3.25 and 3.5 should ask their Major Professor to write a confidential, supporting letter to be included in the student’s evaluation file. These letters should be submitted to the Graduate Program Coordinator one week prior to the Preliminary Examination date. Additionally, students must have completed all core courses offered in the first year of study.

ii. **Format:** The format of the Preliminary Examination is a 10 minute uninterrupted oral presentation by each student, 20 minutes of questions by faculty, and 15 minutes of discussion among the faculty in the absence of the student. The 10 minute time limit on the oral presentation will be strictly enforced. Prior to the examination, students should prepare a written summary of not more than 1000 words and turn it in to the Graduate Program Coordinator not more than a week prior to the scheduled examination date. The oral presentation and the written summary should consist of three sections that can be easily identified by the faculty: (1) the broad objectives of the proposed research; (2) a critical review of literature with an explanation of its
relevance to the objectives of the proposed research; (3) a brief explanation of the proposed experimental/theoretical methods with a tentative schedule.

iii. **Content:** The oral presentation and written summary should be based on a review of what would normally be approximately two to three papers that are directly relevant to the research project of the student. The student should consult with his or her Major Professor for direction towards a few key papers and should then make use of additional literature as well. The student should present a coherent summary of recent progress in the area of interest, clearly identifying the major advances in the area. The student is expected to identify papers relevant to those advances, and explain why they are important and how they relate to the proposed research. The student should not attempt to present uniformly all the information in every paper, but rather carefully select the material that he or she chooses to present. It is recognized that a comprehensive review of most topics will not be possible in a 10 minute presentation or a 1000 word summary.

iv. **Outcome:** In making the assessment of a student’s performance, the committee will include consideration of the following factors: (1) the student’s ability to critically review a portion of literature that is relevant to the research topic; (2) the student’s ability to comprehend a new vocabulary and terminology with interdisciplinary topics. Performance will not be based on the technical merit of the proposed research project or on the evidence of research results. The student’s performance in the oral presentation will be assigned a grade of “excellent,” “good,” “fair,” or “poor” by the Preliminary Exam Committee. In addition, a written summary will be provided by the Committee on the student’s overall exam performance. These results will be assessed along with the student’s graduate and undergraduate academic transcripts in a graduate program faculty meeting. At least one member of the preliminary examination committee should be present at this meeting. The outcome will be one of three possibilities: (1) continuation to the Ph.D. program; (2) recommendation of an oral re-examination on topics to be specified by the faculty; (3) recommendation to the Office of Graduate Studies for a change in degree objective to M.S., Plan I or M. Engr. (considering the recommendation of the Major Professor), or disqualification from the program. In the case of the second outcome, the topics of the re-examination will be arranged on an individual basis. The oral re-examination will last the same time period as before and must occur before the end of the Fall Quarter of the succeeding academic year. At least three faculty members are required to be present for the re-examination. All efforts will be made to ensure that these three faculty members are from the original examination committee. If, due to scheduling conflicts, three members of the original committee are unable to be present, the department chair and/or the graduate program chair will serve in place of the original preliminary examination committee. Following the re-examination, these faculty members will make a
recommendation that will be reviewed at the next graduate program faculty meeting, which includes external members of the graduate program, at which time a final decision regarding continuation in the Ph.D. program will be made.

The outcome of the oral presentation and review process will be announced in writing to each student no later than two weeks following the examination. Unless special permission is granted by the faculty, this outcome is final and the exam cannot be taken again the following year. A student has the opportunity to appeal this decision to the program and then to the Dean of Graduate Studies.

b) Qualifying Examination:

i. General Information
   All students will complete all course requirements before taking the Qualifying Examination (QE), have their Program of Study approved by their proposed Dissertation Committee and Graduate Adviser, and maintain at least a 3.25 GPA in all graduate coursework. Passing this examination makes the student eligible for advancement to candidacy. The QE should be taken by the end of the fifth quarter after admission to the Ph.D. program for students who enter with a Master of Science degree in chemical engineering, and by the end of the sixth quarter after admission to the Ph.D. program for students who enter with a Bachelor of Science degree in chemical engineering.

   The primary purpose of the QE is to validate that the student is academically qualified to conceptualize a research topic, undertake scholarly research and successfully produce a dissertation required for a doctoral degree. The QE must evaluate the student’s command of the field, ensuring that the student has both breadth and depth of knowledge, and must not focus solely on the proposed dissertation research. In addition, the QE provides an opportunity for the committee to provide important guidance to the student regarding his or her chosen research topic.

ii. Written Portion of the Examination – Dissertation Proposal
   The written portion of the examination consists of a Dissertation Proposal written by the student. The Dissertation Proposal should be provided to the QE Committee at least one week prior to the examination. This proposal should be pre-approved by the Major Professor. The Dissertation Proposal is typically 10 to 15 pages, double spaced and of format similar to a NSF or NIH grant proposal containing the following sections: Objectives (Specific Aims), Background, Proposed Work, Schedule of Work, and References. While the overall goals and specific aims of the dissertation proposal may be similar to those in prior proposals written by the student’s Major Professor, the Dissertation Proposal should be written entirely by the student.
iii. **Oral Portion of the Examination**

The oral portion of the QE is typically two to three hours in length and intended to demonstrate the student’s critical thinking ability, powers of imagination and synthesis, and broad knowledge of a field of study. The student will give a 20 to 30 minute presentation during which the QE Committee may ask proposal related questions followed by general questions in the examination areas and feedback by the committee. The student in consultation with the Major Professor and Graduate Adviser may specify several areas for examination. The QE may be limited to these areas and a critical evaluation of the Dissertation Proposal.

The QE Committee will evaluate the student’s general qualifications for a respected position as an educator or leader as well as the student’s preparation in a special area of study based upon relevant portions of the student’s previous academic record, performance on the preliminary examination, performance on the QE, and the student’s potential for scholarly research.

iv. **Outcome of the Exam**

The QE Committee will reach a decision on the student’s performance immediately after the examination. The QE Committee, having reached a decision, shall inform the student of its decision to:

- “Pass” (no conditions may be appended to this decision),
- “Not Pass” (the Chair’s report should specify whether the student is required to retake all or part of the examination, list any additional requirements, and state the exact timeline for completion of requirements to achieve a “Pass”), or
- “Fail”.

If a decision takes the form of “Not Pass” or “Fail”, the chair of the QE Committee must include in the report a specific statement, agreed to by all members of the committee, explaining the decision and must inform the student of the decision. Having received a “Not Pass” the student may attempt the QE one additional time; the QE report must list the specific conditions and timing for the second examination. After a second examination, a vote of “Not Pass” is unacceptable; only “Pass” or “Fail” is recognized. Only one retake of the QE is allowed. Should the student receive a “Fail” on the first or second attempt at the examination, the student will be recommended for disqualification from the program to the Dean of Graduate Studies. If, after due deliberation, it becomes evident that the committee cannot reach a unanimous decision, the Chair shall inform the student that the committee is divided and shall follow the procedures described in the Doctoral Qualifying Examinations policy.
c) Dissertation

1. Exit Seminar

The dissertation follows Plan B with a required Exit Seminar. Satisfaction of this requirement must be verified by two out of three members of the Dissertation Reading Committee. The Exit Seminar is a formal public presentation of the student’s research before the program and its students. The Dissertation Reading Committee will not sign the dissertation until after the Exit Seminar.

2. Dissertation: General Requirements

Filing of a Ph.D. dissertation with the Office of Graduate Studies is normally the last requirement satisfied by the candidate. The deadlines for completing this requirement are listed each quarter in the campus General Catalog (available online at the website of the Office of the Registrar or from the Bookstore). A candidate must be a registered student or in Filing Fee status at the time of filing a dissertation, with the exception of the summer period between the end of the Spring Quarter and the beginning of the Fall Quarter. The Ph.D. Dissertation will be prepared, submitted and filed according to regulations instituted by the Office of Graduate Studies. [http://gradstudies.ucdavis.edu/students/filing.html](http://gradstudies.ucdavis.edu/students/filing.html). Satisfaction of this requirement must be verified by the Dissertation Committee Chair.

3. Dissertation:

The doctoral dissertation must demonstrate the ability to carry out a program of advanced and independent research and to report the results in accordance with standards observed in recognized peer reviewed scientific journals. The research conducted by the student must be of such a character to show the ability to pursue independent investigation. It must also be an original and substantial contribution to knowledge in the student’s major field. The Dissertation Reading Committee chair must be directly involved with the planning and execution of the work done to formulate the dissertation.

Students should meet regularly with their Dissertation Reading Committee. The dissertation must be submitted to each member of the Dissertation Reading Committee at least one month before the student expects to make requested revisions; committee members are expected to respond within 4 weeks, not including summer months for nine month faculty. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame. The dissertation must be approved and signed by the Dissertation Reading Committee before it is submitted to the Office of Graduate Studies for final approval.
9) **Normative Time to Degree**: The Normative Time to Degree for the Ph.D. degree is 12 quarters. The Normative Time to Advancement to Candidacy is 6 quarters. The Normative Time in Candidacy is 6 quarters.

10) **Typical Time Line and Sequence of Events:**

<table>
<thead>
<tr>
<th>Year One</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring (Preliminary Exam Completed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>252: Statistical Thermodynamics (4 units)</td>
<td>253C: Advanced Mass Transfer (4 units)</td>
<td>100 or 200 Elective (3 or 4 units)</td>
</tr>
<tr>
<td></td>
<td>253A: Advanced Fluid Mechanics (4 units)</td>
<td>256: Chem. Kinetics &amp; Reaction Engineering (4 units)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>259: Advanced Eng. Math (4 units)</td>
<td>100 or 200 Elective (3 or 4 units)</td>
<td>299: Research (3-5 units)</td>
</tr>
<tr>
<td></td>
<td>290: Seminar (1 unit)</td>
<td>290: Seminar (1 unit)</td>
<td>290: Seminar (1 unit)</td>
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<tr>
<td></td>
<td>298: Prep. for Grad Student Success (1 unit)</td>
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<tr>
<th>Year Two</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring (Advancement to Candidacy)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>299: Research (11 units)</td>
<td>299: Research (11 units)</td>
<td>299: Research (12 units)</td>
</tr>
<tr>
<td></td>
<td>290: Seminar (1 unit)</td>
<td>290: Seminar (1 unit)</td>
<td>390: Teaching in Chemical Engineering (1 unit)</td>
</tr>
<tr>
<td></td>
<td>Qualifying Exam Preparation</td>
<td>Qualifying Exam Preparation</td>
<td>Qualifying Exam</td>
</tr>
</tbody>
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<tr>
<th>Years Three to Four</th>
<th>Dissertation Research and Completion</th>
</tr>
</thead>
</table>

11) **Sources of Funding**: An overwhelming majority of students in the Ph.D. program are guaranteed four years of funding upon admission. During the first quarter of their first year, students are given a fellowship including full fee fellowship with the expectation that they will identify a Major Professor who should subsequently support them for the remainder of the four years. Should a student switch degree objectives to a Master’s degree from the Ph.D. degree, the four year funding guarantee will be null and void. Should a student not have completed the Ph.D. degree at the end of four years, but continues to make satisfactory academic progress as defined by the Major Professor, the student will remain eligible for funding.

12) **PELP, In Absentia and Filing Fee status**: Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide (https://grad.ucdavis.edu/sites/default/files/upload/files/publications/gs201-gradstudentguide.pdf).
13) **Leaving the Program Prior to Completion of the Ph.D. Requirements:** Should a student leave the program prior to completing the requirements for the Ph.D., they may still be eligible to receive a Master’s degree if they have fulfilled all the requirements (see Master’s section). Student can use the Change of Degree Objective form available from the Registrar’s Office: [http://registrar.ucdavis.edu/local_resources/forms/D065-graduate-major-degree-change.pdf](http://registrar.ucdavis.edu/local_resources/forms/D065-graduate-major-degree-change.pdf). Once the student changes degree objective, the four year funding guarantee is null and void.