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The Chemical Engineering PhD Program

The Doctor of Philosophy degree is the highest university degree. It is granted to students upon evidence of excellence in research and the demonstration of independent, creative scholarship culminating in a dissertation. Coursework in the doctoral program focuses primarily on the engineering science concepts in the student's major and in certain basic sciences. The graduate research program introduces the student to the techniques, procedures and philosophical attitudes necessary for exploring unknown areas in his/her chosen profession. The student is taught the scientific method through in-depth study of a specific research topic. This also yields a more in-depth knowledge of his/her professional major. Often included in the graduate educational experience is an opportunity to teach undergraduates by preparing selected lectures in undergraduate courses, assisting in undergraduate laboratories, or serving as tutors.

Doctor of Philosophy (PhD) Program

The following summarizes the chronological steps which should be followed by Ph.D. students. These guidelines vary, as some students may take longer to complete the dissertation for various reasons.

- Gain admission into the PhD program
- Attend new graduate student orientation meeting
- Select advisor and begin coursework
- Initiate research
- Complete and submit iPOS (Plan of Study) by end of the 2nd semester
- Take and pass the qualifying examinations
- Select the remaining members of the dissertation committee, add them to the iPOS, and begin preparing for the dissertation prospectus
- Complete coursework
- Request to defend the dissertation prospectus and take the comprehensive exam
- Apply for the Master’s in Passing, if applicable
- Complete research and write the dissertation
- Apply for graduation
- Schedule the dissertation defense with the SEMTE Graduate Advising Office and the Graduate College

Plan of Study

Students are able to submit a Plan of Study from the first day of their graduate studies. The Plan of Study (iPOS) is an interactive web based form that graduate students complete and which outlines all coursework required to obtain their degree. Students should read the Graduate College policies on the plan of study requirements.
All SEMTE graduate students are required to submit and have their Plan of Study (iPOS) approved prior to registration for their third semester classes. This means students will have a hold placed on their account before they begin their third semester. To prepare for this, students are expected to make use of their first semester in the program getting to know faculty, finding a faculty advisor, and creating their Plan of Study to demonstrate their intended path to graduate from the program.

Once students have completed the iPOS online, they will submit it to the Graduate Academic Advisor who will review it with the Graduate Program Chair and forward it to the Graduate College for final approval. The student is also responsible for obtaining signatures or email approvals of all committee members and submitting it to the Graduate Academic Advisor. Faculty advisors may approve of the iPOS electronically if a screen shot or PDF of the entire iPOS is attached to an email.

Audited courses do not apply toward the degree program and cannot be listed on the iPOS. In general, SEMTE graduate students are typically not granted permission to audit a course. Special requests to audit courses must be submitted to the Graduate Program Chair after approval by the faculty chair.

Students entering the program with a master’s degree may apply up to 30 credits toward the Ph.D. program of study, but must still take a minimum of 54 hours after being admitted to the Ph.D. program. If the MS has not been completed, a maximum of 12 credits of graduate work may be applied.

Course Requirements for the Doctor of Philosophy Degree

The PhD in Chemical Engineering requires completion of 84 semester hours. These hours include core/elective coursework, research/dissertation and seminar credits. Below are the specific requirements:

1. Chemical Engineering Core
   The PhD program requires 9 semester hours of graduate-level Chemical Engineering courses. The following three courses (comprising these 9 hours) are required for all students:
   a. CHE 533 (3): Transport Processes I
   b. CHE 543 (3): Thermodynamics of Chemical Systems
   c. CHE 544 (3): Chemical Reactor Methods

   Students can petition to waive any core course if they have taken an equivalent graduate course at another accredited university and have achieved a grade of B or better. Students must provide proof in the form of transcripts and a syllabus of that course. A petition should be submitted to the graduate program chair who reviews requests for waivers or substitutions of the core courses. The students must take an approved
technical elective in place of the waived core course. Students will be responsible for material from waived courses during the qualifying exam.

2. **Technical Electives**
   In addition to the 9 hours of core above, the Ph.D. program requires **18** semester hours of technical electives from within or outside the Program of Chemical Engineering. CHE courses meeting this requirement must be at the 520 level or higher. Students should consult with their supervisory committees in selecting appropriate technical elective courses.

3. **Research/Dissertation**
   Students are required to take **12** hours of research (CHE 792) and **12** hours of dissertation (CHE 799), for a combined total of **24** hours. Note that no more than 12 hours of dissertation credit (CHE 799) may appear on a program of study. Moreover, students can only take CHE 799 once they have passed the comprehensive exam and been admitted to candidacy.

4. **Seminar**
   Students must register for the one-credit hour seminar (CHE 591) for a total of five (5) semesters.

5. **Additional Research/Elective hours**
   The additional **28** hours necessary to meet the 84-hour minimum may be fulfilled with any combination of additional research hours (CHE 792) and technical electives from the Chemical Engineering Program or other departments.

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**Program Policy on Maximum Course Load**

Per the Graduate College, registration in nine credits is considered a full-time load for graduate students. SEMTE students are restricted to 11 credit hours per semester. RAs or TAs will be allowed to take 12 credit hours with confirmation of their approved TA or RA position.

**Academic Standing**

A student who has been admitted to a PhD degree program in Chemical Engineering must maintain a 3.0 or higher grade point average (GPA) as stated below.

1. In all work taken for graduate credit (courses numbered 500 or higher);
2. In the coursework on the student’s approved plan of study, and
3. In all post baccalaureate coursework taken at ASU (overall GPA).

A student will be placed on academic probation if one or more of the student's GPAs listed above falls below 3.0. Students will be notified by mail when placed on academic probation.

A student will return to academic good standing by obtaining a minimum 3.0 in the GPAs
listed above by the time the next nine hours are completed. Coursework such as

- Research and thesis/dissertation registration that are for Z or Y grade cannot be included in these nine hours.

A student may be recommended for dismissal from a graduate program if:

- The student fails to increase all of the GPAs listed above to a minimum of 3.0 by the time he/she completes the next nine credit hours as defined in section B;
- Or the student receives a grade of D or E while on academic probation for any reason;
- Or a provisionally admitted student fails to meet the required provision(s) of admission.

A student may appeal actions concerning dismissal by petitioning the departmental unit in which they are enrolled.

Selection of Faculty Advisor and Research Topic

The dissertation topic can be initiated by either the students or the faculty advisor. The dissertation must be composed of original work and one or more research publications or presentations should result from the research project. Students must meet SEMTE deadlines for submission.

Of paramount importance to a successful doctoral student is the selection of a suitable research topic. During the first few weeks of their first semester, new students are required to meet with CHE graduate faculty for the purpose of selecting an advisor and exploring potential research topics. After meeting with the faculty, each student will create a rank ordered list of whom he/she would like to work (note that faculty advisors must meet the qualifications required by the Graduate College). Students should select faculty advisors whose research matches their own goals and interests. Upon receiving the rank ordered lists from students, the graduate faculty will then decide the advisor assignments. Upon receiving their advisor assignments, students should begin discussing possible research topics. The selection of the research topic is the student’s responsibility. Students are urged to select early in their plan of study, and no later than the end of the first semester in residence. Note that the program does not guarantee that a student will be selected to work on a specific project offered by a given faculty member. In some instances, students propose projects that may or may not be of interest to the faculty. The program does not require faculty to advise students on projects of this nature. In all cases, the student must obtain the agreement of a faculty member to serve as the research faculty advisor and chair of the dissertation committee.

The research faculty advisor works closely with the student to help plan his/her overall program
and to coordinate coursework and research activities. Generally, the faculty advisor helps the student select other members of his/her dissertation committees. Frequent contact between the student and the faculty advisor is necessary to accurately define the research project. This helps to ensure that the student’s research prospectus will be acceptable.

Original work is required for the Doctor of Philosophy degree. One or more research publications or presentations should result from the research project. Throughout the program of study, the student is encouraged to actively participate in efforts to acquire funding in support of the faculty advisor’s research program. The student should assist the research faculty advisor in the preparation of grant proposals to local, state and national agencies seeking funding for the project.

The student-faculty advisor relationship is a vital one during the PhD years, and it often continues well beyond them. Each such relationship is unique, and usually offers personal and professional benefits beyond the conduct of the PhD research. These benefits might include meeting important post-degree job contacts and advice on professional development/training in non-research related professional skills (e.g. teaching). It is expected that in most circumstances student-faculty advisor disagreements will be minor and will be amicably resolved. In the uncommon instances that attempts to resolve disagreements are unsuccessful, the student and faculty advisor are encouraged to meet with the graduate program chair for further assistance in resolving any difficulties.

Selection of a PhD Dissertation Committee

Students must select a committee which consists of five (5) faculty members (one of whom will serve as chair). The chair of the committee must be a member of the graduate faculty approved to chair a dissertation committee in the Chemical Engineering program. The committee must contain a minimum of three (3) members from the CHE graduate faculty and among them, a minimum of two (2) must be CHE program faculty. Students are encouraged to discuss the selection of the committee with their faculty advisor. Please keep in mind the following when forming the committee:

- At least one member must be a resident ASU faculty member outside of the Chemical Engineering program. Individuals who are not members of the ASU resident faculty may be appointed to a dissertation committee as a member. To obtain approval for a non-resident faculty member to serve on a committee, a Committee Approval Request and curricula vita for this individual must be submitted to the Graduate College via the student’s academic advisor.

- In the case of doctoral dissertation committees, students are encouraged to select
a research faculty advisor from among the regular tenured or tenure-track faculty within their major. In instances where the student selects an individual who is not a member of the Chemical Engineering Program as a research faculty advisor and chair of the dissertation committee, a co-chair must be appointed. The co-chair must be a member of the regular tenure-track faculty of the Chemical Engineering Program. When the student elects to have co-chairs, a letter outlining the responsibility of each co-chair must be submitted to the graduate program chair. Generally, one co-chair is responsible for the student’s research program; the second co-chair is responsible for the student’s program of study and the enforcement of departmental policies and requirements.

The dissertation committee approves the subject and title of the dissertation and it advises the student during the course of the research and the dissertation writing. The committee meets for the presentation and defense of the student's dissertation prospectus, for the oral defense of the dissertation, and upon request of the student or the committee chair to consult with the student on the progress of the research and dissertation.

After forming the dissertation committee, doctoral students are required to meet at least once per calendar year with all members of the committee (the comprehensive exam counts as a meeting). The meetings with committee members can be in any format necessary (individual, group, video-chat, or phone). The student needs to have each committee member sign a form verifying the date the meeting took place. There is no prescribed format to the meeting (except as specified for the comprehensive exam and final defense) but it is suggested that the student provide a research update and discussion of planned activities.

**PhD Qualifying Exam**

The Chemical Engineering Program requires all students seeking the Doctor of Philosophy degree to pass a qualifying exam. The qualifying exam is required to be taken immediately after two semesters* of RA or three semesters* of residence for students entering with regular admission to the Ph.D. program (*summer is counted as one semester). Thus, a student who entered the PhD program in a fall semester, was a Teaching Assistant in the fall, and was a Research Assistant in the spring and summer semesters, is expected to take the qualifying exam in the second fall semester. For students admitted with two or more course deficiencies, the qualifying exam is to be taken no later than the end of the fourth semester of residence. Failure in the qualifying exam is final unless the committee administering the exam recommends a re-examination and this is approved by the graduate program chair. Students failing the re-examination will be recommended for academic dismissal for not making satisfactory academic progress. Students enrolled in the M.S. program may take the qualifying exam before admission to the PhD program provided they have completed the CHE graduate core classes, and spent at least two semesters as a Research Assistant.

The qualifying exam is designed to test a student’s ability to conduct and communicate original
research like that required for a PhD dissertation. Each student will prepare a paper describing the student’s original research. The paper is limited to 10 pages of text, and 10 additional pages of references, figures, and calculations. It is expected that, after the exam, the paper will be further developed and submitted for publication with the student as first author. Students are encouraged to collaborate with their faculty advisors and research group colleagues; however, the exam paper should describe research led by the student and the paper should be the student’s own work.

Approximately two weeks after submission of the paper, the student will meet with the Chemical Engineering Qualifying Exam Committee for an oral examination. The student should present a 20-minute summary of the paper. After the presentation, the Committee will conduct an oral examination of the student on the research presented as well as related chemical engineering principles. After this examination, the student will be informed in writing whether he/she passed or failed the exam. Students who fail the exam may retake it at the next opportunity. Students who fail the exam twice will be removed from the PhD program for not making satisfactory academic progress; these students may be able to earn a M.S., non-thesis degree.

Comprehensive Examination/Dissertation Prospectus

Once doctoral students complete coursework and select a research faculty advisor and dissertation committee on the iPOS, they are required to take the comprehensive examination. During this exam, students will formally present a written and an oral presentation of the research prospectus to the dissertation committee. Following this presentation, the committee will question the students about the research and general principles within the field of study.

The students must submit a written request to present the dissertation prospectus no later than one month prior to the proposed date of the presentation. The comprehensive exam must be taken within 3 semesters of passing the qualifying exam. Students must schedule an appointment with Academic Advisor in the Graduate Advising Office to be advised of any recent procedural changes and/or academic issues. Students must be registered in at least one credit hour during the semester in which they plan to complete the comprehensive exams and dissertation proposal prospectus. All members of the dissertation committee must be listed and approved on the plan of study (iPOS).
Format and Guidelines for the Comprehensive Examination

The comprehensive examination is made up of two components: a written document and an oral presentation. These written and oral components are designed to test students’ mastery of their research area and their overall comprehension of the problem selected for investigation. The exam is also used to identify weaknesses in a student's background so that appropriate coursework might be suggested. Before the exam can take place, it must be scheduled through the Graduate Advising Office. The oral presentation of the dissertation prospectus is made to the students’ dissertation committee. Other interested members of the faculty are invited to attend.

All students in the doctoral program are required to prepare a written dissertation prospectus. Copies of the written dissertation prospectus must be distributed to all members of the dissertation committee no later than one week prior to the oral presentation. Elements of the dissertation prospectus include a statement of the proposed research, a discussion of the significance of the research, a statement of the hypothesis/hypotheses to be tested, a description of the research methodology, a discussion of the specific data to be collected, a description of the means by which the data will be analyzed, and a review of safety issues related to the research. It is the responsibility of the candidates to write the proposal without the aid of others. A rough draft of the proposal may be shown to the research advisor for approval of content.

The oral presentation of the dissertation prospectus is designed to test the students’ overall comprehension of the problems selected for investigation. It also provides a forum for students to receive input and advice from experienced researchers. In the oral examination, students are expected to defend the prospectus and justify that the proposed research is consistent with a quality doctoral education. The presentation should take advantage of appropriate audio visual aids and should be limited to no more than 50 minutes.

Following the oral presentation of the research proposition, questions are welcomed from members of the departmental faculty. Following general questions, departmental faculty other than those on the dissertation committee are excused and the committee will remain to ask questions regarding the students’ proposed research. The oral discussion of the dissertation prospectus is usually scheduled for three hours.

When the dissertation committee has completed their questions, the candidate is excused from the room while the research dissertation committee conducts its deliberations. The final decision regarding whether or not the dissertation prospectus is acceptable rests solely with the dissertation committee. The dissertation committee conveys its evaluation of the acceptability of the dissertation prospectus to the chair of the departmental graduate committee via the form “Report of Doctoral Comprehensive Examinations and Dissertation Proposal/Prospectus”. The student must submit this form to the Graduate Advising Office.
Approval of the prospectus implies that the proposed research is suitable for the Ph.D. degree and can be accomplished with the resources available. It does not guarantee that the students’ efforts in conducting the research will, in all cases, satisfy degree requirements.

Failure in the comprehensive examinations is considered final unless the committee administering the exam and the chair of the department recommend a re-examination. Should a failure occur, a one-time re-examination request may be petitioned and must be approved by the dissertation committee, the head of the academic unit, and the Graduate College. A re-examination may be administered no sooner than three months and no later than one year from the date of the original examination. Students failing the re-examination will be recommended for removal from the degree program for not making satisfactory academic progress.

**Master’s in Passing**

The Chemical Engineering program has established a Master’s in Passing (MIP) for doctoral students who maintain good standing in the program and wish to obtain a Master’s degree once they completed significant milestones in the doctoral program.

Conditions for the Master’s Degree in Passing in Chemical Engineering:

- Students must be in good standing in the doctoral program and must have passed the written and oral Ph.D. comprehensive exams
- Students must not already have a previously awarded Master’s degree, regardless of discipline and/or country/institution
- Students must maintain a cumulative grade point average of 3.0 or higher
- Thirty-three (33) credit hours are required for the Master’s in Passing:
  - 9 hours of core courses (CHE 533, CHE 543, CHE 544)
  - 18 hours of technical electives
  - 3 hours of CHE 792
  - 3 hours of CHE 591

**PhD Candidacy**

PhD students achieve candidacy status in a letter from the Graduate College Dean upon passing the qualifying and comprehensive examinations, successfully defending the dissertation prospectus, and completion of the required coursework in the program of study with an approved iPOS on file. This is sent directly from the Graduate College and is found in the MyASU system.

**PhD Dissertation Defense**

The dissertation defense is a mandatory oral and public examination administered by the
dissertation committee in accordance with Graduate College guidelines. All defenses for Chemical Engineering students must be scheduled on the Tempe campus. The presentation of the dissertation defense in an open forum fosters a broader awareness of the state of graduate research at the university, promotes a wider scholarly dialogue among disciplines, and recognizes publicly the scholarly contributions of the candidate. Members of the university community are also invited to dissertation defenses through announcements published on the ASU website. The supervisory committee conducts a final part of its examination in closed session. The deliberation and final vote are always conducted in closed session.

The purpose of the examination is to evaluate the student's research efforts and written presentation (dissertation), and to determine if the candidate is worthy of receiving a PhD degree. The emphasis of this examination is on the student's research as detailed in the dissertation and the general areas of study related to it. It is the student’s responsibility to adhere to and be familiar with the deadlines set forth by the Graduate College regarding defenses. Students must be registered in at least one credit hour at the time of their defense.

**Guidelines for the Dissertation Defense**

Before the defense can take place, it must be scheduled through the Graduate Advising Office. It is the responsibility of the students to arrange a time mutually convenient for all committee members, for all audiovisual aids and to schedule the defense in their MyASU. The oral defense of the student’s dissertation is a formal occasion and the student should treat it as such by dressing appropriately and ensuring that the meeting is scheduled for an appropriate seminar room. The student is also responsible for bringing the “Report for Doctoral Defense” form to the defense.

At the beginning of the examination, the student's research faculty advisor introduces the student and the topic of the research to the general audience. The student is then expected to present a brief seminar on the most important results of the research. The presentation should be limited to 30 minutes. Following the presentation by the student, the general audience is invited to ask questions. Following this question and answer session, the general audience is excused and the student's dissertation committee continues to question the student in depth regarding his/her research findings. The student should be prepared to defend the research methodology used in the study and the results obtained. The oral defense of the dissertation is generally scheduled for three hours.

When the dissertation committee completes its questioning, the student is asked to leave the room and the dissertation committee discusses whether or not the student successfully defended the research and whether or not the completed dissertation is acceptable. The results are transmitted to the Graduate College on the “Report for Doctoral Defense” form following the approval of the Head of the Academic Unit. Immediately after the defense, the student takes the form to the SEMTE Graduate Academic Advising office for academic unit processing.
After the form has been processed at the academic unit level, the form will progress to the Graduate College.

**Level of Pass or Fail**

**Pass: No revisions.** At the conclusion of the defense, 1) the committee chair should indicate “pass,” and 2) all committee members should report the examination results at the bottom of the form as pass and sign the form. 3) Provide the Report for Doctoral Defense form to the SEMTE Graduate Academic Advising office for processing and then the form will progress to the Graduate College.

**Pass: Only minor format corrections need to be made** (e.g., typographical errors, pagination). At the conclusion of the defense, 1) the committee chair should indicate, “pass with minor revisions” and briefly describe needed revisions, and 2) all committee members should report the examination results at the bottom of the form and sign the form. 3) Provide the Report for Doctoral Defense form to the SEMTE Graduate Academic Advising office for processing and then the form will progress to the Graduate College.

**Pass with minor revisions: Significant format/editorial corrections and/or minor substantive changes need to be made** (e.g., rewrite some text, correct grammatical errors). At the conclusion of the defense, 1) the committee chair should indicate "pass with minor revisions" and briefly describe revisions, and 2) the committee members should report the examination results at the bottom of the form and sign the form. 3) The student should then bring the original signed Report for Doctoral Defense form to the SEMTE Graduate Academic Advising office. This office will take a copy and forward it to the Graduate College within the required allotted time. 4) The Report for Doctoral Defense form will then be returned to the student until his/her revisions are completed and approved. 5) The student has up to one academic year in order to make all necessary revisions. The student must be enrolled in CHE 795 until all revisions are complete. 6) Also, once revisions are completed, and the original signed Report for Doctoral Defense form has been signed by the Chair that the revisions are completed and approved, the original signed Report for Doctoral Defense form should again be brought to the SEMTE Graduate Academic Advising office. This office will make sure that Graduate College receives the Report for Doctoral Defense form within the required allotted time.

*Note: Once revisions are completed and approved, the student defense document must go back to gradformat@asu.edu for review.*

Student should pay attention to the deadlines for graduation on the Graduate College website: [http://graduate.asu.edu/graddeadlines.html](http://graduate.asu.edu/graddeadlines.html)
Pass with major revisions: Significant substantive changes need to be made (e.g., chapter rewrite). At the conclusion of the defense, 1) the committee chair should indicate, "pass with minor revisions," and briefly describe revisions, and 2) the committee members should report the examination results at the bottom of the form and sign the form. 3) The student should then bring the original signed Report for Doctoral Defense form to the SEMTE Graduate Academic Advising office. This office will take a copy and forward it to the Graduate College within the required allotted time. 4) The Report for Doctoral Defense form will then be returned to the student until his/her revisions are completed and approved. 5) The student has up to one academic year in order to make all necessary revisions. The student must be enrolled in CHE 795 until all revisions are complete. 6) Also, once revisions are completed, and the original signed Report for Doctoral Defense form has been signed by the Chair in section E that the revisions are completed and approved, the original signed Report for Doctoral Defense form should again be brought to the SEMTE Graduate Academic Advising office. This office will make sure that Graduate College receives the Report for Doctoral Defense form within the required allotted time.

Note: Once revisions are completed and approved, the student defense document must go back to gradformat@asu.edu for review.

Student should pay attention to the deadlines for graduation on the Graduate College website: http://graduate.asu.edu/graddeadlines.html

Fail: The basic design and/or overall execution of the study are flawed or the candidate's performance in the oral examination is seriously deficient. At the conclusion of the defense, 1) the committee chairperson should indicate, "fail", and 2) all committee members should report the examination results at the bottom of the form. If the student fails, the supervisory committee in consultation with the chair of the committee (student's research faculty advisor) formulates recommendations for future action and recommends them to the chair of the departmental graduate student affairs committee and the chair of the department. Two recommendations are possible: 1) a re-examination in the format of a new thesis defense may be scheduled following the completion of recommended activities, and a petition to the program, School, College, and Graduate College is approved 2) the research may be judged unacceptable and the student removed from the graduate program. The results of the oral defense are conveyed to the student by the chair of the supervisory committee. The form will then need to go to the SEMTE Graduate Academic Advising office for academic unit processing. The Graduate College will be notified of the defense failure.
Graduate College Policies

The Graduate College must have final approval of all plans of study and is responsible for the conferral of the degree. All SEMTE policies must abide by Graduate College policies, although the School may impose stricter guidelines. Students are thus responsible for reading, understanding, and abiding by all of the policies found in the Graduate College Handbook as well as all SEMTE policies as described herein.

Graduate Student Academic Advising

The initial advising of all incoming students is carried out by the SEMTE Graduate Academic Advising Office prior to the student’s arrival to ASU. Throughout the student’s graduate program, the SEMTE Graduate Academic Advising Office can assist with the process towards completing the degree (i.e. registration, iPOS questions), but not with academic content. Questions involving academic content should be directed to either the faculty chair or the Graduate Program Chair.

Professionalism and Honor Code

Graduate students are expected to be familiar with the Code of Conduct and to maintain the highest degree of academic integrity. Violations of the Code of Conduct or incidents of dishonesty such as cheating in examinations, cheating in laboratory work or plagiarism are subject to university discipline, whether committed by individuals or groups. The Code of Conduct can be found at: http://students.asu.edu/srr/code and the university academic integrity policy is available at http://provost.asu.edu/academicintegrity. The department is committed to providing a safe work environment for faculty, staff and students. Students who refuse to maintain a safe working environment are subject to withdrawal from the graduate program.
# Chemical Engineering (CHE) PHD Degree Check Sheet

**No previous Master’s Degree**

<table>
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<tr>
<th>Name</th>
<th>Date</th>
<th>ID</th>
<th>Admitted</th>
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</table>

**CHE Seminar** *(Only CHE 591 can satisfy seminar requirements)*

| Term Takes | 1 | 1 | 1 | 1 | 1 |

**Core Courses:**

- CHE 533  Transport Process I (SPRING ONLY) 3
- CHE 543  Thermo Of Chemical Systems (FALL ONLY) 3
- CHE 544  Chemical Reactor Engineering (Spring Only) 3

*Students are required to take the qualifying exam after the core courses are complete. Core courses should be taken in the first two semesters, unless a student is admitted with deficiencies or are advised otherwise.*

**CHE Technical Electives**

*Courses in this area must be CHE 500-level or higher; NON-CHE 500+ level courses require prior approval.*

|  | 3 | 3 | 3 | 3 | 3 | 3 |

**CHE 792 Research**

| 12 |

**CHE 799 Dissertation**

*In order to register for CHE 799, students MUST PASS the Comprehensive Exam/Dissertation Proposal Prospectus. This should be completed within a MINIMUM of TWO semesters prior to the defense.*

**Additional Research/Elective Hours**

*Any combination of additional research hours (CHE 792), CHE technical electives, CHE 584 can be used, but require prior approval.*

**Total Credit Hours** 84
### Chemical Engineering (CHE) PHD Degree Check Sheet

#### Previous Master’s Degree

<table>
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<tr>
<th>Name</th>
<th>Date</th>
<th>ID</th>
<th>Admitted</th>
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#### Previously Awarded Master’s Degree

**CHE Seminar** *(Only CHE 591 can satisfy seminar requirements)*

Students are required to enroll in CHE 591 each semester that they are enrolled in the program. However, only 5 credits can be applied to the degree requirements.

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<tr>
<th>Term Taken</th>
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#### Core Courses:

If approved equivalent courses were completed as part of a Master’s degree, additional technical electives equivalent to those total credit hours must be taken.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 533</td>
<td>Transport Process I (SPRING ONLY)</td>
<td>3</td>
</tr>
<tr>
<td>CHE 543</td>
<td>Thermo Of Chemical Systems (FALL ONLY)</td>
<td>3</td>
</tr>
<tr>
<td>CHE 544</td>
<td>Chemical Reactor Engineering (Spring Only)</td>
<td>3</td>
</tr>
</tbody>
</table>

Students are required to take the qualifying exam after the core courses are complete. Core courses should be taken in the first two semesters unless a student is admitted with deficiencies or are advised otherwise.

#### CHE Technical Electives

Courses in this area must be CHE 500+ level or higher; NON-CHE 500+ level courses require prior approval.

<table>
<thead>
<tr>
<th>Term Taken</th>
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<tbody>
<tr>
<td>3</td>
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#### CHE 792 Research

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#### CHE 799 Dissertation

In order to register for CHE 799, students MUST PASS the Comprehensive Exam/Dissertation Proposal Prospectus. This should be done a MINIMUM of TWO semesters prior to the defense.

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#### Additional Research/Elective Hours

Any combination of additional research hours (CHE 792), CHE technical electives, CHE 584 can be used, but require prior approval.

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#### Total Credit Hours

<table>
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