ChE Graduate Student Handbook
Department of Chemical Engineering
Texas Tech University

(Revised March 2023)

I. Introduction

The goal of this document is to compile as well as formalize the policies and procedures of the graduate program of the Department of Chemical Engineering at Texas Tech University. This document complements the rules of the Graduate School, all of which must be met to obtain the degree.

Doctor of Philosophy (Ph.D.) Program

II. Coursework and Basic Requirements

1) Students who are pursuing the Ph.D. degree in Chemical Engineering and do not have an undergraduate degree in Chemical Engineering are required to take three undergraduate leveling courses – Thermodynamics II (CHE 3322), Intermediate Transport Phenomena (CHE 5335) and Reaction Engineering (CHE 3323) - before taking the core graduate courses in these areas. The undergraduate leveling courses do not count as elective courses.

2) All Ph.D. students, including those with prior MS degrees are required to take the following 5 core courses (**15 credits**):
    - Advanced Chemical Engineering Techniques (CHE 5310)
    - Advanced Chemical Engineering Thermodynamics (CHE 5321)
    - Digital Computation for Chemical Engineers (CHE 5323)
    - Fluid Transport Principles and Analysis (CHE 5312), and
    - Reaction Kinetics (CHE 5343)

A schedule of the core courses and levelling courses is provided in the Appendix.

3) The 5 core courses must be completed with a cumulative GPA of 3.2 or above, in the first year of joining the Ph.D. program. If these requirements are not met, the students can retake the course(s) to bring their cumulative GPA in the 5 core courses to at least 3.2.

4) In addition to the core courses, *at least* three elective courses need to be taken by graduate students. The graduate students must select these courses in consultation with their thesis advisor. Graduate courses in other departments which are unrelated to the thesis work may only be taken upon approval of the thesis advisor.

5) All Ph.D. students are required to take 'Responsible Conduct of Research Resources' (RCR) training and stay in compliance throughout their degree program (https://www.depts.ttu.edu/research/integrity/RCR/). As part of this training all students pursuing the Ph.D. degree are required to take ENGR 5392 (Ethics in Engineering Practice and Research). This is a required course and must be successfully completed by the students in the first year of their joining the Ph.D. program.

6) The Ph.D. students are required to enroll in a seminar course (CHE 7121, CHE 7122, CHE 7123, or CHE 7124) each long semester. The credits from the seminar courses are counted towards the degree plan.

7) Ph.D. students are required to take research credits (CHE 7000). Topical names to the research courses are provided by the thesis advisor to be included in the degree plan.

8) Ph.D. students need to have 12 dissertation credits (CHE 8000) – 3 of these 12 must be from the semester in which the student defends.

9) In addition to the coursework, as part of the graduate training, Ph.D. students are expected to give at least one public oral presentation on their research before their thesis defense. This presentation must be made outside Texas Tech University, for example at the American Institute of Chemical Engineers Annual Meeting or another society meeting. It is required that Ph.D. students publish at least three first author peer-reviewed journal articles from their dissertation. At least one of the three articles should have been published or accepted, one more submitted for review, and one more in preparation before the Ph.D. Dissertation Defense can be scheduled. Exceptions to the minimum requirement must be approved by the Dissertation Committee and the Advisor with the concurrence of the Graduate Chair.

10) Ph.D. students are required to have a minimum of 72 credits by the time of thesis defense. Below is the typical break-up of credit hours towards the degree plan.

    - Core courses: 15 credits
    - ENGR 5392 (Ethics in Engineering Practice and Research): 3 credits
    - Course electives: 9 credits (minimum)
    - Seminar courses: 8 credits
    - Research: 25 credits (titles to be provided in degree plan for all but 6 credits)
    - Dissertation: 12 credits

III. Advisor Assignment

The process of advisor assignment will proceed as follows:

1) In the fall semester, the faculty members interested in taking new students will give presentations on their research topics to the new students.

2) The first-year students are required to meet with a minimum of five faculty members whose projects they are interested in. If in any given semester, fewer than five faculty are taking students then the students should meet all the faculty members interested in taking students.

3) Following these meetings, the students will fill out their choices in the *Faculty Advisor Assignment Document* (provided in the Appendix) and submit it to the Director of Graduate Program for Chemical Engineering. Students are required to rank all the faculty members

that they have met. Students cannot include in this document names of faculty members whom they have not met.

4) If students do not meet the five faculty (or the lower number if fewer than five faculty are taking students) and rank them, the department can assign any advisor to the student.

5) Using this list and feedback from the faculty, the graduate committee will make a recommendation for the advisor assignments.

6) The advisor assignments are discussed in the faculty meeting and will be certified by a vote of the entire faculty; assignments are generally finalized by mid-November.

7) A *Student-Advisor Commitment Document* (provided in the Appendix) will be signed by both the assigned graduate student and the advisor and kept in the student's file.

8) In order to facilitate a fair advisor assignment process, the students and faculty will follow the rules stipulated above. The exception being, if the students are specifically admitted for working with a particular advisor. In such a scenario, the advisor's name will be mentioned in the admission offer letter.

9) Students who do not have their advisors preassigned to them (either through admission letter or otherwise) should not participate in lab meetings or laboratory research of a faculty member until their advisor has been officially assigned through the advisor selection process. This is to ensure a fair advisor selection process.

IV. Selection of Dissertation Committee

1) Students must select their dissertation committee at the start of their qualifying examination in consultation with their thesis advisor.

2) The thesis committee should consist of the following: a committee chair (thesis advisor), at least two more faculty members besides the committee chair with full time appointment in chemical engineering, and at least one external committee member from another department at TTU. All these committee members should hold a tenure-track faculty position in the TTU System.

3) Occasionally, a thesis project might require an additional committee member from either academia, industry, or a national laboratory. This committee member must hold a Ph.D. or M.D. degree in engineering, science, or a closely related area and should be approved by the Director of Graduate Program for Chemical Engineering and the University Graduate School. For this purpose, the thesis committee chair (student's advisor) should provide a one paragraph justification for the need to select a committee member from outside of TTU. This member will be in addition to the required committee members stipulated in 2) above.

V. Teaching Assistant (TA) Duties

1) Each Ph.D. student is required to perform TA duties for one semester. The TAs typically work 20 hrs/wk on average. TA responsibilities include maintaining office hours; grading; conducting discussions; proctoring exams; delivering substitute lectures; developing and helping students with projects; and/or supervising, maintaining, and developing undergraduate teaching laboratories.

2) It is possible that some students might have to TA more than once due to departmental needs and funding levels. In this case, the students and their Ph.D. advisor should meet and discuss this possibility.

VI. Ph.D. Qualifying Exam

1) To pass the Ph.D. qualifying exam and advance to Ph.D. candidacy, the students are required to achieve satisfactory/pass grade in the following three criteria:

   a) **Cumulative GPA in core courses**: Students must have completed all the core courses (CHE 5310, CHE 5312, CHE 5321, CHE 5323, and CHE 5343) with a cumulative GPA of 3.2 in these courses.

   b) **Research:** Students must receive a satisfactory grade in research by their Ph.D. research advisor. This assessment will include the student's progress in research and potential to succeed in the Ph.D. program.

   c) **Oral exam:** Students must pass the oral exam. To take the oral exam, students must have already completed all the core courses (CHE 5310, CHE 5312, CHE 5321, CHE 5323, and CHE 5343) with a cumulative GPA of 3.2 in these courses.

   Approximately one week before the exam, the graduate committee will assign the student a journal article in consultation with the student's thesis advisor. The oral exam will last about 90 minutes and will be conducted by a committee of at least three faculty members. The committee members will be assigned by the graduate committee in consultation with the department chair. On the scheduled exam day, the student will present a 20-minute oral critical evaluation of the paper. Following the oral presentation, an oral question-answer session will be conducted by the committee on topics relevant to the journal article and other fundamentals of core chemical engineering courses relevant to the article.

      i) The oral exam will be offered in May and January of each year.

      ii) Students who have a bachelor's degree in chemical engineering and enter the Ph.D. degree program in the Fall semester must take the oral examination offered in the following May (see Appendix).

iii) Students who have a bachelor's degree in chemical engineering and enter the Ph.D. degree program in the Spring semester must take the oral examination offered in the following January (see Appendix).

iv) Students who do not have a bachelor's degree in chemical engineering and enter the Ph.D. degree program in the Fall semester must take the oral examination offered in May of their 2nd year in the program (see Appendix).

v) Students who do not have a bachelor's degree in chemical engineering and enter the Ph.D. degree program in the Spring semester must take the oral examination offered in January of their 3rd year in the program (see Appendix).

vi) The outcomes of the oral exam could be: *Pass*, *Retake,* or *Fail*. Students who fail the oral exam are ineligible to pursue the Ph.D. but are eligible to obtain a terminal MS degree. If allowed to retake the oral exam, the student must take the oral exam the next time it is offered. Failure to retake the oral exam on time will cause the student to be ineligible to pursue the Ph.D. but eligible to obtain a terminal MS degree.

vii) The students are allowed a total of two attempts at the oral exam. If the student fails in the retake of the oral exam, the student will be ineligible to pursue the Ph.D. but eligible to obtain a terminal MS degree.

2) The normal timeline for taking the core courses, oral exam and the completion of the qualifying exam is given in the Appendix. If students have to retake core courses or the oral exam, they have until the end of 2nd year of their Ph.D. degree to meet the requirements of passing the Ph.D. qualifying exam, which include the criteria VI-1-a, VI-1-b, and VI-1-c. If students are unable to meet these criteria, neither the department nor the research advisor is obligated to continue offering any form of financial stipend to the students.

3) Upon successfully meeting the above three requirements, the student is admitted to Ph.D. candidacy and is responsible for submitting the *Qualifying Exam Report* (see Appendix) to the Graduate School within a week of passing the qualifying exam. At this point, the degree plan should also be submitted by the student to the Graduate School. The degree plan should contain the courses to be taken in fulfillment of Ph.D. requirements with names provided for CHE 7000 courses and the plan should be signed by the thesis supervisor and the graduate committee chair.

VII. Ph.D. Proposal Exam

1) In this exam, students are required to prepare a plan of the research they intend to pursue for their Ph.D. degree. This plan should be presented to the student's dissertation committee both as a written report and orally.

2) The written Ph.D. proposal report should consist of the following sections i) research objective, ii) background and literature review, iii) innovation of the student's research, iv) preliminary experimental data, v) an outline of proposed aims of the research that include methods, anticipated challenges, and potential alternatives to overcome these challenges, vi) references, and vii) timeline (including estimated timeline for submission of papers to peer-reviewed journals with suggested names of the journals for the proposed topics). The report should be 10-15 pages long, single spaced, 11-point Arial font throughout, 1" margin. The students should not attempt to fill space on a page by making large figures. Making large figures will result in a poor assessment of the student's written report. Typically, a figure can comprise many sub-figures. Each sub-figure should resemble the size and quality of figures that are published in reputable print journals. The figure legend should be 9-point Arial font and single spaced. The report should also include an appendix (not counted in the 10-15 page limit) on safety assessment. The safety assessment should include a risk assessment of the project, selection of proper PPE, engineering control (e.g. fume hood, biosafety hood etc.), spill response procedure, waste disposal procedure, special safety signs and protocols. NOTE: References, timeline and appendix are not included in the 10-15 page limit, and these sections can have any number of pages.

3) The students should provide the written report to each dissertation committee member at least two weeks in advance of the day when the oral test is scheduled. The report can be given as a hardcopy or as a PDF file (via email) depending on the committee member's preference.

4) On the day of the oral test of the Ph.D. Proposal Exam, the student will present an oral presentation of up to 20 minutes on their Ph.D. proposal, which will be followed by oral question and answer sessions in an 'open session' where other faculty and students are also present, and a 'closed session' with only the dissertation committee in audience. The questions can be related to the material presented by the student in the proposal or outside of it. There is no time limit imposed on the duration of the question and answer session. Typically, the entire test may take about 3 hours.

5) A printed notice of the Ph.D. proposal exam's oral component (abstract, time and place) should be posted in prominent places in the department. In addition, the faculty and students in the department should also be notified by an email. Both notices must be provided at least one week prior to the scheduled date of the oral Ph.D. Proposal Exam date.

6) The outcome of the Ph.D. proposal exam will be determined by the student's performance in both the written and oral parts of the exam. The outcome could be: *Pass, Redefend,* or *Fail*. Students who fail the exam are ineligible to pursue the Ph.D. but are eligible to obtain a terminal MS degree. If allowed to redefend, the student must take the exam within six months. Failure to retake the exam on time will make the student to be ineligible to pursue the Ph.D. but eligible to obtain a terminal MS degree.

7) For students with a bachelor's degree in chemical engineering and entering in Fall, this Ph.D. Proposal Exam should be completed before the end of the Fall semester of the student's third year in the Ph.D. program (see Appendix).

8) For students with a bachelor's degree in chemical engineering and entering in Spring, this Ph.D. Proposal Exam should be completed before the end of the Spring semester of the student's third year in the Ph.D. program (see Appendix).

9) For students who do not have a bachelor's degree in chemical engineering and are entering in Fall, this Ph.D. Proposal Exam should be completed before the end of the Fall semester of the student's fourth year in the Ph.D. program (see Appendix).

10) For students who do not have a bachelor's degree in chemical engineering and are entering in Spring, this Ph.D. Proposal Exam should be completed before the end of the Spring semester of the student's fourth year in the Ph.D. program (see Appendix).

11) The students are allowed a total of two attempts at the Ph.D. Research Proposal Exam. If the student fail's in the retake of the Ph.D. Research Proposal Exam, the student will be ineligible to pursue the Ph.D. but eligible to obtain a terminal MS degree.

12) If students have to retake the Ph.D. Research Proposal Exam, they must take it before the end of the semester that immediately follows the semester in which they fail in their first attempt. For example, if the student fails in Spring semester then the next semester in which to successfully complete the retake is Summer. If students do not take the retake on time, neither the department nor the research advisor is obligated to continue offering any form of financial stipend to the students.

13) After successfully passing the Ph.D. Proposal Exam, it is recommended that the Ph.D. students meet with their dissertation committee on an annual basis to report research progress and receive feedback.

VIII. Oral and Poster Presentation

1) Before the end of the spring semester of their fourth year, students are required to present at least one oral presentation of their research in the department in the department's 'Graduate Student Seminar' series. The series is held in Fall and Spring semesters.

2) Before the end of the spring semester of their fourth year, students are required to present at least one poster presentation of their research in the department in the 'Graduate Student Poster Session' series or the 'Annual Graduate Student Research Poster Competition' held by the Graduate School at Texas Tech. Each of these poster sessions is an annual event.

IX. Ph.D. Dissertation Defense

1) A student planning to graduate must file in the Graduate School's office a "Statement of Intention to Graduate" at the beginning of the semester of intended graduation. A list of

deadlines, including the date for filing the "Statement of Intent to Graduate," can be found on the Graduate School website (www.gradschool.ttu.edu).

2) Once the graduate school is notified of the intent to graduate, the student should contact the dissertation committee members to identify a time slot suitable for everyone.

3) Students and/or their committee chair must recommend a graduate faculty member to serve as the graduate dean's representative. The graduate dean's representative must be a member of the graduate faculty who does not have an appointment in the student's department; this representative's appointment may be in the student's college.

4) A copy of the dissertation (in printed or electronic form, as requested by the particular committee member) should be given to each committee member at least three weeks before the thesis defense. It is expected that the printed copy should be in a "professional" format. For example, a paper copy that is held together by a paper clip is considered unacceptable.

5) A printed notice of the dissertation defense (abstract, time and place) should be posted in prominent places in the department. In addition, the department should also be notified by an email. Both notices must be placed at least one week prior to defense.

6) The dissertation defense will consist of 3 parts: oral presentation by the candidate, open question session and "closed" question session where only the thesis committee members are present.

X. Important Milestones

Important milestones for the Ph.D. program can be found in the Appendix.

Master of Science (MS) Program
(MS thesis, MS non-thesis and BS/MS Program)

Students pursuing the MS (thesis) degree require a total of 30 credits to graduate while students pursuing the MS (non-thesis) degree require a total of 36 credits to graduate. The credit hour breakup of these degree plans is as specified below (degree plan for the BS/MS program can be found in the Appendix).

XI. Coursework

1) Students who are pursuing the MS degree in Chemical Engineering and do not have an undergraduate degree in Chemical Engineering are required to take three undergraduate leveling courses – Thermodynamics II (CHE 3322), Intermediate Transport Phenomena (CHE 5335) and Reaction Engineering (CHE 3323) - before taking the core graduate courses in these areas. The undergraduate leveling courses do not count as elective courses.

2) All students pursuing an MS degree are required to take the following 5 core courses (**15 credits**):
   - Advanced Chemical Engineering Techniques (CHE 5310)
   - Advanced Chemical Engineering Thermodynamics (CHE 5321)
   - Digital Computation for Chemical Engineers (CHE 5323)
   - Fluid Transport Principles and Analysis (CHE 5312), and
   - Reaction Kinetics (CHE 5343).

3) The students need to maintain a cumulative GPA of 3.0 annually.

4) All students pursuing an MS degree and doing research are required to take 'Responsible Conduct of Research Resources' (RCR) training and stay in compliance throughout their degree program (https://www.depts.ttu.edu/research/integrity/RCR/).

5) The 30-credit degree plan for **MS and BS/MS Thesis** (*see Appendix for BS/MS degree plan*)**:**
   - Core courses: 15 credits
   - Course electives: 6 credits (minimum)
   - Seminar courses: 3 credits
   - Thesis Research: 6 credits
   - Thesis defense needs to be passed.

6) The 36-credit degree plan for **MS and BS/MS non-Thesis** (*see Appendix for BS/MS degree plan*)**:**
   - Core courses: 15 credits
   - Course electives: 12 credits (minimum)
   - Seminar courses: 3 credits
   - Research: 6 credits

- Comprehensive exam needs to be passed. The faculty under whom the non-thesis students take the 6 research credits will provide the comprehensive exam. The exam format could include a written report and a presentation.

XII. Advisor assignment

The students pursuing MS degrees need to contact faculty members whose area of research they are interested in and identify advisors.

XIII. Thesis Committee Selection

1) The thesis committee should consist of the following: committee chair (thesis advisor) and at least one other faculty member with full time appointment in chemical engineering. All the committee members should hold a tenure-track faculty position at TTU.

2) Occasionally, a thesis project might require an additional committee member from either academia, industry, or a national laboratory. This committee member must hold a Ph.D. or M.D. degree in engineering, science, or a closely related area and should be approved by the Director of Graduate Program for Chemical Engineering and the University Graduate School. For this purpose, the thesis committee chair (student's advisor) should provide a one paragraph justification for the need to select a committee member from outside of TTU.

XIV. Teaching Assistant (TA) Duties

1) Teaching assistant duties are not mandatory for the MS and BS/MS students.

XV. Thesis Defense

1) Thesis defense is to be initiated by contacting the graduate school.

2) A defense cannot take place in the absence of a representative of the graduate school Dean. Students and/or their committee chair must recommend a graduate faculty member to serve as the graduate dean's representative. The graduate dean's representative must be a member of the graduate faculty who does not have an appointment in the student's department; this representative's appointment may be in the student's college.

3) Once graduate school is notified, student should contact the thesis committee members to identify a time slot suitable for everyone.

4) A copy of the thesis (in printed or electronic form, as requested by the particular committee member) should be given to each committee member at least one week before the thesis efense. It is expected that the printed copy should be in a "professional" format. For example, a paper copy that is held together by a paper clip is considered unacceptable.

5) A printed notice of the thesis defense (abstract, time and place) should be posted in the prominent places in the department. In addition, the department should also be notified by an email. Both notices must be placed at least one week prior to defense.

6) The thesis defense will consist of 3 parts: oral presentation by the candidate, open question session and "closed" question session where only the thesis committee members are present.

Other Guidelines and Information for Ph.D. and MS students

XVI. General procedures and policies

The policy and procedures for the employment of student employees including research assistants and teaching assistants are provided in the TTU OP 70.27: Employment of Student Employees (https://www.depts.ttu.edu/opmanual/OP70.27.php)

NOTE: TAs must be on campus until the 'last day to enter grades' for the semester has passed.

XVII. Preregistration for courses

1) Full-Time Study. Normal full-time enrollment varies between 9 and 13 hours for doctoral students and 9 and 16 hours for other graduate students in the regular semester. The minimum enrollment for full-time graduate status is 9 hours in the regular semester. Full-time enrollment in a summer term is 3 hours for each summer term. Students on fellowships, assistantships, or other appointments designed for the support of graduate study must enroll for 9 hours in each regular semester and 3 hours in each summer term for which they have a fellowship, scholarship, assistantship, or other appointment designed for the support of graduate study.

2) Graduate students should pre-register each semester for the courses they intend to take during the following semester. Failure to register for the minimum number of courses at least 4 weeks prior to the first day of class of the next semester may prevent waivers such as tuition waivers from being applied. In the event that students do not pre-register for the required number of courses and waivers are not applied in time, students will be expected to pay the outstanding balance of their tuition and fees.

XVIII. Safety

1) Graduate students are expected to work safely and to gain knowledge in safety throughout their study in the program. GRAs are required to complete mandatory online safety training

(training website can be found here: https://www.depts.ttu.edu/ehs/Training/index.php) and any other training requested by the supervisor prior to the start of lab work.

2) Graduate students are also responsible for taking refresher training and maintaining their knowledge to work safely.

3) Failure to follow safety policies and to use best practices or failure to complete training as prescribed is a serious violation, and this could result in suspension from lab work for two weeks without pay or dismissal from the Ph.D. or MS program in cases with severe and/or repeated violations.

4) GRAs are covered by State Workers Compensation for injuries occurring while carrying out work duties. Therefore, students must notify their advisor immediately and an incident report must be filed with the Office of Risk Management within 24 hours of the incident; Texas Tech Environmental Health and Safety department (EHS) must also be notified. Employee Incident Form can be found here: https://www.depts.ttu.edu/ehs/about/docs/TTU-Employee-First-Report-of-Injury.pdf

5) Students should also report incidents without personal injuries such as chemical spills or property damage to their advisor and EHS.

6) Use a buddy system at all times including after-hours.

XIX. Academic travel

1) All students should have approval of their supervisor before turning in a completed travel application to the department administrator. Once the application has been received the student is authorized to make the trip and claim appropriate expenses following Texas Tech University guidelines. Students should familiarize themselves with the travel guidelines before making the trip. Texas Tech travel guidelines can be obtained by going to Raiderlink website (www.raiderlink.ttu.edu) and then under 'A&F Worktools' clicking on 'Travel' located under 'Procurement Services'. Upon return from travel, students should complete the travel voucher form and turn in all itemized receipts. Please note that if changes/corrections are made, employees may have to re-certify their expenses.

XX. Health Problems, Stress, and Major Life Events

1) It is possible that students during their graduate studies may experience stressful events and other difficulties such as health-related issues, emotional problems, legal difficulties, death in the family or of a friend, or other emergency situations. Students are encouraged to talk to their Ph.D. advisor, the Director of Graduate Program for Chemical Engineering, and/or the Department Chair. There is also help available to students both on- and off- campus. Students are encouraged to consider these avenues of help. The following is a short list of some available resources for graduate students:

- TTU Student Counseling Center, http://www.depts.ttu.edu/scc/; Professional counselors are available to consult confidentially with students about any issue, whether personal or school-related.

- Employees who are experiencing personal problems are encouraged to seek the private and confidential services of the Employee Assistance Program (EAP) whose staff of trained professionals are committed to providing quality counseling and assistance for individuals, couples, families, and work groups. (TTO OP 70.33 Employee Assistance Program: https://www.depts.ttu.edu/opmanual/OP70.33.pdf)

- Texas Tech Crisis Helpline: 806.742.5555. It is a service available 24/7/365 for TTU students experiencing: mental health crisis, suicidal thoughts, sexual assault, and interpersonal violence

- National Graduate Crisis Line 1-800-GRAD-HLP (800-472-3457): An off-campus, non-profit center for graduate students in crisis that is available 24/7.

2) In some cases, the health problem or life event may be so significant that it prevents a student from making progress in classes or research. In these extreme cases it may make sense to consider a leave of absence, and students should discuss the situation candidly with their Ph.D. advisor, the Director of Graduate Program for Chemical Engineering, and/or the Assistant Academic Dean.

APPENDIX

SCHEDULE OF CORE COURSES
(For students who have a bachelor's degree in chemical engineering)

Grad core course	Semester offered
Advanced Chemical Engineering Techniques (CHE 5310)	Fall
Advanced Chemical Engineering Thermodynamics (CHE 5321)	Fall
Digital Computation for Chemical Engineers (CHE 5323)	Fall
Fluid Transport Principles and Analysis (CHE 5312)	Spring
Reaction Kinetics (CHE 5343)	Spring

SCHEDULE OF LEVELING COURSES AND CORE COURSES
(For students who do not have a bachelor's degree in chemical engineering)

U/G leveling courses	Semester offered		Grad core course	Semester offered
			Advanced Chemical Engineering Techniques (CHE 5310)	Fall
Thermodynamics II (CHE 3322)	Fall	Prereq to	Advanced Chemical Engineering Thermodynamics (CHE 5321)	Fall
			Digital Computation for Chemical Engineers (CHE 5323)	Fall
Intermediate Transport Phenomena (CHE 5335)	Fall	Prereq to	Fluid Transport Principles and Analysis (CHE 5312)	Spring
Reaction Engineering (CHE 3323)	Spring	Prereq to	Reaction Kinetics (CHE 5343)	Spring

MILESTONES FOR PH.D. STUDENTS ENTERING IN FALL

(For students with BS degree in Chemical Engineering)

Year 1	Fall	Complete core courses (CHE 5310, CHE 5312, CHE 5321, CHE 5323, and CHE 5343) with GPA 3.2 or above
	Spring	
	May	Successfully pass oral exam. Apply for Ph.D. candidacy
	Summer	
Year 2	Fall	
	Spring	
	Summer	
Year 3	Fall	Successfully pass Ph.D. Proposal Exam before end of Fall semester
	Spring	
	Summer	
Year 4	Fall	
	Spring	i) Before end of spring present one oral presentation in the chemical engineering 'Graduate Student Seminar' series. ii) Before end of spring present one poster at chemical engineering 'Graduate Student Poster Session' series or the 'Annual Graduate Student Research Poster Competition' held by the Graduate School at Texas Tech. **NOTE: Students should plan ahead and not wait until the end.**

NOTE: The number of years to graduate will vary on student to student. Based on research progress and number of articles published, students should plan their final dissertation defense and graduation accordingly.

MILESTONES FOR PH.D. STUDENTS ENTERING IN SPRING

(For students with BS degree in Chemical Engineering)

Year 1	Fall	-------
	Spring	Complete core courses (CHE 5310, CHE 5312, CHE 5321, CHE 5323, and CHE 5343) with GPA 3.2 or above
	Summer	
Year 2	Fall	
	January	Successfully pass oral exam. Apply for Ph.D. candidacy
	Spring	
	Summer	
Year 3	Fall	
	Spring	Successfully pass Ph.D. Proposal Exam before end of Spring semester
	Summer	
Year 4	Fall	
	Spring	i) Before end of spring present one oral presentation in the chemical engineering 'Graduate Student Seminar' series. ii) Before end of spring present one poster at chemical engineering 'Graduate Student Poster Session' series or the 'Annual Graduate Student Research Poster Competition' held by the Graduate School at Texas Tech. **NOTE: Students should plan ahead and not wait until the end.**

NOTE: The number of years to graduate will vary on student to student. Based on research progress and number of articles published, students should plan their final dissertation defense and graduation accordingly.

MILESTONES FOR PH.D. STUDENTS ENTERING IN FALL

(For students without BS degree in Chemical Engineering)

Year 1	Fall	Take levelling courses and complete core courses (CHE 5310, CHE 5312, CHE 5321, CHE 5323, and CHE 5343) with GPA 3.2 or above
	Spring	
	Summer	
Year 2	Fall	
	Spring	
	May	Successfully pass oral exam. Apply for Ph.D. candidacy
	Summer	
Year 3	Fall	
	Spring	
	Summer	
Year 4	Fall	Successfully pass Ph.D. Proposal Exam before end of Fall semester
	Spring	
	Summer	
Year 5	Fall	
	Spring	i) Before end of spring present one oral presentation in the chemical engineering 'Graduate Student Seminar' series. ii) Before end of spring present one poster at chemical engineering 'Graduate Student Poster Session' series or the 'Annual Graduate Student Research Poster Competition' held by the Graduate School at Texas Tech. **NOTE: Students should plan ahead and not wait until the end.**

NOTE: The number of years to graduate will vary on student to student. Based on research progress and number of articles published, students should plan their final dissertation defense and graduation accordingly.

MILESTONES FOR PH.D. STUDENTS ENTERING IN SPRING

(For students without BS degree in Chemical Engineering)

Year 1	Fall	-------
	Spring	Take levelling courses and complete core courses (CHE 5310, CHE 5312, CHE 5321, CHE 5323, and CHE 5343) with GPA 3.2 or above
	Summer	
Year 2	Fall	
	Spring	
	Summer	
Year 3	Fall	
	January	Successfully pass oral exam. Apply for Ph.D. candidacy
	Spring	
	Summer	
Year 4	Fall	
	Spring	Successfully pass Ph.D. Proposal Exam before end of Spring semester
	Summer	
Year 5	Fall	
	Spring	i) Before end of spring present one oral presentation in the chemical engineering 'Graduate Student Seminar' series. ii) Before end of spring present one poster at chemical engineering 'Graduate Student Poster Session' series or the 'Annual Graduate Student Research Poster Competition' held by the Graduate School at Texas Tech. **NOTE: Students should plan ahead and not wait until the end.**

NOTE: The number of years to graduate will vary on student to student. Based on research progress and number of articles published, students should plan their final dissertation defense and graduation accordingly.

FACULTY ADVISOR ASSIGNMENT DOCUMENT

This is the signature sheet for incoming graduate students. The students are to use this sheet to visit with faculty who are potentially taking graduate students. Each student must visit with a minimum of five faculty members, though they may visit with more. They are to then list the five faculty members in order of preference with whom they would like to work on their Ph.D. degree. Once the students have provided their preferences, the faculty meets to decide the actual pairings of students and faculty. The completed form needs to be returned to the graduate advisor.

NOTE: If fewer than five faculty are taking students, then the students are required to meet all the faculty who are taking students, and then rank them.

_____Student's name

_____Faculty signature 1

_____Faculty signature 2

_____Faculty signature 3

_____Faculty signature 4

_____Faculty signature 5

Student Preferences:

_____**Preference 1.**

_____**Preference 2.**

_____**Preference 3.**

_____**Preference 4.**

_____**Preference 5.**

STUDENT-ADVISOR COMMITMENT DOCUMENT

We_____(student's name) and_____(Ph.D. advisor's name) agree to work as student and advisor towards the student's Ph.D. degree in Chemical Engineering at Texas Tech University.

We agree to mutually work towards the achievement of excellence in this endeavor.

Student name date	Advisor name date

TEXAS TECH UNIVERSITY
Graduate School

Qualifying Exam Report

Date of Exam: _____

Student R#: _____

Student Name: _____

Department/College: _____

The Department/College recommends student:

- ◯ Be admitted to candidacy and **successfully** completed the Qualifying Exam
- ◯ **NOT** be admitted to candidacy and was unsusccessful on the Qualifying Exam

_____ _____

Printed Name of Chair of Committee | E-mail address of Chair of Committee

_____

Signature of Chair of Committee

Please submit this document to the Graduate School Enrollment Services Sharepoint portal or to the Sharepoint contact of your department for processing.

For additional information or assistance, please contact the graduate school at:
em_gradschool@ttu.edu or (806) 742-2787

Bachelor of Science and Master of Science in Chemical Engineering-Thesis Option (159 hrs***)

First Year

Fall	CHEM 1307/1107 Prin. Chem. I		CH E 1121 Ch E Seminar	MATH 1451 Calc I	ENGL 1301 Ess. Coll. Rhetoric	HIST 2300† Amer. Hist. I
Spring	CHEM 1308/1108 Prin. Chem. II	PHYS 1408 Prin. Phys. I	CH E 1305 Eng. Anal.	MATH 1452 Calc II	ENGL 1302 Adv. Coll. Rhetoric	HIST 2301† Amer. Hist. II

Second Year

Fall	CHEM 3305/3105 Org. Chem. I	PHYS 2401 Prin. Phys. II	CH E 2410 Chem. Proc.	MATH 2450 Calc III		POLS 1301‡ Amer. Govt. I
Spring	CHEM 3251, 3301, 3351, 3306/3106, or 4311 Chem. Elect.*		CH E 2421 Thermo. I	MATH 3350 Adv. Math Engr. I	CHE 3315 Fluid Mech.	ENGR 2392 Engr. Ethics (LPC)

Third Year

Fall	CHEM3306/3106, 3341/3141, or 3310 Chem. Elect.*	CH E 2306 Expos. Of Tech Info (Oral Comm.)	CH E 3322 Thermo. II	CH E 3326 Heat Transfer		POLS 2306‡ Texas Politics
Spring	Apply to Graduate College File intent to graduate for BS degree	CH E 3330 Eng. Mat. Sci.	CH E 3341 Mass-Trans. Oper.	CH E 3232 Transport Lab	CHE 3323 Reaction Eng.	IE 2324 Engr. Econ. Analysis (Ind./Group)

Fourth Year

Fall	CHEM 3107 Chem. Elect.*	CH E 53xx Grad Core+	CH E 53xx Grad Core+	CH E 4232 Unit Oper. Lab	CH E 4353 Process Ctrl.	CH E 4322 CH E Review.
Spring	CH E 7121 Grad Seminar	CH E 53xx Grad Core+	CH E 53xx Grad Core+	CHE 4356 Process Safety	CH E 4455 Proc. Des. & Sim.	Creative Arts/Mltclt** elective
Summer	RESEARCH (CHE 5000 or paid)					

Fifth Year

Fall	CH E 7121 Grad Seminar	CH E 53xx Grad Core+	CH E 53xx Grad Elect++	CH E 53xx Grad Elect++	
Spring	CH E 7121 Grad Seminar	CH E 53xx Grad Elect++	CH E 53xx Grad Elect++	CH E 6000 Masters Thesis	THESIS DEFENSE
Summer	CH E 6000 Masters Thesis (if needed)				

CH E Electives:
CH E 4340 - Polymer Processing
CH E 4341 - Polymerization Engineering
CH E 4342 - Polymer Physics and Engineering
CH E 4344 - Polymers/Materials Laboratory
CH E 4346 - Polymer Viscoelasticity
CH E 4363 - Biochemical Engineering
CH E 4364 - Ch E Applications in Biological Systems
CH E 4365– Biotransport
CH E 4366 - Biomicrofluidics
CH E 4372 - Engineering Experimentation
CH E 4381 - Numerical Techniques for Ch E Problems
CH E 4385 - Bioprocess Control
CH E 4391 – Ch E Applications in Energy Science
CH E 4392 – Entrepreneurship in Chemical Engineering
CH E 4393 – Colloid Science and Engineering
CH E 4394 – Soft Materials

*** CHEM Electives:**
8 hours total: 6 lecture, 2 hours of lab
Chemistry courses listed for electives are suggestions only. Consult with departmental advisor for more information on elective choices.

Graduate Courses:
+ 5 required core courses
CH E 5310- Adv. Chemical Engineering Techniques
CH E 5312- Fluid Transport Prin. and Analysis
CH E 5321- Adv. Chem. Eng. Thermodynamics
CH E 5323- Dig. Computation for Chem. Engineers
CH E 5343- Reaction Kinetics
++ Electives as recommended by graduate mentor

*** up to 162 hours if research hours are taken in 4th and 5th year summer sessions.

For CH E course descriptions, click here.

INTERNATIONAL EXPERIENCE REQUIRED FOR STUDENTS ENTERING FALL 2013 AND LATER.

† **U.S. History Requirement (6 hrs):**
HIST 2300 and 2301 will fulfill the U.S. History requirement. However, HIST 2310 can also be applied to this requirement.

‡ **Political Science Requirement (6 hrs):**
POLS 1301 and 2306 will fulfill the political science requirement.

‡ **Foreign Language Requirement:** One year (or the equivalent) of a single foreign language at the college level fulfills this requirement. Two years of credit in a single language in high school qualifies student for a waiver of this requirement.

** **Creative Arts, and Multicultural Electives:**
Courses should be selected from the core curriculum course lists in the undergraduate catalog in order to meet core curriculum requirements. One course should be chosen that simultaneously appears on the Multicultural list and on the Creative Arts list for theleast number of hours for degree. Otherwise an additional course will be needed.

Chemical Engineering B.S/M.S. - Non-Thesis Option (161 hrs)

First Year

Fall	CHEM 1307/1107 Prin. Chem. I		CH E 1121 Ch E Seminar	MATH 1451 Calc I	ENGL 1301 Ess. Coll. Rhetoric	HIST 2300† Amer. Hist. I
Spring	CHEM 1308/1108 Prin. Chem. II	PHYS 1408 Prin. Phys. I	CH E 1305 Eng. Anal.	MATH 1452 Calc II	ENGL 1302 Adv. Coll. Rhetoric	HIST 2301† Amer. Hist. II

Second Year

Fall	CHEM 3305/3105 Org. Chem. I	PHYS 2401 Prin. Phys. II	CH E 2410 Chem. Proc.	MATH 2450 Calc III		POLS 1301‡ Amer. Govt. I
Spring	CHEM 3251, 3301, 3351, 3306/3106, or 4311 Chem. Elect.*		CH E 2421 Thermo. I	MATH 3350 Adv. Math Engr. I	CHE 3315 Fluid Mech.	ENGR 2392 Engr. Ethics (LPC)

Third Year

Fall	CHEM3306/3106, 3341/3141, or 3310 Chem. Elect.*	CH E 2306 Expos. Of Tech Info (Oral Comm.)	CH E 3322 Thermo. II	CH E 3326 Heat Transfer		POLS 2306‡ Texas Politics
Spring	Apply to Graduate College File intent to graduate for BS degree	CH E 3330 Eng. Mat. Sci.	CH E 3341 Mass-Trans. Oper.	CH E 3232 Transport Lab	CH E 3323 Reaction Eng.	IE 2324 Engr. Econ. Analysis (Ind./Group)

Fourth Year

Fall	CHEM 3107 Chem. Elect.*	CH E 53xx Grad Core+	CH E 53xx Grad Core+	CH E 4232 Unit Oper. Lab	CH E 4353 Process Ctrl.	CH E 4322 CH E Review.
Spring		CH E 53xx Grad Core+	CH E 53xx Grad Core+	CHE 4356 Process Safety	CH E 4455 Proc. Des. & Sim.	Creative Arts/Mltclt** elective
Summer	RESEARCH					

Fifth Year

Fall	CH E 7121 Grad Seminar	CH E 53xx Grad Core+	CH E 53xx Grad Elect++	CH E 53xx Grad Elect++	CHE 5000 Ind. Studies
Spring	CH E 7121 Grad Seminar	CH E 53xx Grad Elect++	CH E 53xx Grad Elect++	CH E 53xx Grad Elect++	CHE 5000 Ind. Studies

CH E Electives:
CH E 4340 - Polymer Processing
CH E 4341 - Polymerization Engineering
CH E 4342 - Polymer Physics and Engineering
CH E 4344 - Polymers/Materials Laboratory
CH E 4346 - Polymer Viscoelasticity
CH E 4363 - Biochemical Engineering
CH E 4364 - Ch E Applications in Biological Systems
CH E 4365– Biotransport
CH E 4366 - Biomicrofluidics
CH E 4372 - Engineering Experimentation
CH E 4381 - Numerical Techniques for Ch E Problems
CH E 4385 - Bioprocess Control
CH E 4391 – Ch E Applications in Energy Science
CH E 4392 – Entrepreneurship in Chemical Engineering
CH E 4393 – Colloid Science and Engineering
CH E 4394 – Soft Materials

*** CHEM Electives:**
8 hours total: 6 lecture, 2 hours of lab. Chemistry courses listed for electives are suggestions only. Consult with departmental advisor for more information on elective choices.

Graduate Courses:
+ 5 required core courses
CH E 5310- Adv. Chemical Engineering Techniques
CH E 5312- Fluid Transport Prin. and Analysis
CH E 5321- Adv. Chem. Eng. Thermodynamics
CH E 5323- Dig. Computation for Chem. Engineers
CH E 5343- Reaction Kinetics
++ Electives as recommended by graduate mentor

For CHE course descriptions, click here.

INTERNATIONAL EXPERIENCE REQUIRED FOR STUDENTS ENTERING FALL 2013 AND LATER.

† U.S. History Requirement (6 hrs):
HIST 2300 and 2301 will fulfill the U.S. History requirement. However, HIST 2310 can also be applied to this requirement.

‡ Political Science Requirement (6 hrs):
POLS 1301 and 2306 will fulfill the political science requirement.

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