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. This document complements the rules of the Graduate School, all of which must be met to obtain the degree.

Doctor of Philosophy Program

II. Coursework and Basic Requirements

1) All Ph.D. students, including those with prior M.S. degrees are required to take the following five (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).

2) The five core courses must be completed with a cumulative GPA of 3.0 or above in the first two years. If these requirements are not met, the student can retake the course(s) and must obtain a B or above in the course(s).

3) In addition to the core courses, at least four 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.

4) 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.

5) 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.

6) 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.

7) 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. It is recommended that Ph.D. students publish 4-6 peer-reviewed journal articles from their dissertation.

8) 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
   - Course electives: 12 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 three faculty members whose projects they are interested in.

3) Following these meetings, the students will fill out their top 3 choices in the *Faculty Advisor Assignment Document* (provided in the Appendix) and submit it to the graduate advisor. Students should not submit potential thesis advisor names that they have not met with.

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

5) 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.

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

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

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: committee chair (thesis advisor), at least two faculty members with full time appointment in chemical engineering, at least one external committee member from another department at TTU. All of 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 academia, industry, or a national laboratory. This committee member must hold a Ph.D. or M.D. degree in engineering or science or closely related area and should be approved by the graduate advisor and the 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.

V. Teaching Assistant (TA) Duties

1) Each Ph.D. student is required to perform TA duties for three semesters. The TAs typically work 5-8 hrs/wk on average. TA responsibilities include maintaining office hours, grading, conducting discussions, proctoring exams, delivering substitute or guest lectures, developing and helping students with projects, and/or supervising, maintaining, and developing undergraduate teaching laboratories.
2) It is possible that some students may have to TA more than three times due to departmental needs and funding levels. In this case, the student and advisor should meet and discuss this possibility.

VI. Ph.D. Qualifying Exam

1) The qualifying exam is to be taken after the student has completed all of the core courses with a cumulative GPA of 3.0.

2) The qualifying exam should be completed before the end of the third year of the student.

3) Per current format, the qualifying exam consists of an independent project that is assigned by the student’s advisor. The problem assigned to students is different from previous research conducted. The student is given four to six weeks to work on the problem and then submit a report to the committee. This is followed by a presentation and defending the work in front of the committee (typically a week after the submission of the report).

4) The outcomes of the qualifying exam could be: Pass, Re-defend and Fail. Students who fail the qualifying exam are ineligible to pursue the Ph.D. but are eligible to obtain a terminal M.S. degree.

5) Upon passing the qualifying exam, the student is admitted to Ph.D. candidacy and needs to submit the Qualifying Exam Report (see Appendix) to the Graduate School. At this point, the degree plan should be submitted 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 advisor. See the Appendix for an example. In addition, the thesis advisor should send a memo to the graduate school, cc'ing the graduate advisor, stating that the student passed the qualifying exam and including the date of the exam and the committee members in attendance.

6) It is recommended that the Ph.D. students meet with their dissertation committee on an annual basis after passing their qualifying exam to report research progress and receive feedback.

VII. 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. Final oral examinations should not be scheduled during inter-term breaks – if the committee agrees to an exam between terM.S., it is the student's and/or advisor's responsibility to identify the Dean's Representative and let the Graduate School know who that is.

3) The Graduate School must be notified of the time of the final oral examination at least three weeks in advance. The Graduate School will then find a Dean's Representative to attend the final examination. In the event that there is less than three weeks notification, the student and/or thesis advisor should identify a Dean's Representative and let the Graduate School know the time of the exam and the identified Dean's Representative.
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.

Master of Science Program

Students pursuing M.S. degrees require a total of 36 credits to graduate. Both thesis and non-thesis M.S. degrees are offered, as well as a B.S./M.S. degree plan. The breakup of the 36-credit degree plan is different for each of the M.S. program as specified below.

I. Coursework

1) All students pursuing an M.S. degree are required to take the following five (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).

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

3) The 36-credit degree plan for M.S. Thesis:
   Core courses: 15 credits
   Course electives: 12 credits (minimum)
   Seminar courses: 3 credits
   Thesis Research: 6 credits
   The thesis defense must be passed

4) The 36-credit degree plan for M.S. Non-Thesis:
   Core courses: 15 credits
   Course electives: 12 credits (minimum)
   Seminar courses: 3 credits
   Research: 6 credits
   A comprehensive exam must 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.

In the combined B.S./M.S. degree program, students may elect to do either a thesis or a non-thesis M.S. degree. In this degree plan, six (6) credits of electives in the B.S. degree are taken as graduate courses and are counted towards both B.S. and M.S. degrees. Degree plans for both the M.S. Thesis and M.S. Non-Thesis options are in the Appendix.
II. Advisor Assignment

Students pursuing M.S. degrees need to contact faculty members whose area of research they are interested in and identify advisors.

III. 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 of these committee members should hold a tenure-track faculty position at TTU.

2) Occasionally, a thesis project might require an additional member from academia, industry or a national laboratory. This additional committee member must hold a Ph.D. degree in engineering or science and should be approved by the graduate advisor and the 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.

IV. Teaching Assistant (TA) Duties

1) No teaching assistant (TA) duties are mandatory for the M.S. and BS/M.S. students.

V. Thesis Defense

1) The thesis defense is to be initiated by contacting the graduate school. A defense cannot take place in the absence of a representative of the graduate school Dean.

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

3) 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 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.

4) 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.

5) 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.
APPENDIX
FACULTY ADVISOR ASSIGNMENT DOCUMENT

This is the signature sheet for incoming graduate students for the Fall Semester, 2013. 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 three faculty members, though they may visit with more. They are to then list three 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 deadline for meeting with faculty is October 31, 2011. The completed form needs to be returned to Prof. Vanapalli by Nov 1, 2013 at 2:00 PM. Decisions will be made most likely by Nov 12.

______________________________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.
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, beginning in the Spring semester of 2013.
We agree to mutually work towards the achievement of excellence in this endeavor.

________________________________  ________________________
Student name                  date                        Advisor name       date
Qualifying Exam Report

Student Name: ________________________________
Student R Number: _____________________________
Department/College: ____________________________
Date: ________________

The Department/College recommends student:

☐ Be admitted to candidacy and **successfully** completed the Qualifying Exam

☐ **NOT** be admitted to candidacy and was unsuccessful on the Qualifying Exam

______________________________  ______________________________
Printed Name of Chair of Committee  Signature of Chair of Committee

Mail to:

Enrollment Management Team
The Graduate School
M.S. 1030
TExAS TeCh UniveRsity–TeHe GRaDuATE ScHooL
PRoGRaM FoR THe DoCTORAL DEGREE

One copy of this form must be submitted to the Graduate School for approval no later than the beginning of the second year of doctoral work.

Date
Office Use Only: GRE/GMAT _________ Catalog _________ Deadline _________

Full legal name
Student’s I.D.#

Current mailing address (include zip code)

Degree sought Ph.D Major Chemical Engineering Minor (if declared)__________ Expected Graduation Date

Previous Degree(s) Institution(s) Year(s) Awarded

Doctoral advisory committee chair:

Dissertation title (if known at this time, otherwise list area of dissertation research):

Indicate proposed enrollment pattern for residence year:

Coursework (prefix and number as it appears in catalog or on official transcript):

Major

Minor

Tool or

Transfer

45-hr. min.

15 hr. min.

Language

Course#*

TTU equiv. #*

(60 or more hours if no minor)

(if declared)

(if required)

Institution

ChE-5310 (3) Advanced ChE Techniques
ChE-5312 (3) Fluid Transport Principle and Analysis
ChE-5321 (3) Advanced ChE Thermodynamics
ChE-5323 (3) Digital Computation
ChE-5343 (3) Reaction Kinetics
ChE-53xx (3) Elective
ChE-53xx (3) Elective
ChE-53xx (3) Elective
ChE-53xx (3) Elective
ChE-7000 (5) Topics in Polymer Physics 1 or Topics in Bioengineering 1 or similar
ChE-7000 (5) Topics in Polymer Physics 2 or Topics in Bioengineering 2 or similar
ChE-7000 (5) Experimental Methods in Polymers 1 or Computational Methods in Bioengineering 1 or similar
ChE-7000 (4) Experimental Methods in Polymers 2 or Computational Methods in Bioengineering 2 or similar
ChE-7000 (6) Research
ChE-7121 (1 x 8 = 8) Seminar (or other seminar)
ChE-8000 (12) Doctor’s Dissertation

*In order for transfer courses to be entered on the TTU transcript, courses must be given the TTU equivalent number. For example, MGMT 630 at TAMU may be equivalent to MGT 5371 at TTU. Please indicate when course was (or will be) taken and provide an official transcript to the Graduate School. No more than 30 hours of an earned master’s degree from another institution may be transferred. Grades from transfer courses will not appear on TTU transcripts.

Signature of Graduate Advisor of major department

Signature of Graduate Advisor of minor dept.(if declared)

Graduate Dean

Date

Approved [ ]

ConditionaI Approval [ ]

Not Approved [ ]

Remarks or Conditions of Approval:

Approval of this form by the Dean of the Graduate School merely indicates that the proposed program is acceptable; it carries no assurance of the applicant’s attainment of a degree. Changes to this program may be made only with the approval of the department concerned and the Graduate School, using the form available in the Graduate School. Conditions for approval for admission to candidacy must be met before the proposed semester of graduation. Revised 5/14/02.
# Bachelor of Science and Master of Science in Chemical Engineering - Thesis Option (156 hrs***)

## First Year

<table>
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<tr>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>PHYS 1408 Prin. Phys. I</td>
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</tr>
<tr>
<td>CH E 3251, 3301, 3351, 3306/3106, or 4311 Chem. Elect.*</td>
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## Second Year

<table>
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<td>CH E 3201 Thermo. I</td>
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<tr>
<td>MATH 3350 Adv. Math Engr. I</td>
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<tr>
<td>CHE 2306 Exp. of Tech Info</td>
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<tr>
<td>ART x3xx Visual/Perf Arts*</td>
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</table>

## Third Year

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<tr>
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<td>CHEM 3306/3106, 3341/3141, or 3310 Chem. Elect.*</td>
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<tr>
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<td>CH E 3322 Thermo. II</td>
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<td>CH E 3326 Heat Transfer</td>
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<td>MATH 3350 Adv. Math Engr. I</td>
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<td>CHE 2306 Exp. of Tech Info</td>
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<td>IE 2311 Engr. Econ. Analysis (Behavior)</td>
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## Fourth Year

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<tbody>
<tr>
<td>CHEM 3107 Chem. Elect.*</td>
<td>CHE E 7121 Grad Seminar</td>
</tr>
<tr>
<td>CH E 53xx Grad Core+</td>
<td>CHE E 53xx Grad Core+</td>
</tr>
<tr>
<td>CH E 4232 Unit Oper. Lab</td>
<td>CHE E 6000 Masters Thesis</td>
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<tr>
<td>CH E 4353 Process Ctrl.</td>
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<tr>
<td>CH E 4122 CH E Review.</td>
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<td>HUM x3xx Hum/Mltclt**</td>
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</table>

## Fifth Year

<table>
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<tr>
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<tbody>
<tr>
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<td>CHE E 7121 Grad Seminar</td>
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<td>CH E 53xx Grad Core+</td>
<td>CHE E 53xx Grad Core+</td>
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<tr>
<td>CH E 53xx Grad Elect++</td>
<td>CHE E 53xx Grad Elect++</td>
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## Typical break-up of credits towards degree plan (36 credits)

- **Grad Core Courses:** 15 credits
- **Grad Elective Courses:** 12 credits
- **Grad Seminar Courses:** 3 credits
- **Independent Study:** 6 credits

Comprehensive exam over independent study project.
CH E Electives:
CH E 4000 - Special Problems in Chem. Engineering
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 4345 - Dyn. of Polymeric and Nonlinear Fluids
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 4384 - Process Dynamics and Auto Control
CH E 4385 - Bioprocess Control

* CHEM Electives:
8 hours total: 6 lecture, 2 hours of lab
Chemistry courses listed for electives are suggestions only

Graduate Courses:
+ 5 required core courses
  CH E 5310- Adv. Chemical Engineering Techniques
  CH E 5312- Fluid Transport Prin. and Analysis
  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.

† U.S. History Requirement (6 hrs):
HIST 2300 and 2301 will fulfill the U.S. History requirement. However, HIST 3310 and HIST 3323 can also be applied to this requirement.

‡ Political Science Requirement (6 hrs):
POLS 1301 and 2302 will fulfill the political science requirement. If a student earns an A or B in POLS 1301, any upper-level Political Science course listed in the core curriculum section of the current catalog can be substituted for POLS 2302.

‡ 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 can be substituted.

** Humanities, Visual/Performance Arts, and Behavior/Multicultural Electives:
Courses should be selected from the core curriculum course lists in the undergraduate bulletin in order to meet core curriculum requirements. One course should be chosen that simultaneously appears on the Multicultural list and on either the Humanities, or Visual/Performing Arts.

Otherwise an additional course will be needed.
# Bachelor of Science and Master of Science in Chemical Engineering Non-Thesis Option (161 hrs)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
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</tr>
<tr>
<td><strong>Fall</strong></td>
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</tr>
</tbody>
</table>

| **Second Year** | |
| | CHEM 3251, 3301, 3351, 3306/3106, or 4311 Chem. Elect.* | CH E 2421 Thermo. I | MATH 3350 Adv. Math Engr. I | CHE 2306 Expo. of Tech Info | ART x3xx Visual/Perf Arts** |
| **Spring** | CHEM 3306/3106, 3341/3141, or 3310 Chem. Elect.* | CH E 3315 Fluid Mech. | CH E 3322 Thermo. II | CH E 3326 Heat Transfer | POLS 2302† Amer. Govt. II |
| **Third 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 4122 CH E Review. |
| | CHE 7121 Grad Seminar | CH E 53xx Grad Core+ | CH E 53xx Grad Core+ | CHE 4356 Process Safety | CH E 4555 Proc. Des. & Sim. | HUM x3xx Hum/Mltclt** |
| **Spring** | CHE 5000 Research | CHE 4555 Proc. Des. & Sim. | CHE 5000 Research | HUM x3xx Hum/Mltclt** | CHE 5000 Research | COMPREHENSIVE EXAM |
| **Summer** | RESEARCH (CHE 5000) | CHE 5000 Research | HUM x3xx Hum/Mltclt** | CHE 5000 Research | COMPREHENSIVE EXAM |

| **Fifth Year** | |
| **Fall** | | | | | | |
| **Spring** | | | | | | |

## Typical break-up of credits towards degree plan (36 credits)

- **Grad Core Courses:** 15 credits
- **Grad Elective Courses:** 12 credits
- **Grad Seminar Courses:** 3 credits
- **Research Study:** 6 credits

Comprehensive exam needs to be passed.
CH E Electives:
CH E 4000 - Special Problems in Chem. Engineering
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 4345 - Dyn. of Polymeric and Nonlinear Fluids
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 4384 - Process Dynamics and Auto Control
CH E 4385 - Bioprocess Control

CHEM Electives:
8 hours total: 6 lecture, 2 hours of lab
Chemistry courses listed for electives are suggestions only

Graduate Courses:
+ 5 required core courses
CH E 5310 - Adv. Chemical Engineering Techniques
CH E 5312 - Fluid Transport Prin. and Analysis
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.

† U.S. History Requirement (6 hrs):
HIST 2300 and 2301 will fulfill the U.S. History requirement. However, HIST 3310 and HIST 3323 can also be applied to this requirement.

‡ Political Science Requirement (6 hrs):
POLS 1301 and 2302 will fulfill the political science requirement. If a student earns an A or B in POLS 1301, any upper-level Political Science course listed in the core curriculum section of the current catalog can be substituted for POLS 2302.

‡ 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 can be substituted.

** Humanities, Visual/Performance Arts, and Behavior/Multicultural Electives:
Courses should be selected from the core curriculum course lists in the undergraduate bulletin in order to meet core curriculum requirements. One course should be chosen that simultaneously appears on the Multicultural list and on either the Humanities, or Visual/Performing Arts.
Otherwise an additional course will be needed.