Chemical Engineering MS Student Handbook

School for Engineering of Matter, Transport, and Energy

Arizona State University

Academic Year 2012-2013

This document serves as the official graduate student handbook for outlining degree requirements and policies and procedures for completion of a MS degree in Chemical Engineering. This document is also available at the following website with hyperlinks in the electronic version:

http://engineering.asu.edu/sites/default/files/shared/graduate/grad_che_handbook.pdf
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I. INTRODUCTION

A. Objective of the Handbook
This document summarizes the current academic requirements for the Master’s degree in the Chemical Engineering program in the School for Engineering of Matter, Transport, and Energy in the Ira A. Fulton Schools of Engineering. The handbook serves as a guide by outlining important deadlines, degree requirements and rules and regulations imposed by the School, the Ira A. Fulton Schools of Engineering (FSE), and the Graduate College (GC). It also outlines the standards of performance expected of all master’s degree candidates. In some cases, inconsistencies arise between the contents of the handbook and the Graduate College as policies are changed by either the Fulton Schools or the GC. In these cases, the university's published rules and policies take precedence. Please report any inconsistencies to the Graduate Coordinator.

Throughout the course of their graduate careers, students will need to submit various School or program and Graduate College related forms. Students can use the program forms found on our website: http://engineering.asu.edu/semte/GradForms.html. Program forms can also be picked up in the office of the Graduate Coordinator, ECG 202. The Graduate College forms may be found on the following link: http://graduate.asu.edu/forms/index.html.

B. Graduate Student Responsibilities
It is the responsibility of the graduate student to know and to observe all procedures and requirements as defined in this handbook, the Graduate Policies and Procedures, the Schedule of Classes, and the Format Manual (a guide to assist students writing theses or dissertations). Students may obtain a copy of the Graduate Policies and Procedures manual at the following website: http://graduate.asu.edu/faculty_staff/policies. A copy of the Schedule of Classes is found at the following website: https://webapp4.asu.edu/catalog/. The Format Manual may be obtained from the Graduate College online at http://graduate.asu.edu/formatmanual. Graduate students are expected to be familiar with the Code of Conduct, which is available in the Office of Student Affairs or at http://students.asu.edu/srr/code. 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. Graduate students are expected to maintain the highest degree of academic integrity, enthusiasm for their academic studies, and a high degree of intellectual curiosity.

Effective fall 2012 and forward, all incoming SEMTE graduate students will be required to submit and have their Plan of Student (iPOS) approved, prior to being eligible for registration of third semester classes.

This means students who begin in one semester, will have a hold placed on their account before they begin their third semester, including summer.

To prepare for this, students are expected to make use of their first semester in the program by getting to know faculty, selecting a faculty advisor*, and creating their Plan of Study to demonstrate their intended path to graduate from the program. Should a student fail to meet this requirement, the student is at risk of being removed from the program.
C. Faculty Responsibilities
Faculty accepting the responsibility of mentoring graduate students are expected to know, observe, and enforce the policies, procedures, and requirements as defined and outlined in this handbook and the other publications listed above.

D. Safety
The department is committed to providing a safe work environment for faculty, staff and students. Students are required to follow safe procedures in accomplishing their research and teaching assignments. All graduate students are required to attend a safety orientation class outlining University, Fulton Schools and School safety guidelines and regulations. This orientation class is typically held at the beginning of each fall semester. You will be notified about the date and time of the orientation class. Students who refuse to maintain a safe working environment are subject to withdrawal from the graduate program.

E. Critical path to the Master’s degree
The student must accomplish several activities in the process of acquiring the master’s degree. The flowchart below summarizes the chronological steps that must be followed in this process. Deadlines associated with each of these steps are given in Section VIII.

CRITICAL PATH TO THE MASTER’S DEGREE

1. Gain admission to program
2. Attend new graduate student orientation meeting
3. Select faculty advisor and begin coursework
4. File official program of study-No later than after 15 hours of coursework has been completed
5. Initiate research; Select remaining members of thesis committee
6. Complete coursework
7. Complete research & write thesis/applied project
8. Schedule the oral defense of the thesis/applied project research paper 15 working days prior with both the School (and the Graduate College via the MyASU for thesis students)
9. Submit thesis for format approval to the Graduate College (thesis students only) after scheduling defense
10. Successfully defend the thesis/applied project research paper
Submit appropriate pass/fail paperwork to graduate coordinator (and Graduate College for thesis students)

Submit the thesis to ProQuest and submit confirmation of submission receipt to graduate advisor for grade changes (thesis students only)

Return all keys, departmental property, dispose of all lab materials, samples and waste

Graduate
II. GOAL OF THE MASTER’S DEGREE PROGRAM

The faculty within the Chemical Engineering Graduate Program offer a Master of Science (M.S.) in Chemical Engineering. Students have the option of choosing between the thesis and non-thesis track options. Students are assumed to be non-thesis until they secure a thesis faculty advisor and file the iPOS. Generally, full-time students complete the requirements for the Master of Science degree in two years.

A. Thesis track option
The thesis track combines coursework (on advanced topics in the student's field of specialization) with an introduction to research. The student is taught the scientific method through in-depth study of a specific research topic. Generally, the master’s student's program of study advances the knowledge obtained in his/her broader undergraduate program of study. Often included in the master's degree educational experience is an opportunity to teach undergraduates by serving as teaching assistants to undergraduate courses.

B. Non-thesis track
The non-thesis track is designed to bridge the gap between knowledge of the engineering sciences and creative engineering practice. At the same time, it increases the depth and breadth of knowledge in selected areas of emphasis. As offered by the Chemical Engineering Program, the non-thesis track is designed primarily for students who hold full-time jobs and attend university classes on a part-time basis. Although non-thesis students are required to complete a research paper at the conclusion of their coursework, the research done for this paper is not at the same level as that required for a thesis. Hence, the M.S.E. is more practitioner-oriented rather than research-based.

Two options are offered within the non-thesis category: 1) a general non-thesis track. and 2) a non-thesis track with a concentration in Semiconductor Processing and Manufacturing. below discusses specific requirements for each of the degrees offered The Ira A. Fulton School of Engineering has made curriculum changes in the Electrical Engineering, Industrial Engineering, Chemical Engineering, and Materials Engineering graduate programs to allow students to pursue interdisciplinary studies in semiconductor processing and manufacturing (SPM Program), leading to masters degrees within their own discipline. Furthermore, these departments and others at ASU are working together to offer late-afternoon/early-evening and televised courses to make it easier for engineers employed full-time in local industry to earn master’s degrees. The SPM Program with an emphasis in Chemical Engineering is designed for students who are employed by the semiconductor industry. Moreover, Chemical Engineering students enrolled in the SPM program may pursue the non-thesis option only. Students pursuing the Master of Science in Engineering (M.S.E.) as their terminal degree do not qualify for financial aid.
Masters in Passing (MIP): The CHE program will admit students into the PhD program directly from a related Bachelor’s degree. Students who do not already have a previously awarded Master’s degree, regardless of degree discipline, may not qualify for a Master’s in Passing. In the Chemical Engineering program, students must successfully pass the Doctoral Qualifying and Research Prospectus/Comprehensive exams to be eligible for the MIP degree. This degree, “allows students in the Ph.D. program to also obtain a master's degree after reaching a suitable level of achievement in the Ph.D. program.
III. SELECTION OF A RESEARCH TOPIC

The selection of a suitable research topic is of paramount importance to a successful graduate program. Students are urged to select a research advisor and topic early in their program of study, generally in the beginning of the first semester in residence. To accomplish this, the student visits with faculty members and then selects an advisor and thesis topic that match the student’s goals and interests. The department does not guarantee that a student will be selected to work on a specific project offered by a given faculty member. Several students often desire the same project in the case of funded research. For this reason, the student should express interest in several projects being offered by various faculty members. The department as a whole decides on the final placement of students with research advisors. The student is also responsible for enlisting faculty to serve as members on the student’s supervisory committee. Faculty interests can be found on the website at: http://engineering.asu.edu/graduate/che/faculty

The research advisor (or major professor) chair works closely with the student to help plan the student’s overall program and to coordinate coursework and research activities. Generally, the advisor helps the student select other members of the supervisory committee. Frequent contact between the student and the advisor is necessary to accurately define the research project. This helps to ensure that the student's research topic (for purposes of writing the thesis) is acceptable. Either the student or the faculty research advisor initiates the thesis topic. Research by nature is not precisely programmed. Often, well-planned experimental designs are unsuccessful. This circumstance may require the application of different methods and procedures than those envisioned at the start of the project. For these reasons, students are encouraged to initiate their thesis research even before they are able to devote full-time to the project. This helps to eliminate unnecessary delays in graduation. Original work is desirable in pursuing the Master of Science, thesis-track degree. One or more research publications or presentations should result from the research project.

Throughout the program of study, each student is encouraged to actively participate in efforts to acquire funding in support of the advisor's research program. The student should assist his/her research advisor in the preparation of grant proposals and/or progress reports to funding agencies.

IV. GENERAL ADMISSION REQUIREMENTS

A. Regular Admission
To be eligible for regular admission, the student must have a Bachelor of Science degree in Chemical Engineering (or in a closely related field). To be eligible for regular admission, United States citizens normally will have a minimum cumulative grade point average (GPA) of 3.0 out of a total possible 4.0 or equivalent. International applicants normally will be in the top 10% of their graduating class. Students entering with master's degrees are typically have a minimum cumulative GPA in their master's degree coursework of 3.5 out of a possible 4.0. The Graduate Record Exam (GRE) is required for all applicants. Foreign students must also submit test scores from the Test of English as a Foreign Language Exam (TOEFL). A score of 600 (PBT) or 100 (IBT) or greater is required for regular admission.

B. Regular Admission with Deficiencies
Regular admission may also be given to students with a Bachelor of Science degree in a discipline other than Chemical Engineering. In this case, the student may be required to complete a number of undergraduate courses to eliminate deficiencies. These courses are in addition to the graduate plan of study. Although highly uncommon, regular admission may also be given to students who are deficient in English by program requirements but meet University requirements (e.g. TOEFL 80<score <100 on the
IBT). In this case, however, the student will be required to take and successfully complete courses through the ASU American English and Culture Program (AECP). Deficiencies are determined at the time of admission by the Graduate Affairs Committee and listed on the letter of admission specifies the deficiencies and time frame in which they must be completed before the student is awarded their graduate degree. Students will be required to complete any deficiencies at the first opportunity after admission and will not be able to file a Plan of Study until all deficiencies are completed.

C. Provisional Admission
Applicants with scholastic records below the standards for regular admission may be admitted provisionally in certain special cases at the discretion of the program graduate student admissions committee with the approval of the graduate program chair. A student admitted with provisional status must earn no grade lower than a "B" in his/her first 12 hours of graduate coursework, typically. Full-time provisional students must take a minimum of nine (9) hours during their first semester in residence. [Part-time provisional students may take fewer than nine (9) hours of coursework during their first semester]. Specific provisions are determined at the time of admission by the Graduate Committee. Failure to satisfy these requirements will result in the recommendation for academic dismissal from the program for not meeting the provisions of their admission offer. Students who meet this requirement are reclassified as regular graduate students, at which time the regulations governing academic performance for regular students becomes applicable. It is the students’ responsibility to see that their status is changed from provisional to regular after having successfully completed these requirements. Students should contact the Graduate Coordinator for assistance in changing their status. Students are not able to file a Plan of Study until all provisions have been met.

V. GENERAL REQUIREMENTS

The Graduate College (GC) sets certain general requirements for the Master’s degree. In addition to these general requirements, the department sets specific program requirements that exceed those imposed by the GC. This section outlines general requirements specified by both the GC and by the Chemical Engineering Program. These requirements are common to all majors offered within the department. **In addition to understanding the material presented in this handbook, we strongly encourage you to also consult the current Graduate College Policies and Procedures for more information regarding these policies: http://graduate.asu.edu/faculty_staff/policies

A. Grading
Grades are assigned in graduate courses as follows:
A  Excellent (4.00)
B  Good (3.00)
C  Passing (2.00)
D  No Graduate Credit (1.00)**
E  Failure (0.00)**
W  Withdrawal*
I  Incomplete****
X  Audit
Y  Satisfactory
Z  Course in progress***

**Please note that effective the fall 2004 semester, faculty can now award +/- designations to grades. The awarding of +/- grades is at the discretion of individual faculty. For a full listing of GPA values associated with these grades, please see the following link: http://students.asu.edu/grades-grading-policies
* This grade is given whenever a student officially withdraws from a class.

** This grade cannot be applied to a graduate degree but is included in the calculation of a grade point average.

*** This grade is usually given pending completion of courses such as a thesis, dissertation or practicum. It may also be given in lieu of an "I" for other graduate courses where the incomplete work may take in excess of one year to complete. All grades of "Z" must be changed to "Y" before graduation.

**** Graduate course work (500-, 600-, and 700-level courses) reported as an “I” (incomplete) must be completed within one calendar year. At the time the “I” grade is given, the student must complete a “Request for Grade of Incomplete” form. The form first serves as a record of the “I” grade and the work required to complete it. When the student has completed the work, the form then serves as a change-of-grade authorization.

If the work specified on the form is not completed within one calendar year, the “I” grade (500-, 600-, and 700-level courses) becomes part of the student’s permanent transcript, and the student is not allowed to complete the course work as specified on the “Incomplete” form. The student may, however, repeat the course after the “I” has become permanent, by reregistering, paying fees, and fulfilling all course requirements. The grade for the repeated course appears on the transcript but does not replace the permanent “I.”

A grade of "P" (Pass) in a 400 or higher level course may not appear on a program of study. Grades of "D" or "E" cannot be used to meet the requirements for a degree, although they are used to compute grade point averages. A student receiving a grade of "D" or "E" must repeat the course in a regularly scheduled (not an independent study) class if it is to be included in the program of study. However, both the "D" or "E" and the new grade are used to compute the grade point averages. Grades on transfer work (used toward a program of study) will not be used in computing grade point averages.

B. Satisfactory Academic Progress

To be eligible for a graduate degree a student must adhere to the Satisfactory Academic Progress set forth by the Chemical Engineering Program, School for Engineering of Matter, Transport, and Energy, Ira A. Fulton Schools of Engineering, and the Graduate college. Academic excellence is expected of students doing graduate work. Upon recommendation from the Graduate Program Chair of the Chemical Engineering Program, the Director of the School for Engineering of Matter, Transport, and Energy, the Dean of the Ira A. Fulton Schools of Engineering, and/or the Dean of the Graduate College, students who are not making satisfactory academic progress towards their degree may be recommended for dismissal from the program.

A student who has been admitted to a graduate degree program in Engineering, with either regular or provisional admission status, must maintain a 3.0 or higher grade point average (GPA) in all three of the following areas:
1. in all work taken for graduate credit (courses numbered 500 or higher),
2. in the coursework in the student’s approved program of study, and
3. in all course work taken at ASU (overall GPA) post baccalaureate.

A. 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.

B. A student will earn academic good standing by obtaining a 3.0 or better in the GPAs listed above by the time the next nine hours are completed. Coursework such as research and dissertation registration that are for Z or Y grade cannot be included in these nine hours.

C. A student may be recommended for dismissal from a graduate program if the student fails to increase all of the GPAs listed above to 3.0 or better by the time he/she completes at least nine credit hours as defined in section B.

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

Academic units in Engineering can expand this policy statement to include additional policy governing the satisfactory academic progress of the students in their graduate programs.

Students must also meet Graduate College satisfactory academic progress. Please see their website for requirements and additional information at http://graduate.asu.edu/progress/steps/critical_policies_to_remember/maintaining_progress

C. Program Good Academic Standing
The Chemical Engineering program has additional requirements that students must adhere to in order to maintain good academic standing on top of the academic standing requirements set forth by the Ira A. Fulton Schools of Engineering and the Graduate College.

To remain in good standing, the student must achieve and maintain a minimum GPA of 3.00 or higher in all work taken for graduate credit, AND a 3.00 or higher GPA in all coursework at ASU.

A student is placed on academic probation by the Program, School for Engineering of Matter, Transport, and Energy, and the Ira A. Fulton Schools of Engineering if any of the following conditions are met:

1. the student's GPA falls below 3.00 in the approved program of study;
2. the student's GPA for all post-baccalaureate courses taken at ASU falls below 3.00;
3. the student receives a grade of "D" or "E" in a required deficiency course; or
4. the student receives a grade of "D" or "E" in any course at the 400 level or above.
5. the student fails to make satisfactory progress toward a degree for reasons other than above.
A probationary student who does not successfully improve his/her GPA by the end of the next enrollment period may be recommended by the department for withdrawal.

A student may be recommended for withdrawal by the Graduate College if:

1. the student is on academic probation because his/her GPA has fallen below 3.00 in the approved program of study or for all post baccalaureate courses taken at ASU and fails to bring the GPA to 3.00 or above by the time the next nine semester hours are completed; or
2. the student receives a grade of "D" or "E" while on academic probation; or
3. the student fails to obtain a GPA of at least 3.00 in all courses cited as deficiencies upon admission; or
4. the student fails to meet any other conditions imposed as a part of probation.
5. for reasons other than above, the student fails to make satisfactory progress toward a degree.

Students will be notified by postal mail to their local mailing address when they are first placed on academic probation. If a student is withdrawn from the graduate program, he/she will receive notice from the Graduate College. A student may appeal any action concerning academic probation and withdrawal by beginning with a petition to the graduate student affairs committee within the School for Engineering of Matter, Transport, and Energy.

D. Misconduct
The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of the individual colleges. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, falsification or misrepresentation of data or facilitating such activities. The university and colleges’ academic integrity policies are available in the Office of the Executive Vice President and Provost and the offices of the deans of the individual colleges. The university academic integrity policy is also available in the Office of Student Life, or on the Web at http://provost.asu.edu/academicintegrity

E. Graduate Credit Courses
Courses at the 500, 600 and 700 levels are graduate credit courses. Courses at the 400 level may satisfy graduate degree requirements when appearing on an approved program of study. Only a maximum of 6 credit hours of 400 level credit may be counted towards a graduate Plan of Study. For additional information, please see the Graduate College website: http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements.

F. Transfer Credit
Transfer of credit is the acceptance of credit from another institution for inclusion in a program of study leading to a degree awarded by Arizona State University. The number of hours transferred from other institutions may not exceed 20% of the total minimum semester hours required for a master’s degree—hence, students can transfer up to 6 credit hours toward a master’s degree in the department. Transfer coursework must be completed within three academic years of admission into the degree seeking program at ASU. Please see the Graduate College transfer policy: http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements.
G. Non-Degree/Pre-Admission Credit
Graduate College policy allows a Master’s student to take up to 9 semester hours of graduate level credit while enrolled as a non-degree student at ASU, which is known as pre-admission credit. Pre-admission may be applied to a program of study once enrolled in a graduate degree as long as the academic unit approves and the grades earned are above a 3.0 or “B” grade. For master’s students who transfer in 6 hours of credit toward a degree, please note that they can only then use 3 hours of non-degree credit toward that degree (the combination of transfer/non-degree hours cannot exceed 9 hours). Pre-admission coursework must be completed within three academic years of admission into the degree seeking program at ASU. Please view the Graduate College website for additional information: [http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements](http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements)

H. Dual Degree
A dual degree may be available. It is designed to enable qualified graduate students to pursue two graduate degrees. Students in the Chemical Engineering program must be in good academic standing before application to pursue a dual degree. Students must petition both departments and receive approval. Please note that not all programs will permit a dual degree. NOTE: One-sixth (1/6) of the total combined hours may be shared towards the two degrees. (i.e. two 30 hour degrees = 60 hours total; hence, 10 hours may be used in both degrees).

I. Course load and Continuous Enrollment
At the graduate level, 9 hours is considered full time status by the university. Course load is not to exceed 15 semester hours of credit during each of the two semesters (fall and spring); 6 semester hours during each 5-week summer session or 9 semester hours of credit during the 8-week summer session. Enrollment verification guidelines for graduate students can be found on the Graduate College website: [http://graduate.asu.edu/faculty_staff/policies/registration](http://graduate.asu.edu/faculty_staff/policies/registration)

All graduate assistants and associates must enroll for a minimum of 12 credit hours (this may include research credit hours) during each semester of their employment. This departmental and Ira A. Fulton Schools of Engineering requirement exceeds the Graduate College minimum of six (6) hours. The hours cannot include audit enrollment. A half-time (at least 50%) graduate assistant or associate working 20 clock hours per week may not register for more than 12 hours (13 hours with seminar) of coursework each semester; a one-third time (33%) assistant or associate for more than 13 hours and a one-quarter-time (25%) assistant or associate for more than 15 hours.

During the summer sessions, graduate assistants employed 25% time may enroll for a maximum of 6 semester hours during a 5-week session or 9 hours during an 8-week session; those employed 50% may enroll for a maximum of 5 hours during a 5-week session or 7 hours during the 8-week session and those employed 100% time may enroll for a maximum of 3 hours during the 5-week session or 4 hours during the 8-week session.

All graduate students doing research, working on theses or dissertations, taking comprehensive final examinations or using university facilities or faculty time, must be registered for a minimum of one hour of credit that appears on the program of study or is an appropriate graduate level course. Students who withdraw from all of their courses are also considered as non-enrolled and therefore breaking continuous enrollment. Audit courses do not count towards continuous enrollment. If students do not maintain continuous enrollment (fall and spring semesters only), they will be considered out of status and must
reapply to the program. All re-applications to the program involve a new admission date, which results in all coursework previously completed is counted as pre-admission credit. If a student is going to be away from the program for a semester, s/he is strongly encouraged to visit with the graduate advisor to discuss a leave of absence. Additional information can be found about continuous enrollment and leave of absence at the Graduate College website: "http://graduate.asu.edu/faculty_staff/policies/registration"

Students a part of the Ira A. Fulton Schools for Engineering are allowed to register for no more than 15 credits each semester. Should a student wish to take more than 15 credits in a given semester, the student must receive approval from their Faculty Advisor, Program Chair, and the Dean’s Office. Please see Graduate Advisor for the petition form.

J. Graduate Student Orientation
All new entering graduate students are required to attend a departmental graduate student orientation meeting. The meeting is held in the week prior to the beginning of classes of the student’s first semester in residence. During this orientation meeting, students are advised regarding departmental policies and are given initial advice regarding registration for courses.

K. Graduate College Teaching Assistant/Associate Orientations
Besides their departmental orientation sessions, all new TAs are required by the university to attend the Orientation and Training Program conducted by the Graduate College, which is held one week prior to the beginning of classes in their first semester in residence. Fulfillment of this training experience is a condition of appointment mandated by the Arizona Board of Regents. Students who fail to fulfill requirements will be ineligible for confirmed appointments. Additional information can be found on the Graduate College website at: "http://graduate.asu.edu/faculty_staff/tara"

International students who have been offered a TA position must pass the SPEAK test. Information regarding the SPEAK test can be found at: "http://global.asu.edu/aecp/speaktest". Any offer of a TA position is contingent upon passing the SPEAK test.

L. Supervisory Committee
All students admitted with regular or provisional status are required to establish a graduate supervisory committee during their first semester of residence. This committee is responsible for the guidance and the direction of the student's graduate program. The supervisory committee is comprised of a minimum of three members, including a chair. Generally, the chair of the supervisory committee is the M.S. student's faculty advisor. The committee is responsible for approving the M.S. thesis track student's research proposal and the title of the master's thesis, and for conducting the final defense of the master's thesis. M.S., non-thesis track students with applied projects should discuss potential committee members with the graduate program chair during course advisement at the end of their first semester of residence and form a committee. The chair of the committee will provide minimal technical guidance on the applied project, but will provide input on the suitability of potential projects for satisfying the requirements for the M.S., non-thesis degree.

In some cases, individuals who are not members of the resident faculty may be appointed to a supervisory committee as a member. Such appointments must be consistent with quality graduate training and must be strongly recommended by the chair of the department. A curriculum vitae for this individual must be submitted to the Graduate College along with a form and the recommendation from the graduate program chair through the CHE Graduate Advisor. In instances where the student selects a chair of the supervisory committee who is not a member of the Chemical Engineering Program, a co-chair must also
be appointed. The co-chair must be a member of the regular faculty of the Chemical Engineering Program and a faculty member in the student's major. 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 enforcement of departmental policies and requirements.

VI. OVERVIEW OF THE M.S. DEGREE

A. General Requirements Specific to both the tracks

1. Program of Study
All students are required to submit an official program of study, outlining the courses they have taken and will complete to fulfill degree requirements. The Interactive Plan of Study (iPOS) must be filed at the end of their first semester. Students who do not do this may receive a hold on their academic record preventing registration until the iPOS has been filed. The Graduate College will place a hold preventing registration if a student has not filed the iPOS when at least 50% (15 credit hours) have been completed. Additional information is available at http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements

The iPOS can be located on ASU Interactive/MyASU at http://my.asu.edu/

The steps for filing the iPOS are laid out here for your convenience:

1. Register for and complete coursework in first semester and register for coursework in the second semester prior to it commencing
2. Select faculty advisor and begin coursework; have faculty advisor assist with course selection for second semester registration
3. At the end of the first semester, file the iPOS
4. File iPOS through the MyASU system
5. List all coursework already completed that you wish to use towards your degree
6. List all coursework that you plan to complete to fulfill degree requirements
### List Faculty Advisor as Committee Chair

<table>
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<tbody>
<tr>
<td>Add additional Committee Members to iPOS (&quot;this may be done at a later date but must be done prior to scheduling the defense. This is completed with a committee change petition to the iPOS accessed through MyASU)</td>
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<tbody>
<tr>
<td>Submit iPOS through MyASU system to Graduate Advisor</td>
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<tbody>
<tr>
<td>Obtain Faculty Advisor’s approval of iPOS courses (this may be done either with a physical signature on a printed iPOS with both the signature page and the course page or by email with the iPOS signature and coursework pages attached)</td>
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<tbody>
<tr>
<td>Submit Faculty Advisor's approval to Graduate Advisor for academic unit processing (&quot;please note that it is YOUR responsibility for obtaining and submitting the faculty advisor’s approval of the iPOS and your iPOS will not be processed until the Graduate Advisor has the proper approvals).</td>
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<tbody>
<tr>
<td>If you have added committee members to the committee, each will need to confirm their participation on the committee. This may be done either by an email to the Graduate Advisor or by having them sign the iPOS approval page</td>
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<tbody>
<tr>
<td>In the graduation semester, verify that your iPOS has the correct committee members and courses listed. (&quot;if your iPOS is not correct, your graduation will be delayed. Please note that this is your responsibility)</td>
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<tbody>
<tr>
<td>Submit any necessary changes to the iPOS through the MyASU and notify the Graduate Advisor that a change is pending indicating your full name, 10 digit ASU ID number, and your program.</td>
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</tbody>
</table>

The iPOS can be located on ASU Interactive/MyASU at [http://my.asu.edu/](http://my.asu.edu/).

Course modifications may be made to the iPOS with the approval of faculty mentors after the iPOS has been submitted and approved.

### 2. Transfer work and Pre-admission credits

Students may request for transfer work and pre-admission coursework completed at ASU for part of the iPOS. Please see the Graduate College requirements and definitions of transfer credit and pre-admission credit at the following website: [http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements](http://graduate.asu.edu/faculty_staff/policies/graduate_degree_requirements). Please note that students may use transfer or pre-admission credit on the iPOS, however any graduate coursework taken prior to admission that are included on the iPOS must have been completed within three years of the semester and year of admission to the program.
3. Graduation
The student is eligible for graduation when all degree requirements are met. This includes coursework is successfully completed, the Graduate College, Ira A. Fulton Schools of Engineering, and program scholarship requirements are met (i.e. student obtains the minimum 3.0 required GPAs), any required comprehensive examinations are passed, and the final culminating experience (i.e. thesis or applied project) are approved by the supervisory committee and accepted by the Head of the Academic Unit and the Dean of the Graduate College, and the required number of thesis copies are submitted to the bookstore for binding.

4. Foreign Language Requirement
None.

5. Maximum Time Limit
All work offered toward the master's degree must be completed within 6 consecutive years. The six-year time limit begins with the semester and year of admission to the program. For example, if admission was granted for Fall Semester 2011, the student must complete all requirements by August 2017. For additional information, please see the Graduate College website at: http://graduate.asu.edu/faculty_staff/policies/maintaining_progress

6. Research Seminar Requirements
In addition to the coursework and thesis requirements, all students are required to complete the research seminar requirements. All full-time Chemical Engineering master's degree students must successfully complete the seminar course every semester in residence.

B. General Requirements Specific to the Master of Science Degree (M.S.), thesis track option

The following additional requirements are specific to the Master of Science degree.

1. Thesis
To satisfy the research requirement for the Master of Science, thesis track option degree, the student is expected to present a thesis, which is defended in an oral examination. The thesis should be of high quality, giving evidence that the program provided an introduction to original research. The final approved copy will be bound and placed in the university library, archives and in the department office. Students should obtain copies of The Format Manual (which is a guide for the preparation of master’s theses) from the Graduate College at http://graduate.asu.edu/formatmanual. The final copy of the thesis or its equivalent is reviewed by the student's supervisory committee and submitted to the Graduate College for format evaluation at least 10 working days prior to the scheduled thesis defense. Each student writing a thesis must register for and complete a total of 6 semester hours of thesis credit (CHE 599) listed on the iPOS. These 6 semester hours of thesis are directed to a common research problem. Students can optionally take an additional 3 hours of research credit (CHE 592) to be used towards the iPOS. Credit taken to fulfill the thesis/research enrollment requirement must appear on the iPOS. Students must be enrolled for at least 1 hour of credit that appears on the program of study or 1 hour of appropriate graduate level credit (i.e. CHE 595: Continuing Registration) during the semester or summer session in which they defend the thesis and/or are considered a graduate. If a defense occurs in the time between the semesters or summer sessions, students are required to register for the next semester.
2. Thesis Defense
The oral defenses of a master's thesis must be scheduled at least 15 working days prior to the agreed upon defense date by adhering to the steps outlined below. Master's thesis defenses are public and open to all members of the university community. The oral defense engages the supervisory committee and the candidate in a critical discussion of the research and findings of the study. Moreover, the defense attempts to relate the content of the thesis to the major field. The presentation of the thesis 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. The graduate coordinator notifies students/faculty within the department about thesis defenses. Members of the university community are also invited to thesis defenses through announcements published on the 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.

Here is a flow chart for the thesis process to assist you once you are ready to defend. Verify that the iPOS is in order with your entire committee listed.

↓

Take note of the Graduate Deadlines set forth by the Graduate College and University found on their respective websites; http://graduate.asu.edu/progress/graduation_deadlines and http://students.asu.edu/academic-calendar

Confirm with your committee the date of defense

↓

Register for a minimum of one graduate credit hour in the semester of graduation through the MyASU system

↓

File for Graduation through the MyASU system

↓

Confirm with your committee the date of defense

↓

Verify that your iPOS has the correct committee listed through the iPOS tab in the MyASU system. If your committee has changed or is out of date, you need to submit a committee change petition through the iPOS system and notify the graduate advisor that you have done this.
**Master’s Graduate Student Handbook**

<table>
<thead>
<tr>
<th>Complete the Schedule Defense Room Reservation Form on the Program Website 15 working days or more prior to your defense date: <a href="http://engineering.asu.edu/emte/graduateforms">http://engineering.asu.edu/emte/graduateforms</a> and submit to the Graduate Advisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>As you are waiting for the room assignment, complete the Thesis/Dissertation Defense Announcement that will be provided to you by the Graduate Advisor.</td>
</tr>
<tr>
<td>After you have received a room assignment from the Graduate Advisor, you may schedule your defense with the Graduate College by logging into the MyASU and clicking on the tab that says “Defense.” This must be done 10 working days prior to the day you’d like to defend. Please make sure you pay attention to the input of your culminating document title as this is how it will appear on your official transcript; in other words, please make sure you spell everything correctly.</td>
</tr>
<tr>
<td>You must send the final draft of your completed document, including your 10 digit ASU ID number, to the Graduate College for format review within 24 hours of scheduling your defense to <a href="mailto:gradformat@asu.edu">gradformat@asu.edu</a>.</td>
</tr>
<tr>
<td>Provide your committee a final draft of the thesis at least 10 working days prior to the defense</td>
</tr>
<tr>
<td>Notify the Graduate Advisor and the Graduate College via a change to the scheduling of the defense through the MyASU system if any modifications need to be made to the defense (i.e., date, time, or location; if you will have an absent committee member, please contact the Graduate Advisor for information on the Graduate College policy and procedure for absent committee members).</td>
</tr>
<tr>
<td>Confirm with your chair that s/he has received the pass/fail form from the Graduate College and that the chair will bring the form to the defense</td>
</tr>
</tbody>
</table>
Successfully defend the thesis

Bring your pass/fail form with the signatures to the Graduate Advisor for academic unit processing within 10 business days of defending the thesis; if you have revisions that must still be completed a copy of the form will suffice. The original form with all original signatures will need to be given to the Graduate Advisor after all revisions have been completed and signed off on by the chair.

The Graduate Advisor will notify you when your pass/fail form is ready to be picked up and taken to the Graduate College in Interdisciplinary Building B Wing, room 170 for the Graduate College Dean’s signature.

The Graduate College will notify you when your document is ready to be submitted to ProQuest, although you may also check the MyASU system under the “Defense” tab as that will say “Ready to submit to ETD/ProQuest.”

Provide a copy of the ProQuest Submission receipt to the Graduate Advisor to have CHE 599 and CHE 592 grades on the iPOS changed from “Z” to “Y.”

Your degree will post after the degree conferral date outlined in the Academic Calendar and all of your grades have been changed.

Verify your mailing address through the MyASU system.

You will receive your degree in the mail 6-8 weeks after your degree has posted. The degree will be mailed to your mailing address listed in MyASU.

C. General Requirements Specific to the Master of Science, non-thesis track (M.S.)

The following additional requirements are specific to the Master of Science, non-thesis degree.

1. Research Paper
Students in the M.S, non-thesis track program must produce and defend a technical paper, often referred to as an applied project. Such papers are generally 15-20 pages in length (double spaced plus figures), and are based upon original work. Students should consult with their supervisory committees regarding the proper format of this paper. In the semester that the student plans to graduate, s/he should establish a suitable time with the committee to defend the research paper and register for the required 3 credits of CHE 593 with their faculty advisor. Please note that unlike a thesis, a research paper does not need to obtain format approval nor does it need to be submitted to Graduate College for format review. It is an internal document only, however must be orally defended. Please review Appendix I for guidelines concerning the format of the M.S.E. Paper.
Here is a flow chart for how the Research Paper progress should go:

1. Verify that the iPOS is in order with your entire committee listed
2. Take note of the Graduate Deadlines set forth by the Graduate College and University found on their respective websites; [http://graduate.asu.edu/progress/graduation_deadlines](http://graduate.asu.edu/progress/graduation_deadlines) and [http://students.asu.edu/academic-calendar](http://students.asu.edu/academic-calendar)
3. Confirm with your committee the date of defense
4. Register for at least one graduate credit hour in the semester of graduation through the MyASU system
5. File for Graduation through the MyASU system
6. Confirm with your committee the date of defense
7. Complete the Schedule Defense Room Reservation Form on the Program Website 15 working days or more prior to your presentation date: [http://engineering.asu.edu/emte/graduateforms](http://engineering.asu.edu/emte/graduateforms)
8. Bring a copy of the Report of Final Master’s Culminating Experience Form to the presentation, which can be found on the our website: [http://engineering.asu.edu/emte/graduateforms](http://engineering.asu.edu/emte/graduateforms)
9. Provide your committee a final draft of the paper at least 10 working days prior to the defense
10. Successfully defend the document
11. Bring your Report of Final Masters Culminating Experience form with the signatures to the Graduate Advisor for academic unit processing
12. Your degree will post after the degree conferral date outlined in the Academic Calendar and all of your grades have been posted
VII. SPECIFIC PROGRAM REQUIREMENTS

In addition to the general requirements listed above, the department has established additional specific requirements for each of the majors in the Chemical Engineering Program. Please see below for specific major requirements:

A. Thesis Track

Chemical Engineering

Master of Science Degree (MS),
Option 1: Thesis Track
Chemical Engineering

The required coursework for this degree is divided into the following categories:

1. Chemical Engineering Core Requirements
   Students are required to take (15) semester hours of graduate level Chemical Engineering courses, exclusive of seminar (CHE 591), deficiency courses, Research/Thesis (CHE 592/599), and Reading and Conference (CHE 590). Of these (15) hours, three courses (9 hours) must be the following:

   -- CHE 533 (3): Transport Processes I
   -- CHE 543 (3): Thermodynamics of Chemical Systems
   -- CHE 544 (3): Chemical Reactor Engineering

2. Technical Electives
   Master’s candidates must select a minimum of (9) hours of graduate-level elective courses (beyond the required 15 hours of CHE core requirements) if they take (6) hours of research and thesis. (6) hours of technical electives are required if the student elects to take (9) hours of research and thesis. At least one technical elective course (3 hours) must be taken from outside of Chemical Engineering.

**400-level courses in departments outside of Chemical Engineering are considered appropriate technical electives unless the course content significantly matches that of 300-level or lower courses in Engineering. For instance, STP 420 does not qualify as a valid technical elective because it is similar to ECE 383. Any questions on course validity for the technical elective requirement should be addressed to the student’s committee chair and/or the Graduate Coordinator.

**CHE 590 (Reading and Conference) may be taken as a technical elective only once (for a maximum of 3 credits).
3. Research/Thesis
Each student must register for a combined total of 6 semester hours thesis (CHE 599). Students may list for 3 hours of Research (CHE 592) if they wish but it is not required.

4. Seminar
All full-time Chemical Engineering graduate students are required to successfully complete the seminar course (CHE 591) every semester in residence. Only (3) hours of seminar apply toward the MS degree, regardless of how many times it is taken.

Total: 33 credits
**Please see Appendix for a Worksheet

5. Transition Program Requirements
Students without a bachelor's degree in Chemical Engineering and without the equivalent of the following courses in their undergraduate program of study are deficient in some skills needed for graduate study in Chemical Engineering. These courses must be completed in addition to the required graduate coursework.

6. Mathematics and Basic Sciences
- Mathematics: Calculus through "Ordinary Differential Equations" (e.g. MAT 270, 271, 272 and 274; typically at least 15 semester hours of credit total).
- Physics: One year of calculus-based physics including laboratory (8 semester hours).
- Chemistry: Minimum of two courses in General, Basic or Inorganic Chemistry with laboratory (8 semester hours); two courses in Organic Chemistry with laboratory (8 semester hours); and one upper division course in Physical, Analytical, or Biochemistry course (3 semester hours).

7. Chemical Engineering Fundamentals
CHE 231 Transport Phenomena I: Fluids (3 semester hours)
CHE 333 Introduction to Mass Transport (3 semester hours)
CHE 342 Introduction to Chemical Thermodynamics (3 semester hours)
CHE 442 Introduction to Chemical Reactor Design (3 semester hours)

B. Non-Thesis Track

Master of Science (MS)

Option 2: (Non-Thesis)

All students who are admitted into the MS program are assumed to be non-thesis students. Usually these students are those who pursue their degree on a part-time basis while being employed full-time. Financial assistance is not available to students who elect this degree option.
1. Chemical Engineering Core Requirements

Students are required to take (15) semester hours of graduate level Chemical Engineering courses, exclusive of seminar (CHE 591), deficiency courses, Research/Thesis (CHE 592/599), and Reading and Conference (CHE 590). Of these (15) hours, three courses (9 hours) must be the following:

-- CHE 533 (3): Transport Processes I
-- CHE 543 (3): Thermodynamics of Chemical Systems
-- CHE 544 (3): Chemical Reactor Engineering

2. Technical Electives

Master’s candidates must select a minimum of (9) hours of graduate-level elective courses (beyond the required 21 hours of CHE core requirements) At least one technical elective course (3 hours) must be taken from outside of Chemical Engineering.

**400-level courses in departments outside of Chemical Engineering are considered appropriate technical electives unless the course content significantly matches that of 300-level or lower courses in Engineering. For instance, STP 420 does not qualify as a valid technical elective because it is similar to ECE 383. Any questions on course validity for the technical elective requirement should be addressed to the student’s committee chair and/or the Graduate Coordinator.

**CHE 590 (Reading and Conference) may be taken as a technical elective only once (for a maximum of 3 credits).

3. Applied Project (CHE 593)

Each student must register for a total of 3 semester hours applied project (CHE 593) and should take during the last semester of graduation.

**Total: 33 credits

Students who choose this option follow the requirements for the Master of Science Degree, but will replace the thesis/research credits with (6) additional credit hours of coursework. MSE students are not required to take the (3) credit hours of seminar, but they can if they choose; however, if they do not take seminar, they must replace these (3) hours with an additional technical elective. This degree requires a total of 33 semester hours.

After completing the coursework, students must complete a report, typically 15-20 double spaced pages plus figures, on a topic of their choice (the topic needs to be approved by their committee). At the conclusion of the report, the student will make an oral presentation on the topic to his/her committee.

**Please see Appendix for a worksheet

C. Option 3: Chemical Engineering with a specialization in Semiconductor Processing and Manufacturing (Non-thesis) (Not available in 2012-2013 academic year)

The Master of Science degree, non-thesis track, with a major in Chemical Engineering and a specialization in Semiconductor Processing and Manufacturing, involves a total of 33 semester hours. After completing the coursework, students must complete an applied project, typically 15-20 double spaced pages plus figures, on a topic of their choice (the topic needs to be approved by their committee) and need to follow the procedures to schedule an applied project outlined previously in this document. At
the conclusion of the report, the student will make an oral presentation on the topic to his/her committee. The following courses are required for this degree:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>CHE 458/598</td>
<td>3</td>
<td>Semiconductor Material Processing</td>
</tr>
<tr>
<td>CHE 598</td>
<td>3</td>
<td>Deposition and Etching</td>
</tr>
<tr>
<td>EEE 591</td>
<td>3</td>
<td>Fundamentals of Solid State Devices</td>
</tr>
<tr>
<td>IEE 570 or IEE 572</td>
<td>3</td>
<td>Advanced Quality Control Design of Engineering Experiments</td>
</tr>
<tr>
<td>MSE 598</td>
<td>3</td>
<td>Materials Issues in Semiconductor Processing</td>
</tr>
</tbody>
</table>

(6) credits of chemical engineering electives at the 500 level or higher
(6) credits of technical electives at the 500 level or higher
(3) credits of CHE 593: Applied Project

1. Seminar
   - In addition to the 30 credits listed above, students may choose to take either (3) credits of the 1 unit graduate seminar (CHE 591) or an additional technical elective (500 level or higher).

Total: 33 credits

**Please see Appendix for Worksheet**

**VIII. MASTER'S DEGREE PROGRAM DEADLINES**

It is the graduate student's responsibility to see that all graduate program deadlines and requirements are met. To aid the student in an efficient and timely progression through the program, the following calendar of activities is provided.

A. Orientation
   All new students are required to attend the departmental graduate student orientation meeting, which is held the week prior to the beginning of each semester.

B. Registration Advisement
   Prior to the registration period for each semester, all graduate students should consult their approved iPOS for what courses to register for in the upcoming semester. If there are courses that are not offered, the student must meet with their supervisory committee chairs/research advisors for assistance with course selection. The chair/advisor will sign the *Graduate Advising Registration form* (see [http://engineering.asu.edu/semte/GradForms.html](http://engineering.asu.edu/semte/GradForms.html)), indicating which courses the student should take in the subsequent semester, and the student will return the form to the Graduate Advisor for registration clearance. The form may be dropped off at ECG 202 after all signatures have been obtained. Students may also submit the form electronically to the faculty member and have the faculty member approve the form via email to the Graduate Advisor. The student then should submit a course change petition to the iPOS after their next semester registration has been approved and notify the graduate advisor that the
petition has been submitted and is pending approval; it is critical for the student to include his/her 10 digit ASU ID number.

C. Selection of Supervisory Committee and Submission of Interactive Program of Study
No later than the end of the first semester of residence, students should select their supervisory committee (see section V. letter L for information regarding the composition of the committee). At least one semester prior to the semester of the thesis/research paper defense, students should submit an Interactive Program of Study (iPOS). Not only does the interactive program of study serve to outline the student’s courses, but it also makes official the student’s thesis committee—that is, the committee members who are denoted on the IPOS will constitute the student’s official committee. **Please note that the interactive program of study should include all required coursework, research/thesis, and seminar hours, even if certain credits have not yet been completed and are to be taken in a subsequent semester.** The iPOS can be located on ASU Interactive at [https://sec.was.asu.edu/intsite/Main](https://sec.was.asu.edu/intsite/Main). Once students have completed the iPOS online, they will submit it to the Graduate Coordinator (i.e. once the student hits “submit,” it automatically is sent to the Graduate Coordinator), who will review and forward it to the Graduate College for final approval. The student’s responsibility to provide the Graduate Coordinator with the approval of the chair and/or committee. The student may submit the iPOS with only the chair listed, but must add the entire committee to the iPOS at least 2 months prior to the final defense.

5) Applying for Graduation: In the semester the student plans to graduate, he/she will need to apply for graduation at the Graduation office through the MyASU. Please see the following link, [http://graduate.asu.edu/progress/graduation_deadlines](http://graduate.asu.edu/progress/graduation_deadlines), for graduation deadlines and procedures.

D. Completion and Defense of the Thesis (only)
During the actual defense of the thesis, the pass/fail form will be brought to the defense by the faculty advisor. The entire committee will need to sign off on the pass/fail form or adhere to the specifications of the absent committee member procedures set forth by the Graduate College. The student will then be responsible for submitting this approval page to the Graduate Advisor for departmental processing and then ultimately to the Graduate College. In order for the Dean of the Graduate College to sign the approval page, the following requirements must be met:

1. The student will need to have already obtained final format approval of the thesis.

2. The **Thesis Pass/Fail** form (which will have already been sent to the student’s committee prior to the defense), will need to have been signed by the head of the academic unit and forwarded to the Graduate College. For quicker processing of the **Pass/Fail** form, it is recommended that the student hand-deliver it to the Graduate College after receiving notification from the Graduate Advisor that the form is ready to process to the next step.

**Please refer to Appendix I for guidelines regarding the conduct of the thesis defense.**

After the pass/fail form has been delivered to the Graduate College, the student must submit the final thesis to ProQuest through the MyASU system. Please see the Graduate College website for deadlines: [http://graduate.asu.edu/graddeadlines.html](http://graduate.asu.edu/graddeadlines.html) **Failure to meet any of these deadlines will prevent you from graduating.** If a student wishes to have a bound copy of the document, that may be purchased through ProQuest.

It is strongly suggested that thesis students check the current requirements from the Graduate College regarding thesis format and requirements as these can change and the student is responsible for adhering
to the correct format guide. The requirements of the graduate college supersede any conflicting requirements listed herein.

**Enrollment Requirements for the Thesis Defense** -- Students must be enrolled for at least one credit hour of appropriate graduate-level credit during the semester or summer session in which they defend a thesis. This credit must appear on the official program of study. If defending during the summer, enrollment in any one summer session (eight-week, first-five week, or second-five week) will fulfill this requirement. If your thesis defense is scheduled during a break period, you must be enrolled during the next semester.

E. Completion and Defense of the Applied Project (Non-thesis)

Once the student has completed a defense-ready draft of the Applied Project research paper, the and the committee will need to decide upon a suitable date for the final defense and oral examination. Applied projects do not need to seek format approval for their paper. The scheduling of the research paper defense and the actual format of the research paper are internal processes only and outlined previously in the document. Following completion of the research paper defense, the student will need to present his committee with the Report of Final Master's Culminating Experience form (found on: http://engineering.asu.edu/semte/GradForms.html), obtain all of the needed signatures, and then submit the document directly to the Graduate Coordinator.

For information regarding the preferred format of the Applied Project research paper, please refer to the Guidelines for Writing and Presenting the Applied Project Research Paper in Appendix I.

The Enrollment requirements for the defense of the Applied Project research paper are the same as for the thesis. Please see above for more information on this.

F. Final requirements

After completion of the steps above, students will need to take care of the following departmental requirements:

--return all keys and departmental property.
--samples and notebooks must be turned over to the student’s research advisor.
--laboratory waste needs to be disposed of and desks need to be cleaned out.
--a US mailing address must be updated for a location to send the final degree.

IX. FINANCIAL SUPPORT

Financial support for graduate students in the Chemical Engineering Program is available from two primary sources. These include research assistantships and teaching assistantships. Please note that non-thesis students that are not concurrently pursuing a Ph.D. are not eligible for financial support through the Chemical Engineering Program.

A. Teaching Assistantships

Some teaching assistantships may be available to qualified individuals. All teaching assistants whose official country of origin’s native language is not English must take the SPEAK test, administered at ASU. Additional information, including registration information, on the SPEAK test can be found on their website at: http://global.asu.edu/aecp/speaktest

Students receiving teaching assistantships may be assigned appointments which are half-time (20 hours per week) or quarter-time (10 hours per week). Assignments may include sole responsibility for the
teaching of undergraduate laboratories, assistance in the teaching of undergraduate laboratory recitations, and assistance in grading of undergraduate homework. Students may additionally be asked to prepare lectures in undergraduate courses and administer examinations. Teaching responsibilities are in addition to the time spent on research for the graduate degree. Teaching assistantships often are also available in other departments at the university, such as Chemistry, Mathematics and Computer Science. Teaching assistantships may include insurance, tuition remission, and a stipend as benefits. Please see the Graduate College website regarding specific information on TA trainings, resources, benefits, and the TA handbook: http://graduate.asu.edu/financing/tara

B. Research Assistantships
Research assistantship appointments pay the student a stipend for involvement in a particular faculty research project—this project usually also serves as the student’s thesis research topic. In addition to a stipend, students receiving a research assistantship are generally given benefits similar to that of the TA. You may view benefit information on the Graduate College website: http://graduate.asu.edu/financing/tara Students receiving stipends for research activity, which also constitutes the thesis research, spend considerably more time each week working on the project than is otherwise expected by the assistantship.

For more information regarding Teaching/Research Assistantship policies, please view the following link: http://graduate.asu.edu/financing/tara.

C. Policies Related to Financial Support of Graduate Students
It is the desire of the program to provide financial support for as many students as possible. Financial resources, however, are limited. For this reason, only a limited number of students receive written offers of financial aid prior to entering the program. Students who elect to enter the program without a written commitment of financial aid are responsible for providing their own financial support. Although it is the desire of the faculty to assist students by the aggressive pursuit of research grants, the faculty are not responsible for providing funding when a student enrolls in the program. All supported students are expected to complete their work assignments in a satisfactory manner as judged by the faculty. Additionally, supported students are required to register for at least 12 semester hours of coursework (4 courses) during each semester of residence, which includes research hours. Any student not making satisfactory academic progress in their program may result in the loss of financial support.

X. ACCESS TO DEPARTMENTAL STAFF AND FACILITIES

A. Room and Building Access

1. Keys
Keys for offices and laboratories in the Fulton School of Engineering, Engineering Research Center (ERC), J.W. Schwada Classroom Office Building (SCOB), and Goldwater Center (GWC) are obtained by filling out an "Authorization for Key Request" form (available online at: http://bf.asu.edu/facilities/key#request). The Graduate Program Chair and the student's research advisor must sign the form. Once you have the appropriate signatures, please submit the form to the SEMTE front office (ECG 301). All keys must be returned before graduation to the SEMTE office ECG 301.
2. Isaac
Depending on the room or building you need access to, you will need to fill out either an Isaac access form or Key form (see above). Isaac access is operated through a microchip in your ASU Sun Card (student ID), which you swipe at the entry of a room or building to which you have access. In order to receive access you must fill out an Isaac access form, available in the SEMTE Business Offices in ECG 301. You will need to have your faculty advisor sign the form and then submit the form to the SEMTE Business Offices.

3. Copier
**The School copier is for faculty and staff use.** Faculty may authorize their students to use the copier for teaching duties or for research by issuing their copier access code to the student. Large jobs (greater than 100 copies) require approval by the department Business Operations Manager. Of course, no personal copying can be done on the School machine. Pay copiers are available at many locations on and off campus.

4. Miscellaneous
*Misuse of departmental copiers, supplies, and facilities is a serious offense which will lead to disciplinary action. At a minimum, students found to have used departmental resources for non-department approved purposes will be required to reimburse the department for such uses.*

**XI. SEMINAR REQUIREMENTS**

**Guidelines for the Graduate/Departmental Seminar -CHE 591**

Full-time M.S., thesis track students in the Chemical Engineering program are required to register for CHE 591 every semester in residence. Non-thesis students may register for the CHE 591 course if they wish although it is not required.

CHE 591 may consist of meetings of all graduate students together for a "general" seminar, or meetings of groups of students doing related research for "topical" seminars. Meetings are scheduled once per week.

Topical groups consist of a minimum of two faculty and six graduate students. Students choose their topical group by the second week of class in the fall semester, and are committed to that group for the entire academic year. Each student is required to give a **minimum** of one presentation per year (usually in the topical seminar). As early as possible in the semester, each topical group posts a tentative list of speakers, titles and dates.

Grades are based on attendance or on additional requirements as stated by the seminar instructor. One unexcused absence is allowed each semester. Each subsequent unexcused absence results in a drop of one letter grade. Students are encouraged to attend any topical seminars of interest to them but are required to attend their chosen topical seminar. Attendance is usually verified in both general and topical seminar by a sign up sheet. Each topical group is responsible for maintenance of standards. It is expected that student speakers be given immediate constructive oral and written feedback from the entire group. In addition to attending topical and group graduate seminars, all graduates are required to attend the Chemical Engineering Seminar Series which hosts outside speakers from industry and academia.
APPENDIX I

GUIDELINES FOR THE CONDUCT OF THE ORAL DEFENSE OF THE MASTER'S THESIS

After the student has completed his/her research, s/he is required to orally defend the master's thesis in an open and public forum. The Graduate College requires that the oral defense of the master's thesis be publically announced to ensure that the university community is invited to attend. The oral defense of the student's master's thesis is a formal occasion and the student should treat it as such by dressing appropriately (i.e. business attire) and scheduling the meeting for an appropriate seminar room. It is the responsibility of the student to arrange a time mutually convenient for all committee members, for all audiovisual aids, and to schedule the room location. Audiovisual aids can be checked out from the university; please see the following website: http://help.asu.edu/tempe_circulation. At the beginning of the examination, the student's research advisor will introduce the student and the topic of the research to the general audience. The student is then expected to present a brief seminar outlining the results of his/her research. The presentation should be limited to 30 minutes. Following the presentation by the student, the general audience is invited to ask questions. The general audience is then excused and the student's supervisory committee continues to question the student in depth regarding the 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 thesis is limited to a period of three hours. If necessary, however, the proceedings may be adjourned and rescheduled for a mutually convenient date within one week.

Only one adjournment is permissible. When the committee completes its questioning, the student is asked to leave the room. The supervisory committee then discusses whether or not the student successfully defended his/her research and whether or not the completed thesis is acceptable. The results are transmitted to the Graduate College on the Report for Master's Thesis/Practicum Defense form following the approval of the Head of the Academic Unit. Immediately after the defense, the student takes the form to the Graduate Advisor 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) The form processes to the Graduate Advisor for unit processing.

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," 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) The form processes to the Graduate Advisor for unit processing.

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, not including the chairperson, should report the examination results at the bottom of the form and sign the form. 3) Provide a copy of the form to the Graduate Coordinator for processing and reporting to the Graduate College that the defense has occurred. 4) After revisions are made, the chairperson should report the exam results at the bottom of the form and sign the thesis approval page. 5) The form processes to the Graduate Advisor. The Graduate Advisor may hold on to the form until all revisions are made for safe keeping.
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 major revisions" and briefly describe revisions. 2) all committee members should report the examination results at the bottom of the form, and sign the form. 3). The form should go to the Graduate Advisor until all revisions are made. The Graduate Advisor will see that the Graduate College has notification that the defense occurred, however the student has up to one academic year in order to make all necessary revisions. The student must be enrolled in CHE 595 until all revisions are complete. 4) Once all revisions are made, the committee chair will sign off on the form in section D and the form will be processed at the academic unit level.

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 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 still need to come to the Graduate Advisor for academic unit processing. The Graduate College will be notified of the defense failure.
APPENDIX II

GUIDELINES FOR WRITING AND PRESENTING THE APPLIED PROJECT RESEARCH PAPER

The non-thesis track requires the preparation and submission of a final report on a research topic of the student’s choice. Below are suggestions on how to select a topic for the report, and present it to the faculty.

Topic

Most non-thesis students work full time in technical jobs. For these students, the Applied Project topic should be a research-oriented project from their recent work experience. The student should have been the technical lead for the project. The purpose of the paper is to demonstrate that the student has learned how to apply the engineering science method, including material from ASU graduate courses, in the solution of practical technical problems.

Although the Applied Project paper is not expected to be published, the paper should not contain any trade secret or proprietary information. Proprietary information may be omitted so long as the essential research method and results are clear.

Non-thesis students who do not have full-time technical jobs are urged select a faculty advisor who can suggest an appropriate topic.

Paper

The paper should be 15-20 pages, doubled spaced. The paper should follow the form of engineering research reports and include a title page, table of contents, one page abstract, body, references, and optional supplementary material. A suggested outline for the body of the paper is: Introduction, Methods, Results, Discussion, and Conclusions. Figures should be clearly labeled and captioned.

The paper should be written for an academic audience. Include sufficient background for chemical engineers not in your company or industry. Describe the motivation and technical challenges of the research project. Define all terms of art. Spell out abbreviations when first used. Students are encouraged to solicit comments from the chair of their committee on a final draft paper.

The main goal of the paper is to demonstrate that you have learned something in your classes that you have applied (or will be able to apply) to interesting technical problems. If, for example, your topic is material properties, then relate material performance to physical and chemical properties. Even if you used trial and error for the actual applied research, the paper should include a scientific rationale for the choices made and provide a way forward to more scientific research in the future.

The goal of this paper, as one student wrote, is to have “inspired me to become more analytical and ‘chemical engineering minded’ in my problem solving responsibilities here at work”

Presentation

Students will present and defend their paper before a supervisory committee. The presentation should last for 20 min followed by 30 min of questions, and 10 min of faculty deliberation. The presentation should
summarize the paper with an emphasis on the most important results, the scientific basis of the research, and conclusions.

The final paper should be delivered to the committee at least one week before the presentation. The student arranges a mutually convenient time for the presentation with the faculty on the committee. The room should be reserved for 2 hours to allow additional time if needed. The student also is responsible for reserving a room, computer, and projector for the presentation. Students may check out equipment from the university; please see the following website for additional information:

http://help.asu.edu/tempe_circulation
SEMTE Chemical (ChE) MS Thesis Degree Requirement Guidelines

Master of Science in Engineering Degree (MS)
Chemical Engineering
General Degree
(Thesis)

*Please review the ChE MS handbook for more specific information about the program breakdown: http://engineering.asu.edu/semte/GradHandbooks.html

The required coursework for this degree is divided into the following categories:

15 semester hours of graduate level CHE credit (Excluding 591, 501-505, 590, and 592/599)

CHE core courses
   a. CHE 533 3 hours
   b. CHE 543 3 hours
   c. CHE 544 3 hours
   CHE ______ 3 hours
   CHE ______ 3 hours

Technical Electives/Research (graduate level)
   CHE 592 (Research)/CHE/Course outside CHE prefix ______ 3 hours
   CHE or Course outside CHE prefix________ 3 hours
   Course outside CHE prefix _________ 3 hours

Thesis
   CHE 599 6 hours

Seminar (Must be enrolled each semester in residence – minimum 3 hours)
   CHE 591 1 hour
   CHE 591 1 hour
   CHE 591 1 hour

Total Hours: 33 credit hours
**Master’s Graduate Student Handbook**

**SEMTE Chemical (ChE) MS Non-Thesis Degree Requirement Guidelines**

**Master of Science in Engineering Degree (MS)**  
**Chemical Engineering**  
**General Degree**  
**(Non-Thesis)**

*Please review the ChE MS handbook for more specific information about the program breakdown: [http://engineering.asu.edu/semte/GradHandbooks.html](http://engineering.asu.edu/semte/GradHandbooks.html)*

The required coursework for this degree is divided into the following categories:

**15 semester hours of graduate level CHE credit (Excluding 591, 501-505, 590, and 592/599)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. CHE 533</td>
<td>3 hours</td>
</tr>
<tr>
<td>b. CHE 543</td>
<td>3 hours</td>
</tr>
<tr>
<td>c. CHE 544</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHE ______</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHE ______</td>
<td>3 hours</td>
</tr>
</tbody>
</table>

**Technical Electives/Research (graduate level)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 591*/CHE/Course outside CHE prefix ______</td>
<td>3 hours</td>
</tr>
<tr>
<td><em>(CHE 591 is a 1 credit seminar taken over 3 semesters)</em></td>
<td></td>
</tr>
<tr>
<td>CHE 592 (Research)/CHE/Course outside CHE prefix ______</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHE or Course outside CHE prefix ______</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHE or Course outside CHE prefix ______</td>
<td>3 hours</td>
</tr>
<tr>
<td>Course outside CHE prefix ______</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHE 593* (Applied Project)</td>
<td>3 hours</td>
</tr>
</tbody>
</table>

*Requires committee of at least 2 ChE Faculty; or if in the CHE 593 course, then committee consists solely of the Graduate Program Chair instructor.*

**Total Hours:** 33 credit hours
Master of Science in Engineering Degree (MSE)
Chemical Engineering
Semiconductor Processing and Manufacturing
(Non-Thesis)
(Not available in 2012-2013)

The required coursework for this degree is divided into the following categories:

A. 15 semester hours of required CHE courses
   1. CHE 458/598: Semiconductor Material Processing 3 hours
   2. CHE 598: Deposition and Etching 3 hours
   3. EEE 591: Fundamentals of Solid State Devices 3 hours
   4. MSE 598: Materials Issues in Semiconductor Processing 3 hours
   5. IEE 570: Advanced Quality Control or IEE 572: Design of Engineering Experiments 3 hours

B. 6 Credits of Chemical Engineering at 500 level or higher
   a. CHE ______ 3 hours
   b. CHE ______ 3 hours

C. 15 credits of Technical Electives
   a. CHE 593 _______ 3 hours
   b. 500 level T. E. _________ 3 hours
   c. 500 level T.E. _________ 3 hours
   d. CHE 591 or 500 level T.E. ________ 3 hours

Total Hours 33 hours

**For more detailed information regarding course requirements, please see CHE Handbook."
APPENDIX IV

Contact Information

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