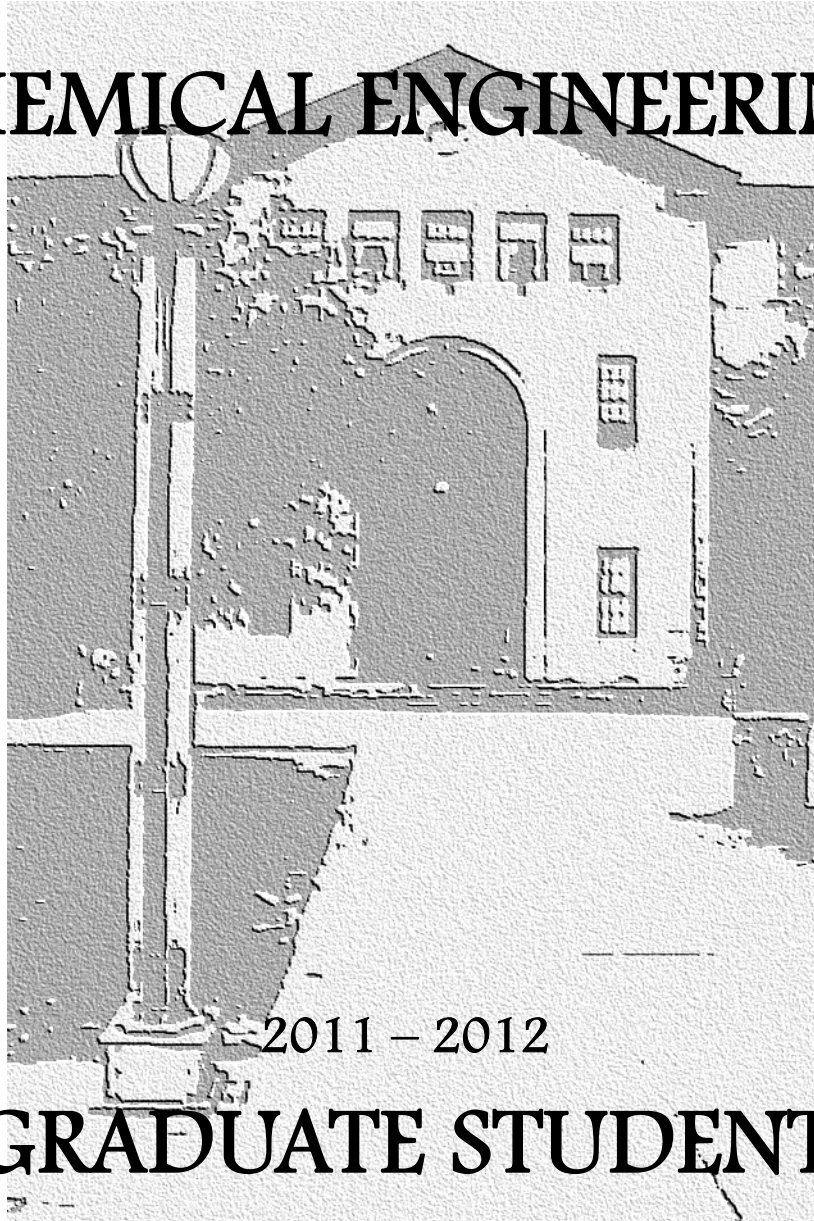


CARNEGIE MELLON

CHEMICAL ENGINEERING



2011 – 2012

GRADUATE STUDENT

HANDBOOK

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1. CHEGSA

Salutations!

Welcome to the department of Chemical Engineering at Carnegie Mellon University. Our department is well known for excellences in research and education and is home to a strong community composed of graduate students, undergraduate students, faculty and staff. The Chemical Engineering Graduate Student Association (ChEGSA) helps maintain a strong community in our department by serving as the link between the graduate students and the undergraduate students, faculty and staff. Who is ChEGSA you may ask? ChEGSA is comprised of every graduate student in our department. ChEGSA is governed by group of volunteers who organize each social, fundraising and symposium event throughout the year. Election to the governing board of ChEGSA takes place early each academic year.

ChEGSA is host to many different social events during the year, the most frequent being weekly happy hour in the graduate student lounge (Doherty Hall A209) held every Friday afternoon. Happy hour is great time to relax with colleagues and professors. ChEGSA also hosts a fall party, a Christmas party, a Superbowl party and a spring party each year. Additionally we have a number of smaller events such as a camping trip in the surrounding Pittsburgh region, a ski trip at Seven Springs, tailgating at Pirates' games, and the wine and cheese tasting during graduate student appreciation week. ChEGSA also organizes service events for the community with an annual food drive, volunteering at state science fairs and other philanthropic endeavors.

Fundraising for ChEGSA social events comes from the A-level Coca Cola machine. Be sure to support the weekly happy hours and other events through regular purchase of a refreshing, cool beverage from our Coke machine.

The annual ChEGSA Graduate Student Research Symposium is the most significant professional event for graduate students in our department. This year marks the thirty-second symposium, a two day event where graduate students present their research to the department, industrial guests and visiting alumni. Industrial guests and alumni play a key role in the symposium acting as both financial sponsors and guest judges. The annual symposium serves as a link to industry and strengthens the research knowledge base within our own department.

With that said, never forget that ChEGSA is here to serve you, the graduate student. We hope you enjoy your stay here at Carnegie Mellon. Please let us know if we can help you on your quest toward a higher education.

Sincerely,

Max Fahrenkopf
ChEGSA President

ChEGSA's goal is to encourage good working relationships among students, faculty and staff. To accomplish this, ChEGSA sponsors several social events to which all graduate students, faculty, and staff are invited:

- Happy hour is held at 4:30 p.m. every Friday (unless posted otherwise) in the ChEGSA lounge (A209) at which beer, soft drinks, snacks, and (occasionally) pizza are provided. Happy hour is free to all graduate students, guests (within reason), faculty, and staff in this department.
- Two parties are organized during the fall semester: one to welcome new students and another for December holidays. A party is held in the spring and a picnic (sometimes held before a Pirates game) during the summer. Recently, we have also sponsored skiing trips, a golf tournament, camping/hiking trips, a Cinco de Mayo happy hour, a Superbowl party, a wine and cheese event and an international potluck dinner.
- Subject to demand, ChEGSA sponsors intramural sports: football, basketball, soccer (1985, 1986 and 1998 intramural champs), volleyball (2005 intramural champs), softball (1985, 2004 GSA league champs, 2005 intramural champs), swimming (1988 intramural champs), floor hockey, and racquetball (2001 intramural champs). If you are interested in these or other sporting events, please talk to any of the ChEGSA officers.

·CHEGSA SYMPOSIUM

The ChEGSA Symposium, held in the fall, gives students the opportunity to make formal technical presentations in a setting similar to the one used at technical meetings and conferences. Students at various stages of their studies present symposium papers, and all the session chairpersons are student volunteers. Members of the faculty and industrial guests serve as judges to determine the winners of the awards given at a follow-up banquet.

We highly encourage everyone, particularly students who are new to the department, to take full advantage of the symposium. It provides an excellent setting for students to get a panoramic view of a large part of the research being conducted in the department. It also affords an opportunity for students to interact with the industrial representatives who attend the symposium. In addition to providing the bulk of the financial support for the symposium, many of these representatives also recruit on campus.

·CHEGSA LOUNGE

ChEGSA maintains a lounge in DH A209 that features

- A place to sit and relax and have your lunch and/or dinner
- A microwave oven, refrigerator, compact disc player, and color TV
- Foosball, pool, and ping-pong tables
- Equipment for volleyball, softball, soccer, and football

·COCA-COLA MACHINE

Happy hour and most of the parties organized by ChEGSA are partially funded from sales of soda from this machine. The machine is located on the A-level (next to the stairwell) and has a selection of Coca-Cola products. Please support ChEGSA by buying your soft drinks from this machine.

·PERSONAL PARTICIPATION

ChEGSA may be the only organization that offers its members so many benefits without asking for any responsibility in return. There are no dues and events are either completely free or heavily subsidized.

In return for this privilege, we ask that you plan to "**do something for ChEGSA**" at least once a year. There are several ways to do this: you can help organize a party or the symposium, fill the Coke machine, assist with the delivery of soft drinks, or help with the purchase of supplies needed for happy hour. Whatever it is that you can offer, the important thing is to **participate**. Help enlarge the small circle of student non-officers who give so much of their time to ChEGSA throughout the year.

1B. CURRENT OFFICERS

	<u>Name</u>	<u>E-mail</u>
President	Max Fahrenkopf	mfahrenk
Vice President	Anthony Kotula	akotula
Symposium Chairs	Ethan Demeter	edemeter
	Ajit Gopalakrishnan	agopalak
	Aaron Reinicker	areinick
Social Chairs	Patrick Boyer	pboyer
	John Goldman	johnatha
	Denise Posluszny	dposlusz
	Hersh Raval	hralval
Fundraising Chair	Allison Cozad	acozad
GSA Reps	Anita Lee	anitalee
	Ellis Robinson	esrobins
Webmaster/Secretary	Alex Dowling	awdowlin

These officers are here to serve you. Please bring any suggestions or concerns to their attention.

Carnegie Mellon University

Article 1 - Name

The official name of the association shall be “The Chemical Engineering Graduate Student Association, Carnegie Mellon University,” hereinafter referred to as ChEGSA.

Article 2 - Object

The object of the ChEGSA shall be:

2.1 to provide a link between its members and industry, chemical engineering societies in other universities, the Graduate Student Assembly of Carnegie Mellon and the American Institute of Chemical Engineering.

2.2 to represent and promote the views of its members, and to implement academic, cultural, educational, physical, professional, social and other programs of interest to its members.

Article 3 – Membership

The regular members of the ChEGSA shall be students currently registered at Carnegie Mellon in the graduate Chemical Engineering program of the Faculty of Engineering.

Article 4 – Fiscal Year

The fiscal year of the ChEGSA shall be from the commencement of the Spring semester of one academic year till the preceding day of the commencement of the Spring semester of the next academic year.

Article 5 – Members of the Governing Board

5.1 The Governing Board shall consist of:

- i) the President
- ii) the Treasurer
- iii) the External Affairs Representatives
- iv) the Internal Affairs Representatives

- v) the Webmaster/Communications
- vi) the Graduate Student Assembly (G.S.A.) representatives
- vii) the Fundraising Officer

5.2 Elections for the Governing Board shall be held prior to the selection of advisors by first-year students.

5.3 The terms of office for the members of the Governing Board excluding the GSA representatives shall be congruent with the length of the fiscal year. The terms of office for the GSA representatives shall coincide with the term of office for GSA, which is currently from the commencement of the Fall semester of one academic year till the preceding day of the commencement of the Fall semester of the next academic year.

Article 6 – Powers and Duties of the Governing Board

6.1 The Governing Board shall, to the best of its ability, fulfill the object of the ChEGSA, as described in Article 2.

6.2 The President shall:

- i) be elected from the ChEGSA constituency and shall not be a first year student.
- ii) be charged with the general management and supervision of the affairs of the ChEGSA.
- iii) be charged with all duties relating to public relations on behalf of ChEGSA.
- iv) be charged with arranging regular Governing Board meetings whose dates will be chosen upon the discretion of the Governing Board, and preside over the meetings.

6.3 The Treasurer shall:

- i) be elected from the ChEGSA constituency and shall preferably not be a first year student.
- ii) be charged with receiving all moneys and have exclusive signing authority.

- iii) be charged with keeping a proper account of all financial affairs of the ChEGSA and reporting and/or presenting financial statements at meetings as required.
- iv) be charged with preparing, in cooperation with the Governing Board, the annual budget of the ChEGSA.
- v) assume, in the absence of the President, all of the duties of the office of the President.

6.4 The External Affairs Representatives shall:

- i) be elected from the ChEGSA constituency and shall preferably consist of 2-3 students, at least one of which is a non-first year student.
- ii) be charged with the responsibility of increasing and improving relations between the ChEGSA and industrial/external groups.
- iii) be charged with the responsibility of ensuring the successful financing and organization of the annual ChEGSA Symposium.

6.5 The Internal Affairs Representatives shall:

- i) be elected from the ChEGSA constituency and shall preferably consist of 3-4 students, at least one of which is a non-first year student.
- ii) be charged with the responsibility of increasing and improving relations between the Chemical Engineering graduate students and Faculty/Staff.
- iii) be charged with the responsibility of increasing and improving relations between the Chemical Engineering graduate students and undergraduate students.
- iv) be charged with the responsibility of organizing Happy Hour every week, unless other departmental or ChEGSA events conflict.
- v) be charged with the responsibility of organizing Chemical Engineering intramural sporting teams and organizing Chemical Engineering tournaments in ping-pong, foosball and pool.
- vi) be charged with the responsibility of organizing parties throughout the year, such as the First-Year party, the Christmas party, the St-Patrick's Day party and the Summer picnic.
- vii) be charged with organizing faculty/staff appreciation events such as Secretaries Day and other important intra-departmental events.

6.6 The Webmaster shall:

- i) be elected from the ChEGSA constituency.
- ii) be charged with the responsibility of maintaining the ChEGSA constituency's address and phone list, as well as the ChEGSA email distribution lists.
- iii) be charged with the responsibility of ensuring the proper functioning of the ChEGSA websites.
- iv) be charged with the responsibility of taking minutes during ChEGSA meetings and ensuring electronic communication of ChEGSA matters to and from the constituency.

6.7 The Graduate Student Assembly representatives shall:

- i) be elected from the ChEGSA constituency and shall preferably be first year students.
- ii) be charged with representing ChEGSA in the Graduate Student Assembly.
- iii) be charged with ensuring, in conjunction with the GSA, that their constituency is up to date regarding current GSA events, policies and benefits.
- iv) be charged with attending monthly GSA meetings on the first Wednesday of every month as well as attending meetings of their respective sub-committees within GSA

6.7 The Fundraising Officer shall:

- i) be charged with forming a committee of five people whose role shall be to ensure the successful operation of the soda machine.
- ii) be charged with ensuring that the soda machine is working properly.
- iii) be charged with ordering stock for the soda machine and ensuring that sales for the soda machine balance.

Article 7 – The Constitution may be amended by a two-thirds (2/3) majority vote of members of the Governing Board.

2. FINANCIAL POLICIES

2A. FINANCIAL AWARDS

The Department of Chemical Engineering pays tuition and provides a stipend for living expenses to PhD graduate students accepted into its graduate program with the promise of financial aid. Financial aid, if available, is normally offered simultaneously with acceptance to the PhD graduate program. The award of financial aid at any other time is an exception and is handled on a case-by-case basis by appeal to the Department Head. Students are normally guaranteed continued support subject to their having an Advisor, meeting the deadlines and requirements outlined in section 3, and not exceeding the Statute of Limitations on Funding described in section 2C. Students having independent support and students entering the MS and MChE programs do not receive financial assistance from the Department.

2B. PAYMENT OF TUITION

Although students who are granted departmental fellowships are guaranteed full tuition plus a stipend each month, they will still be billed for tuition by the Cashier's Office. Because many of our graduate students are supported under government grants that will allow the direct payment of tuition, the department has adopted the policy of granting all students a monthly salary sufficient to allow them to pay their tuition. Students are responsible for obtaining and paying their health insurance.

Students need only return the form accompanying their billing from the Cashier's Office, marking the box that indicates tuition is to be paid in nine monthly payroll deductions. See Toni McIltrout in DH 1105 if you have any questions or problems with your pay or tuition deductions.

2C. STATUTE OF LIMITATIONS FOR FINANCIAL SUPPORT

For the purposes of this Handbook, a person entering the PhD program in the Department of Chemical Engineering with a BS degree will be called "Direct Entry." A person entering the program with a MS degree will be called "Advanced Entry." A Direct Entry student is supported up to fourteen semesters of full-time residence and Advanced Entry students are supported up to twelve semesters of full-time residence.

The Department typically does not support MS students, but in the rare case of financial aid to an MS student, that support shall continue for no more than four semesters after entry.

Continuation of support in all cases depends on satisfactory progress by the student in coursework (as discussed in section 3C.6) and research. If the Statute of Limitations for Support expires, the student must justify to his/her research advisor and department head why additional funds should be provided. This justification must take the form of a written petition. The advisor will provide a written recommendation to the department head regarding action on the student's petition. If approved, funding will be provided on a month-to-month basis. See also the discussion in section 3A.3.

3. ACADEMIC REQUIREMENTS

The Department of Chemical Engineering offers three basic graduate degrees: the Doctor of Philosophy (PhD), the Master of Science in Chemical Engineering (MS), and the Master of Chemical Engineering (MChE). The PhD and MS degrees require original research and a thesis. The MChE degree is a coursework-only degree. Variations on these degrees are possible. For example, a degree program called MSCPS, which combines the basic requirements of the MS and courses in the CPS program, is an option.

3A. REGISTRATION REQUIREMENTS

3A.1 REGISTERING FOR THE FIRST SEMESTER

All incoming PhD students (Direct Entry or Advanced Entry) are required to take **four** courses of nine units or more in their first semester. They must also register for the graduate seminar 06-800 (taken every semester), and the safety course. Students asked to be a TA must also register for 06-799A. Thus Direct Entry students should register for a minimum of 43 units in the first semester (includes at least one core chemical engineering course) and a maximum of 53 units. This normal load comprises four courses, the safety course, graduate seminar, and TA duty (if selected). Advanced Entry students should register for a minimum of 40 units comprised of 4 courses of at least nine units, graduate seminar, the safety course, and the TA course if necessary.

MS and MChE students should register for whatever number of units is appropriate for them, but no fewer than 36 units.

3A.2 REGISTERING AFTER THE FIRST YEAR (WITH FINANCIAL SUPPORT)

The recommended course load for the second semester is three courses for Direct Entry students. Advanced Entry students should develop a second-semester course schedule in consultation with their thesis advisor(s).

All PhD students must carry 48 units of credit in every semester after the first semester including coursework, graduate seminar, the TA course (when applicable) and research units. In every semester the number of research units must equal 48 units minus the sum of coursework, seminar, and TA units.

3A.3 REGISTERING AFTER TERMINATION OF FINANCIAL SUPPORT & ABD STATUS

The goal of the faculty of the Chemical Engineering Department is that each student finishes his/her degree within the limits of time for financial support. Most often this is the case. When the student does not complete the degree requirements in the allotted time and no further support through the Department is forthcoming (see section 2C), the following rules apply. (This is a summary of the CIT policy on the status of PhD students. Interested students and faculty should consult the CIT guidelines for a detailed description of policy.) First some definitions:

ABD

“All But Dissertation” status. When the student has finished all degree requirements but the thesis defense and submission of a properly signed dissertation, the student is technically termed ABD until the dissertation is approved and filed. According to the University policy promulgated on 01JUN2011, the University recognizes two types of ABD students: Students *In Residence* and *In Absentia*. What follows below is a summary; any student considering ABD as an option should find out the applicable policies at the department, college, and university levels and discuss them with the Graduate Advisor, currently Prof. Sides.

ABD "IN RESIDENCE"

This category is for students who are self-supported and need to make substantial use of university facilities such as offices and labs.

ABS (ALSO KNOWN AS *IN ABSENTIA*)

A student who is ABD, who is self-supported, and who does not require the use of any facilities other than access to the library and to a public computer terminal, does not have to register and pay tuition until he/she reaches the semester of expected graduation. This situation is called being "*in absentia*."

IMPLICATIONS OF ABD & ABS STATUS

CIT recognizes the ABD "In Residence" and "In Absentia" categories. The following is a short interpretation of the implications of the above categories. Consult the CIT policy for PhD students for details.

1. Full-time MChE, MS, and PhD candidates, including ABD candidates, must register for a minimum of 36 units per semester if they are doing research that requires use of university facilities such as laboratories.

2. If all requirements except the thesis have been fulfilled and the student is self-supported (e.g. is beyond the statute of limitations for financial support), the student may declare him/herself to be ABD *in absentia*; however, these students cannot receive a stipend and cannot use laboratory facilities. Also, the university will not certify a student who is ABS for immigration purposes. The ABS student must register for a minimum of 5 units in the semester of graduation.

3. It sometimes happens that a PhD student is beyond the limits of financial support and needs to do a few experiments to complete the dissertation. In this case the student must write a letter of petition to the Dean of CIT through the Associate Dean for ABD "with student status." This gives the right to register for only 5 units and work in a laboratory. This petition is carefully reviewed along with input from the Advisor at which time all current policies and rules will be applied. Normally, if allowed, it will be granted for at most one semester. This exception does not apply to MS students.

3B. ADVISORS

Professor Paul Sides, the **Graduate Advisor**, will be the advisor of all graduate students in the first semester. Thereafter PhD and MS students will have Thesis Advisors as their primary advisors. Professor Sides will continue to provide advice to MS and PhD students on satisfaction of

technical requirements and any other non-thesis issues that arise. Professor Sides will remain the primary advisor for MChE students.

Each MS or PhD student must have one or more official **Thesis Advisor(s)** to graduate. The Thesis Advisor/Student relationship is a cornerstone of graduate education. The Department of Chemical Engineering is committed to making the best possible Thesis Advisor/Student match, to establish standards and timetables for equitable treatment of students, and to serve as an objective point of reference for both the student and the advisor when called upon to resolve disputes. Disputes between faculty and students should be brought to the attention of the Department Head in person when either party feels that reference to a third party is necessary. (See sections 3.C.6 and 3.D) Such notice will begin the process of resolution of the dispute. See also the CIT Grievance policy for additional information.

3B.1 ADVISOR SELECTION

The Advisor selection process accounts for student preferences, faculty availability and funding base, and other general department requirements. During the first semester in residence, a new graduate student must meet each faculty member on the list provided by the department head to discuss research projects underway or planned. New students are required to attend the ChEGSA Symposium to learn about related projects directed by the prospective advisors. After interviewing all prospective advisors, the student must indicate three choices for a thesis advisor, in order of preference. In addition, the student must submit a 100-400-word essay on his/her research and career interests and the reason(s) supporting his/her advisor choices. The student preferences are required to be in the department office by a particular date in the first semester. An announcement is made each year as to the exact date.

The Department Head gathers the documents submitted by the students, compares them to a list of open projects submitted by faculty, factors in departmental requirements such as the funding status of projects and the necessity that new faculty need students, and makes the match. Most students are granted their first or second choice. Occasionally, constraints of student numbers or finances require a student to work on the topic listed as third choice. In exceptional circumstances, the Department Head will meet with those students who cannot be assigned any of their choices.

3B.2 ROLE OF THE ADVISOR

The role of the Advisor is complex and can vary from student to student, but at least three characteristics can be identified: mentor, evaluator, and colleague. The Advisor is responsible for

helping the student define a project, for evaluating the student's progress, and for jointly working with the student toward a successful outcome.

The Advisor continually determines whether or not the student is making satisfactory progress, as mentioned in section 3C.6.

3B.3 ROLE OF THE STUDENT

The Student, under the guidance of the Advisor, should make original scholarly contributions in his/her area of research and disseminate his/her findings through journal publications and meeting presentations. Since the Student must demonstrate the ability to perform at the highest intellectual level by both national and international standards, he/she should have one or more articles at least past the reviewed/accepted stage of publication and should have made at least one conference presentation at the time of the defense.

3C. MAJOR PROGRAM REQUIREMENTS AND RULES OF TIMING

1. Students must complete coursework as outlined in section 3E. An average of B or better must be maintained.
2. Students in the PhD program must complete their TA assignments as described in section 3G.
3. Students in the PhD program must take the Qualifying Exam within 12 months of admission to the graduate program at CMU. In unusual cases such as mid-year starts or illness, the Student and Advisor may petition the Graduate Advisor and Department Head for delay. (See section 3I for a description of the exam.)
4. Direct Entry Students and students completing a MS at CMU who wish to enter the PhD program must pass the PhD Proposal by the last day of the seventh semester in residence (summer counts as one semester). Advanced Entry students must pass the PhD Proposal by the last day of the sixth semester. If the semester in question is a summer semester, then the student must pass the proposal before the first day of classes in the fall semester. A reminder of the proposal deadline will be sent to each student the semester before the deadline. Failure to meet this deadline will result in suspension of stipend until a proposal is accepted; tuition support will also be suspended after one additional semester. The PhD Proposal is described in section 3J. Careful reading of section 3J will make clear that the Student should not postpone this step until near the deadline; it

is highly recommended that the student schedule his/her PhD Proposal in the first half of the semester by the end of which it must be completed.

5. Admission to candidacy for the PhD degree, which commences with successful completion of the Qualifying Exam, is for a period of no longer than six calendar years. If, at the end of this six-year period, the PhD has not been awarded, the student may petition for extension of the six-year limit under extenuating circumstances such as a forced change of advisor, military service or prolonged illness.

6. In general, all students are subject to continual review of their progress by their Advisor who is responsible for determining whether each student's progress is satisfactory or not. If the Advisor determines at any time that the student is not making satisfactory progress and believes that the situation might lead to disassociation with the Student, the Advisor must provide written notification of such a determination to the Student and to the Department Head at the earliest appropriate moment. The letter should include:

- A statement of the shortcomings that led to a determination of unsatisfactory progress.
- Specification of what changes must occur to resume satisfactory progress.
- A time period (minimum one month) during which the student will be regarded as being on probation.

If the Advisor still regards the progress as unsatisfactory after the end of probation, the provisions for Change of Advisor or Dismissal (section 3D) are activated.

7. The minimum residency of a student on campus is one year.

3D. CHANGE OF ADVISOR OR DISMISSAL

It is the responsibility of both Advisor and Student to seek accommodations of differences in good faith. Under extremely negative circumstances, either the Student or the Advisor may petition the Department Head to oversee the resolution of the problem. If none can be achieved, the Department Head will ordinarily direct the student to discussions with potential new advisors to see if a better match can be made. The student may seek a new Advisor, but the Department of Chemical Engineering is not obligated to find a new Advisor for the student. If a new match is

found, the Student might be requested to document work already performed before making the switch; the timing and circumstances of the switch will be made on a case-by-case basis. If no new match is found, the Department Head will advise the student of his/her dismissal from the graduate program as of a specified date. These cases are rare.

Any student who feels unfairly treated may consult the CIT Grievance policy for further appeal.

3E. COURSE AND QUALITY POINT (QPA) REQUIREMENTS

Notes about courses ...

- A student must receive a letter grade in a course to count that course toward meeting the numerical unit requirements for any degree. Courses issuing Pass/Fail grades will not count toward degree requirements.
- In the forthcoming sections about degree requirements, the basic rule is that the student must maintain a B average with some additional requirements concerning performance in graduate courses. Note that the B average applies to courses that the student intends, or must use, for satisfying degree requirements. Transcripts show all courses and grades and might not reflect perfectly whether the student is satisfying the QPA requirement in the courses required for the degree. A student can check with Shannon Young if there is any doubt about progress toward satisfying degree requirements and QPA requirements.
- If a course is repeated, the higher grade is used in the calculation of the QPA in order to determine whether the student has satisfied degree requirements.
- The College of Engineering now requires that student transcripts report withdrawals from courses after the withdrawal deadline. A student's transcript will record a **W** for any course where the student withdraws from the course after the official deadline to drop.
- **Definitions**

Graduate: Any course having a designation 06-Nxx, where $N \geq 6$ except for the TA course 06-799A and graduate seminar 06-800. These courses are not graded and therefore cannot be counted toward the unit requirement.

Core Graduate: The department has designated six of our Graduate courses as "Core Graduate courses;" these are Thermodynamics (06-705), Kinetics (06-702), Fluid Mechanics (06-703), Heat and Mass Transfer (06-704), Mathematical Techniques in Chemical Engineering (06-713), and Advanced Process Systems Engineering (06-720). *Note: Core Graduate courses can be substituted for non-Core Graduate courses but not vice versa. (Students entering with a M.S., however, can count a maximum of two Core Graduate courses toward the Ph.D., which is the only exception to this rule.)*

Outside Technical: A technical course having substantial engineering or scientific content offered by a different department and having a course number of the form xx-Mxx, where $M \geq 2$. *A list of courses that Chemical Engineering students have taken and that includes courses pre-approved for this category appears in Table I at the end of this section. If a student wants to count a course that does not appear on this list as a technical elective, and if there is any doubt about its suitability, please check with the Graduate Advisor, who is solely responsible for this matter.*

Breadth/Depth/Skill: Practically any course at the sophomore level or above (xx-Mxx where $M \geq 2$). This specification includes humanities, economics, statistics, business, management, communications as well as science and engineering. Physical Education courses do not qualify. Check with the Graduate Advisor if there is doubt about the appropriateness of any course. This category is designed to give MChE students flexibility in directing their education to meet their career goals.

Safety: Our department is committed to safety awareness. As of the Fall 2006 semester, we require that all graduate students take the Chemical Engineering safety course, 06-608.

COURSE AND QPA REQUIREMENTS FOR THE MS DEGREE

Students seeking the M.S. degree must complete a minimum of 24 units of thesis work and 72 units of coursework having the following distribution:

- 4 Core graduate
- 1 Graduate (at least 9 units)
- 1 Graduate or Outside Technical (at least 9 units)
- 1 Safety Course (06-608 recommended)

Notes:

- An average grade of "B" and no grade lower than "C" are required for the mandatory units of course work (exclusive of research), with no more than one unbalanced "C" among the 48 units of core graduate courses.
- "Satisfactory progress" in course work means that the normal full-time course load is carried, and a "B" average or better is maintained each semester.
- Students must also complete and submit a satisfactory **MS thesis**. This thesis does not require a committee, but must be signed by the research advisor and the Department Head. Specific details of presentation should be consistent with those recommended by the American Chemical Society (ACS) in *The ACS Style Guide: A Manual for Authors and Editors* (Section III). The *Guide* is available from the department. It contains complete guidelines for tables, figures, references, etc. Follow the rules about thesis preparation standards at http://www.cit.cmu.edu/current_students/graduates/thesis_dissertation_policies.html
- In particular, note the rules about the Acknowledgments section which, at minimum, requires the source(s) of support for the work, even if it is self support. For doctoral dissertations, the doctoral committee must also be listed in the Acknowledgments, and the chair of the committee should be identified. The doctoral committee should **not** be listed on the title page.
- The graduate seminar cannot be counted toward these unit requirements.
- When the course units do not sum to 48 in any semester, MS students should register for sufficient 06-700 MS research units to make the total 48.
- This distribution of courses might not fulfill the minimum 72 units of course work if the student elects to take some 9-unit courses. MS students should consult with their Thesis Advisor to decide on the best way to fulfill the 72-unit requirement.
- A student must receive a letter grade in a course to count that course toward meeting the numerical unit requirements for any degree. Courses issuing Pass/Fail grades will not count to degree requirements.

- The MS program is full time until all degree requirements are satisfied; students must register for at least 36 units per semester. (The 96 unit requirement is a minimum number of units. Students always have research credits well beyond the formal 24 credits allocated for research.) The only exception to this rule is the following: Students who have been in full time status for a minimum of four semesters, counting the summer as a semester, and who have completed the MS thesis with all necessary signatures before the beginning of the next semester, may petition the Graduate Advisor for permission to take a reduced courseload in their final semester in order to satisfy any remaining course requirements. Note, however, that the department is required to report to the Office of International Education when an international student has completed all requirements for a degree.

COURSE AND QPA REQUIREMENTS FOR THE PHD DEGREE

Direct Entry students (see section 2C for definition) must take a minimum of 96 units of course work as part of the 144 total units required for the Ph.D.

- 4 Core Graduate
- 2 Graduate (at least 9 units each)
- 1 Outside Technical (at least 9 units)
- 1 Graduate or Outside Technical (at least 9 units)
- 1 Safety (06-608)

- This distribution of units might not fulfill the minimum 96 units of course work. Students should consult with their advisor to decide on the best way to fulfill the 96-unit requirement.
- The student must maintain an overall “B” average, with no grade lower than “C,” and receive no more than one unbalanced “C” among the core courses.
- Graduate seminar and TA course credit cannot be counted toward course unit requirements.
- The PhD student must enroll for PhD research units (06-900) in any semester in which the course units do not total more than 48. Register for sufficient units to bring the total to 48 in this case. Research units do not count toward the 96-unit requirement for coursework.
- A student must receive a letter grade in a course to count that course toward meeting the numerical unit requirements for any degree. Courses issuing Pass/Fail grades will not count to degree requirements.

Advanced Entry students (see section 2C for definition) must take 48 units of course work, with the following minimum distribution:

- 1 Core Graduate
- 1 Graduate (at least 9 units)
- 2 Graduate or Outside Technical (at least 9 units each)
- 1 Safety (06-608)

Note: A maximum of two core graduate courses will be acceptable.

- An overall "B" average (no more than one unbalanced "C" among the core graduate courses) and no grade lower than "C" is required to satisfy the course requirements. "Satisfactory progress" in course work means that the normal full-time course load is carried, and a "B" average or better is maintained each semester.
- Graduate seminar and TA courses cannot be counted toward course unit requirements.
- The PhD student must enroll for PhD research units (06-900) in any semester in which the course units do not total more than 48. Register for sufficient units to bring the total to 48 in this case. Research units do not count toward the 48-unit requirement for coursework.
- A student must receive a letter grade in a course to count that course toward meeting the numerical unit requirements for any degree. Courses issuing Pass/Fail grades will not count to degree requirements.

COURSE AND QPA REQUIREMENTS FOR THE MChE DEGREE

Students electing the coursework option must complete 96 units of coursework having the following distribution:

- 4 Core Graduate
- 1 Graduate or Outside Technical (at least 9 units)
Breadth/Depth/Skill courses totaling 36 units
- 1 Safety (06-608)

- The department will accept up to 24 units of course credit from other schools. Only one course from another school can replace a Core Graduate course. The Graduate Advisor must approve all transferred credits. These courses must not have been counted toward any of the student's prior degrees.
- Graduate seminar cannot be counted toward unit requirements.
- Students in the MChE program must finish with an overall "B" average with no more than one unbalanced "C" among the core graduate courses. No grade lower than "C" is acceptable.
- A student must receive a letter grade in a course to count that course toward meeting the numerical unit requirements for any degree. Courses issuing Pass/Fail grades will not count to degree requirements.
- There is no minimum course requirement per semester; this degree can be a full time or part time goal. If part time, the degree requirements must be satisfied within five years from the end of the semester during which the first course that counts toward the degree is completed.

COURSE AND QPA REQUIREMENTS FOR THE MChE-CPS DEGREE

The Department of Chemical Engineering offers a special degree combining coursework experience in the core of Chemical Engineering and coursework in the Colloids, Polymers and Surfaces program. Students electing this option must complete 96 units including the following minimum coursework:

- 3 Core graduate courses other than Thermodynamics
- 1 06-705 Advanced Chemical Engineering Thermodynamics
- 1 06-607 Phys Chem. Colloids and Surfaces
- 1 06-609 Phys Chem. Macromolecules
- 1 39-801 Colloids and Surfaces Laboratory
- 1 39-802 Laboratory in Polymers

(Note that this list leaves the student 6 credits short of the required 96 units. The students should consult with Professor Annette Jacobson, Director of the CPS Program to decide on electives to satisfy the 96-unit requirement.) Students in the MChE - CPS program must finish with an overall “B” average with no more than one unbalanced “C” among the core graduate courses. No grade lower than “C” is acceptable.

Table 1. A list of courses outside the Department of Chemical Engineering taken by our students. The third column is the number of students who have taken this course. This is a snapshot as of Spring 2003; the numbers will not be updated. These courses are pre-approved as Outside Technical courses. If you want to take a course and count it as Outside Technical, and it is not on this list, you should clear it with the Graduate Advisor Professor Sides.

03-231	Biochemistry I	1
03-232	Biochemistry I	3
03-438	Physcl Biochemistry	3
03-439	Intro to Biophysics	2
03-442	Mol Bio Eukaryotes	1
03-534	Fluore Spec Bio Rsch	1
03-738	Physcl Biochemistry	3
03-240	Cell Biology	1
03-871	Structural Biophysics	1
09-344	Physical Chem Quantm	1
09-518	Bioorganic Chemistry	1
09-560	Computatn Chemistry	8
09-701	Quantum Chemistry I	3
09-702	Statcl Mech & Dynamc	3
09-712	Synth Organic Chem	1
09-723	Proxmi Probe Technqs	3
09-741	Orgnc Chem Polymers	1
09-742	Poly Phy Chem	2
09-745	Polymer Rheology	2
09-746	Linear Viscoelstcty	4
09-860	Computation Chemistry	1
12-411	Engineering Economics	1
12-651	Air Quality Engin	4

12-704	Pr Est Mthd Eng Sys	1
12-720	Water Source Chem	1
12-726	Math Mdl Env Qua Sy	2
12-732	Air Quality Engin	
12-742	Engr Databases CAE	1
12-743	Expert Systms In CAE	1
12-751	Adv Tpcs Air Quality	3
12-755	Finite Elem Mech I	3
12-756	Finite Elem Mech II	1
15-211	Fund Struc CMP Sc I	7
15-398	Bug Catching	1
15-491	Cmp Percp & Scene Anl	1
15-820	Model Chkg Theo Prov	1
15-849	Performance Modeling	1
15-859	Hier Methods Simulation	
18-311	Semicond Devices	1
18-316	In Data Stor Sys Tch	2
18-483	Civ/Mil Ap of Space	1
18-716	Adv Appl Magnetism	1
18-751	Appl Stoch Process	1
18-771	Linear Systems	1
18-772	Non Linear Systems	
18-815	Integ Circ Fabr Proc	1
18-829	Dsgn Microfluidc Cir	2
18-879	Hybrid Dynamic Sys	4
19-424	Energy & the Envrnmt	1

19-630	AT CMY AIR POL GL CH	1
19-650	Climate & Energy	1
19-726	Math Mdl Envrn Sys	2
19-742	New Tech & Eco Grwth	1
21-257	Modl Meth Optimization	1
21-292	Operation Rsch I	2
21-369	Numerical Methods	2
21-605	TCHNG Mathematics	3
21-630	Ord Diff Equations	1
21-651	General Topology	2
21-690	Methods of Optimization	9
21-691	Inter Point Methods	
21-732	Part Diff Equa I	1
21-762	Finite Elem Methods	
21-765	Parallel & Sci Com	
24-311	Numerical Methods	1
24-701	Math Tch Mech Eng I	1
24-718	Computnl Fluid Mech	1
24-719	Adv TPC Fluid Mech	2
24-719	CFD: Finte Vol Methd	4
24-721	Thermodynamics I	1
27-432	Elec Mag Opt PR Mags	1
27-511	Intro Biomatrls II	2
27-530	Adv Phys Metallurgh	
27-533	Prn Grth Proc Semcon	1
27-542	Str Prop Thin Films	1

27-764	Nanostructured Materials	1
27-770	Electron Mag Op Prop	2
27-776	Foundtn Material Sci	1
27-794	Elctrochem Prc Mtrls	1
33-225	Quantm Phy Struc Mat	1
33-338	Intrm Elec & Mag I	1
33-448	Intro Solid St Phys	8
33-453	Intermediate Optics	1
33-466	Ex Astrophyc Cosmlgy	1
33-765	Statistical Mechanics	
33-777	Intro Astrophysics	1
36-220	Engr Stat Qual Ctrl	1
36-401	Adv Data Analysis I	1
36-707	Regression Analysis	1
36-711	Statistic Computing	1
36-724	Appl Bayesian Mthds	1
39-405	Eng Des Crea Prd/Prc	7
39-605	Engineering Dsgn Prj	3
39-717	Data Storage Systems	1
39-801	Coll Poly Sur Lab I	6
39-802	Col Poly Sur Lab II	6
42-401	BME Design	1
42-511	Intro Biomaterls II	1
42-609	Biotechnlgy Env Proc	
42-622	Bioprocess Design	2

42-704	Biological Transport	3
42-744	Medical Devices	1
42-882	Directed Study	1
45-760	Quant Mthds Mgt Sci	2
45-761	Operations Research	2
45-862	Optimiztn Models Log	1
45-865	Sequencing & Sch	3
47-830	Integer Programming	14
47-831	Adv Integer Progmng	4
47-833	Optimal Control Theo	9
47-834	Linear Programming	10
47-835	Graph Theory	7
47-836	Network & Mechanics	2
47-840	Dyn Prog St Dec Mod	1
47-850	Opertns Resch Semnr	1
47-856	Theo/Algor Lin Prgm	12
47-861	Adv Linear Programmng	1
47-866	Sequencing & Scheduling	3
47-885	Lgc Opt & Cnst Satis	4
47-936	Convex Analysis	1
47-937	INT-PNT Mth Cnvx Opt	1
47-938	NonLin Programming	7
47-949	SP Tpcs in Oper Rsch	2
70-461	Combntrl Optimiztn	1

3F. POLICY ON TRANSFER OF CREDIT FROM OTHER INSTITUTIONS

Up to 24 units (two courses) of graduate work completed at other universities, with a grade point average of 3.0 or better, may be transferred from another academic institution provided that such course work is part of the graduate program leading to the degree sought. Such transfer credit is not granted prior to admission to the graduate program and must be approved by the department after the student has satisfactorily completed at least 36 units of graduate courses at Carnegie Mellon. These courses must not have been counted toward any other prior degrees. The Department Head and College of Engineering administration must approve the transfer. Students should complete a Transfer Credit Request form and provide all required attachments for their request to be considered.

3G. 06-799 ASSIGNMENTS (TEACHING RESPONSIBILITIES)

TAs provide help and advice to students, and grade homework assignments and projects. In most cases, your responsibilities will not exceed 5 hours per week. You should be available at least 2 hours per week for consultation at the times that the professor of your course will announce to the class.

In order for you to be effective in your duties as a TA, you should be familiar with the material covered in class. You should obtain copies of the class notes and the solutions or problem sets. If you think you do not have enough background in the course, you should audit the course.

The responsibility for serving as a TA is spread among all of our first- and second-year PhD graduate students instead of having some students designated as teaching assistants (TAs) while others have no teaching responsibilities. Besides the fairness of this plan, some teaching experience is beneficial to all students, whether or not they plan an academic career. The requirement of 5 hours per week lasts for three semesters and consists primarily of grading papers and leading recitation sessions. A student may volunteer to assist in teaching after his/her three-semester requirement has been fulfilled. Many students find this aspect of their education enjoyable and satisfying.

The two-unit course, 06-799, is the vehicle for these assignments. Students must register for this course during each semester they are assigned as a TA. The units received for this course are not counted toward PhD degree requirements. Assignments are made by the Department Head and announced at the beginning of each semester.

To re-emphasize, this course is a requirement for graduation and must be taken seriously by all Ph.D. students; it is in no way linked to a student's source of financial support. Unsatisfactory performance in a TA assignment may require the student to serve an additional semester as a TA.

3.G.1 ITA TEST

The Department of Chemical Engineering requires its international PhD students to comply with campus rules and standards about mastery of English language in order to be effective as a TA. All PhD students, who are non-native speakers of English, must participate in a language Placement Interview given by the Intercultural Communication Center (ICC). Based on the results of the interview, administrators at the ICC will place the student in the appropriate ICC programs and will suggest the most realistic date to try the International Teaching Assistant (ITA) test. Students and departments receive copies of interview results. You are strongly advised to have an interview at the start of your first semester on campus. Please call the ICC office at 8-4979, or visit them in Warner Hall 308, to schedule an interview at your earliest convenience.

The ITA test is required by state law before non-native speakers of English can work as TAs. It is offered three times a year: November, April, August (incoming students only). The ITA test evaluates whether students have sufficient fluency to communicate effectively with students. Chemical Engineering TAs are often required to offer one-on-one help and advice to students, making the ITA test a requirement. The department requires that TAs pass at a Category Two level before the departmental TA requirement is fulfilled.

3H. SEMINAR

The graduate seminar (06-800) is required each semester for all students in residence. It provides opportunities to learn about research in various chemical engineering and related fields being conducted at other universities and in industry. **All graduate students must register for this course during each semester of full-time study. Attendance is mandatory. A failing grade can be given to students who do not attend seminars.**

3I. PHD QUALIFYING EXAMINATION

3I.1 WHO CAN TAKE THE EXAM?

Only students enrolled in the Chemical Engineering doctoral program and having a research advisor may take the qualifier. Students not officially in the doctoral program may not take the qualifier.

The Ph.D. Qualifying Examination is oral and is usually administered in August. It tests research potential, communication skills, and a general knowledge of chemical engineering. The examination consists of two parts:

1. Each student must provide a written report of research accomplished and projected at CMU. The report consists of three sections: (1) the Title and Abstract, (2) the report Body, and (3) the list of the Literature Cited in the body; no material other than these three sections may be included. Specifications for the report are summarized below:

- a. Title and Abstract section – one page total. The Abstract is limited to 300 words.
- b. Body section – no more than ten pages total. This includes all figures and tables. Any material that is not Title, Abstract or Literature Cited is considered part of the Body.
- c. Literature Cited section – unlimited in length, but typically one to two pages. Use full citations: list all authors, full title of article, full name of journal and inclusive page numbers.
- d. Format.
 - d.1. Use one-inch margins at the top, bottom, left, and right for all three sections. Figures or tables in the Body must also fit within these margins.
 - d.2. Use 12 point Times New Roman (or close equivalent) font for all text in all sections. Text within figures or tables must be at least 10 point font.
 - d.3. Use double-spacing for the Title and Abstract and for the Body sections: no more than 23 lines per page (2.56 lines per inch). The Literature Cited section may be single-spaced.

Reports that do not comply with these requirements will not be accepted. The date on which the report is due will be announced well in advance. The student may solicit editorial comments from his/her advisor and the advisor may participate in practice talks.

2. On exam day, according to a schedule published one to two weeks before the exams, each student makes a 20-minute presentation before four members of the faculty. A question period of 30 to 60 minutes follows the formal presentation. The same four members of the faculty will administer and score the examination for all students, except when a student's research advisor is

also serving on the examining panel. In this case, a fifth (alternate) member of the examining panel will replace the student's research advisor. The student's research advisor may participate in rehearsals of the presentation and may sit in on the actual exam as a silent observer to provide feedback to the student on his/her performance.

3. The following criteria will be considered in arriving at each student's score:

- Definition of the research problem

- Knowledge of fundamental principles involved

- Knowledge of the appropriate literature

- Approach to solution and quality of preliminary results

- Ability to critically evaluate preliminary results and define direction of
future work

- Quality of the written and oral presentations

Sample ChE Ph.D. Qualifying Examination Scoring Rubric

(Used in 2010 Qualifying Exam, not necessarily used each year, but it gives more detail on criteria)

Student: _____

Faculty Examiner: _____

Semester: Fall 2010, First Round

1. Student can express him/herself well in written form (as demonstrated by written report)

1.1. rating

1.1.1. Excellent – well-organized and written, could be directly incorporated into a manuscript or proposal

1.1.2. Clear Pass – clearly written and understandable; could be used externally with editing help

1.1.3. Minimal Pass – parts unclear or not well-organized, but understandable overall; needs heavy editing

1.1.4. Must Improve – document did not prepare reader well for oral presentation

1.1.5. Clear Fail – concepts and organization incoherent, needs remedial writing help

1.2. comments

2. Student can express him/herself well in oral form (as demonstrated by oral presentation)

2.1. rating

2.1.1. Excellent – polished performance suitable in content and style for conference presentation

2.1.2. Clear Pass – good performance with solid content and style

2.1.3. Minimal Pass – minimal performance, but essential content was coherent

2.1.4. Must Improve – missing some essential content, portions of presentation unclear

2.1.5. Clear Fail – incoherent, missing significant content, poor use of allotted time

2.2. comments

3. Student is poised under pressure (as demonstrated by student's management of Q&A session)

3.1. rating

3.1.1. Excellent – able to engage examiners in discussion, had comfortable/confident demeanor

3.1.2. Clear pass – sustained discussions; occasionally hesitant, but very responsive to prompting

3.1.3. Minimal pass – while sometimes stuck, student able to dialog with questioners

3.1.4. Must Improve – student frequently immobilized, prompting frequently unsuccessful

3.1.5. Clear Fail – student unable to mount responses and unable to be prompted

3.2. comments

4. Student clearly understands project and the relevant science & engineering background knowledge

4.1. rating

4.1.1. Excellent – facile with aims, motivation, approach; strong “elevator pitch”; makes own connections freely and explicitly to background knowledge

4.1.2. Clear Pass – clear grasp of project aims, motivation and approach beyond surface level; good awareness of and comfort level with background knowledge

4.1.3. Minimal Pass – can describe aims, motivation and approach at surface level; able, with prompting, to connect with background knowledge

4.1.4. Must Improve – uncertain/unclear about one or more of aims, motivation, approach; missing key elements of relevant background knowledge

4.1.5. Clear Fail – unable to explain logic behind aims, motivation, approach; unable to see relevance of, or apply basic background knowledge

4.2. comments

5. Student can set project in the context of what has been done by others

5.1. rating

5.1.1. Excellent – deep knowledge of prior work, can explain nuances between own work and competitors

5.1.2. Clear Pass – can differentiate own effort and directions from prior work and competing groups

5.1.3. Minimal Pass – can describe prior work, competitors' efforts; can make some connections to own work

5.1.4. Must Improve – some surface awareness of prior work and competing groups but unsure of how own work fits in

5.1.4.1. Clear Fail – no connection with prior work, unaware of competing groups, working in a vacuum

5.2. comments

6. Student is productive

6.1. rating

6.1.1. Excellent – output is of high quality and roughly equivalent to publication; exceptional productivity

6.1.2. Clear Pass – solid body of work, making fine progress and on a good trajectory; normal productivity

6.1.3. Minimal Pass – making forward progress; basic productivity that should be stepped up

6.1.4. Must Improve – pace not up to expectations of first year student

6.1.5. Clear Fail – minimal effort or commitment evident; serious concerns about ability to make progress

6.2. Comments

7. Student understands tools used, results expected and obtained, and can draw deeper conclusions

7.1. rating

7.1.1. Excellent – expertise with tools demonstrated, facile with expectations and in explaining any discrepancies, consistently volunteers deep analysis of work

7.1.2. Clear Pass – good grasp of tools used, expectations and explanation of discrepancies, can sustain deeper analysis with occasional prompting

7.1.3. Minimal Pass – can explain at surface level tools used, expectations and discrepancies, can analyze results with prompting

7.1.4. Must Improve – unsure of how tools used function, unconfident in what to expect, unsure of discrepancies, unable to sustain an analysis of results even with frequent prompting

7.1.5. Clear Fail – tools treated as “black boxes”, no expectations, no assessment of discrepancies, understanding of work limited to surface level, unaware of any deeper implications

7.2. comments

8. Student can see the path forward

8.1. rating

8.1.1. Excellent – can lay out clear plan to move forward, spontaneous in addressing path forward

8.1.2. Clear Pass – has a viable ideas for moving forward, will have good proposal within a year

8.1.3. Minimal Pass – has some ideas of what to do next, significant coaching necessary for good proposal

8.1.4. Must Improve – has little idea what to do next, operating in technician mode without thinking for own self

8.1.5. Clear Fail – has no idea what to do next, unlikely to be successful even in technician mode

8.2. comments

Overall Impression: This is the individual examiner's score for the exam. The examiner's question ratings above are *not* averaged, rather they are used by the examiner to form their opinion of the student's overall performance in the categories below. The final score for the exam will comprise the distribution of scores from each of the four examiners.

exam score

High Pass – excellent performance, exceptionally strong in all respects, excellent proposal within one year anticipated, already performing at level of a senior graduate student

Pass – reasonable to solid performance, successful proposal within one year anticipated, performing at level typical for a junior graduate student

High Retake – student capable of passing with better performance, retake would be helpful to polish skills and bring out best in student, shows promise of successful proposal within one year

Retake – student capable of passing with much better performance, retake is necessary to definitively demonstrate mastery of key skills, shows promise of successful proposal within one year

Fail – below the bar; concern that student will be able to be successful as a PhD student; path forward to proposal unclear; dramatic improvement necessary to pass if student were to retake

Low Fail – well below the bar; serious concern that student will be able to be successful as a PhD student; very unlikely to pass if student were to retake

31.2 SCORING THE EXAM

The faculty as a whole will meet as soon as possible after the exam and assign each student one of three grades: **Pass, Retake, or Fail.**

- **Pass**

Students who pass the examination immediately become candidates for the PhD degree and must next prepare for the PhD Proposal. (See PhD Proposal, section 3J). The PhD Proposal must be presented and successfully defended within four semesters after passing the Qualifying Exam for Direct Entry students. Advanced Entry students must defend a proposal within three semesters after passing the Qualifying Exam.

- **Retake**

Students assigned a grade of "Retake" should understand that their performance on this exam must improve before they move on to preparing for the PhD Proposal. These students must retake the qualifying exam at a time to be determined by the examining faculty. The student should consult with his/her advisor about areas that need attention. The status of the student and the stipend remain unchanged. A maximum of one retake is allowed

- **Fail**

The student who fails the qualifier cannot complete a PhD in Chemical Engineering at CMU. The timing and terms of departure from the graduate program can vary from case to case depending on the interests of the student and the Thesis Advisor and on the availability of resources. The student should meet with the Thesis Advisor at the earliest possible time. The Thesis Advisor and the Graduate Advisor will make recommendations to the Head, who will make final decisions on all cases.

3J. PHD PROPOSAL

3J.1 PREPARING FOR THE PHD PROPOSAL

After the Qualifying Exam, the next major requirement for the Ph.D. degree is acceptance by a Thesis Committee of a proposal for PhD research. (See Sec. 3K.1 for discussion of the Thesis Committee.) The student should regard the PhD Proposal as **both** an *examination* of his/her fitness to do doctoral research on the chosen topic **and** an *opportunity* to get early input from the thesis committee into the proposed investigation. The knowledge necessary for the research, a clear conception of the scope of the work, and familiarity with the methods to be used are the prerequisites for the Proposal. These factors are more important than specific data taken or codes written.

The PhD Proposal consists of a written document describing the proposed research and an oral presentation of the proposed research.

- **The Written Proposal**

The written proposal should include a summary of previous experimental and theoretical work relevant to the proposed research. The student is expected to have a detailed understanding of all the material reported in the written proposal. This specifically includes knowledge of definitions and terminology; the ability to derive equations with an appreciation for the assumptions involved and the limitations thereof; and the ability to describe qualitatively pertinent phenomena.

The written proposal should define the thesis problem and include an outline for a plan of attack on the thesis problem, which the student should be prepared to defend. While the outcome of an investigation may be impossible to predict, the student should be aware of the possibilities and contingencies, and include the necessary research alternatives in his/her proposal. An organizational table outlining the time to be allotted to various facets of the problem should be included.

The student should answer the question, "If my research succeeds, what original research contributions will I have made?"

Twenty-five pages is the upper limit for the proposal document including the body, references, appendices, figures and tables. The document must be typed in 12-point font with no less than one-inch margins and no more than four lines per inch.

It is expected that the detailed preparation for both the written proposal and the oral presentation will result from extensive discussions between student and research supervisor, with the final responsibility resting on the student.

- **The Oral Presentation**

At the presentation, the committee will evaluate the student's knowledge in the area of the thesis topic and the potential contributions, as described in the written research proposal. The student and his/her advisor should establish a date and time. The student should then reserve the Conference Room and any audio-visual equipment through Janet Latini. He/she should also contact Shannon Young at least two weeks prior to the presentation to inform her of the date and time of the

proposal, the thesis title, and the names of the committee members. Shannon will then prepare a computer card for the required signatures. After the computer card is signed on the day of the proposal, the student should return it to Shannon.

3J.2 RESULTS OF THE PHD PROPOSAL

- **Passing:** If the thesis committee finds that the student passes the exam, the committee will check "Pass" on the PhD Proposal certification card and the student continues in the PhD program toward the objective of defending and filing a completed thesis. If the student is beyond the deadline for passing the PhD Proposal and funding has been discontinued, then support will be restored at this time.

- **Not Passing:** As the ultimate evaluator of the student's fitness to continue on a particular project, the PhD Thesis Committee may not pass a student at the proposal if it perceives low probability for scholarly contributions in the proposed area. The following rules govern this decision:

1. If the thesis committee recommends a new exam, the committee should not check anything (i.e. **neither Pass nor Fail**) on the certification card. If the student is not beyond the time allowed for successful completion of the PhD Proposal, then funding can be continued at the normal level (subject to approval by the Thesis Advisor) until the deadline for successful completion of the proposal. If the student is beyond the Proposal deadline, the rules of section 3C item #4 with regard to tuition and stipend apply until the PhD Proposal is completed successfully.

2. If the Thesis Committee recommends termination, the Thesis Committee should check **Fail** on the certification card. Tuition support will be discontinued at the earliest possible time; stipend will be stopped immediately. The Student and the Thesis Advisor, in consultation with the Graduate Advisor, should discuss the final outcome of the Student's residency at CMU and make a recommendation to the Department Head who will make a final decision.

A Student who feels unfairly treated should consult the CIT Grievance policy.

3K. THESIS

The MS or PhD thesis is the capstone of the graduate research experience and is a requirement for either the MS or PhD degree. The final step to graduation is acceptance of a thesis by a Thesis

Committee. Since it is an official record of work and achievements, there are special guidelines for its preparation. These issues are described below.

3K.1 THESIS COMMITTEE

Just as every PhD student must have an Advisor, every student must have a Thesis Committee to hear the PhD Proposal and to approve the thesis. When a student is ready to present the Proposal, he/she consults with the Advisor and together they identify suitable members of the PhD committee. The student contacts the prospective members and obtains their assent to serve on the student's Thesis Committee. The PhD thesis committee consists of:

- A minimum of three faculty members from the Chemical Engineering department (including the Advisor). *Note: During the 2005/2006 academic year, the faculty decided that, beginning with doctoral students entering in Fall 2006, each student must have two chemical engineering faculty members on his/her committee who are not advisors. Thus, if a student is co-advised by two chemical engineering faculty, there must be four chemical engineering faculty committee members.*
- A minimum of one member of the CMU faculty from a department other than Chemical Engineering. *Note: During the 2005/2006 academic year, the faculty decided that, beginning with doctoral students entering in Fall 2006, each student must have one non-chemical engineering faculty member who is not an advisor on his/her committee. Thus, if a student is co-advised by one non-chemical engineering faculty member, there must be two non-chemical engineering committee members.*
- A maximum of one voting member from outside the University. *The member from outside the University must hold a doctor's degree or equivalent. Otherwise, the person is a Visitor. There is no restriction or dependence of the composition of the committee on whether the member from outside the University is a co-advisor.*
- If it happens that a student's advisor or committee member has left Carnegie Mellon before the defense and has no continuing appointment in the department, the student must identify a thesis committee that satisfies the above requirements.

This committee will evaluate the PhD Proposal (Sec. 3J), offer suggestions concerning the scope and techniques used in the research, and evaluate the PhD dissertation after hearing a public defense of the thesis (Sec. 3K.3) by the candidate.

3K.2 WRITING THE THESIS

Preparation of the thesis is a separate topic and is described in major section 4.

3K.3 PRESENTATION OF FINAL PUBLIC ORAL DEFENSE

The Defense: The public oral defense of the thesis is the opportunity for the Student to highlight his/her accomplishments in a short opening presentation and to answer detailed questions from the thesis committee members and the public. The student must show by argument and fact that the accomplishments are both original and meet national, as well as international, standards of excellence. Evidence of publication and professional performance, as mentioned in section 3.B.3, will strengthen the case. Each member of the Thesis Committee must sign the card certifying that the student passed the thesis defense and must sign the thesis before the Department and the University will confer the doctor's degree.

Logistics: The student and his/her advisor should set up a date and time. The College of Engineering has rules about timing of the defense with respect to participating in Commencement. If you foresee your defense occurring after 31 March in any year, you should consult the college's website to stay within the timeframe. The student should then reserve the Conference Room and any audio-visual equipment through Janet. The student must also contact Shannon at least two weeks before the scheduled date and pass on the date and time of the defense, the title of the dissertation and the names of the committee members. She will distribute a public notice to the campus community and prepare a computer card for the signatures of the committee members. After the card is signed on the day of the defense, the student should return it to Shannon. Any other materials necessary for the proposal or the defense, such as transparencies, should be coordinated beforehand with Janet.

3L. CHECKOUT PROCEDURE

There is a packet of information regarding checkout procedures and thesis information that each student must obtain from Shannon before the final defense. One of the most important forms is the lab safety checkout. The aim of the checkout is to make sure that waste has been disposed and chemicals are properly labeled and stored. See Section 7 and the **Department of Chemical Engineering Safety Policy** manual for the safety form and details.

3M. SWITCHING AMONG MS, PHD AND MCHE PROGRAMS

3M.1 CHANGING FROM PHD TO MS:

If a student initially accepts admission into the Direct Entry PhD program and then decides to finish with a MS degree, the student can switch to the MS program at any time. The Student must send a letter requesting this change to the Graduate Advisor (Paul Sides) with a copy to the Advisor. Continuation of financial aid for pursuit of the MS degree is not guaranteed. The Department Head, in consultation with the Advisor, will make the decision on any request for continuation of tuition support and stipend.

3M.2 ENTERING THE PHD PROGRAM AFTER THE MS OR MChE

A student who is in the MS or MChE program, and who has his or her own guaranteed support for a minimum of four years from the proposed date of admission to the PhD program, may apply at any time for admission into the PhD program by sending a written request to the current graduate recruiter, who will admit the student or decline admission. The Department Head typically will assign the student to an advisor reflecting the preferences of the student and the interest of the advisor.

A student who is in the MS or MChE program, and who is requesting support for work toward the PhD, must apply for admission to the PhD program according to the regular recruitment policy. There are two deadlines for application, October 15 and January 15 of each year. The Department Head will make the final decision about admission in the case of students applying by the October 15 deadline; the decision will be based on the recommendation of the graduate recruiter and the availability of funding for the project. In this case, the student can enter the PhD program as soon as the MS coursework and thesis have been completed. In the case where the student has filed by the January 15 deadline, the graduate recruiter will make the decision about admission by the 15th of April. In this case, however, the student should expect to enter the PhD program and begin to receive support in September of the same year or after the completion of the MS degree, whichever is later.

In all cases, the student does not have to re-take the GRE or any language test but must complete a new application form and request that three CMU faculty provide recommendations. These documents, along with a letter of transmittal, must be sent to the graduate recruiter for that year. Acceptance into the program will depend on both qualifications and availability of financial support; the student will be admitted or not on those bases. Just as with newly entering students, there will be no guarantee of a particular advisor. The Department Head will assign the student to an advisor.

Two important points:

1. The student must complete the MS or MChE as a full time student before entering the PhD program. Note that the formal 96 unit requirement is a minimum in all cases. Research units reflect the student's activity in pursuit of the MS or PhD; it is typical that a student's transcript will record many more research units than the 24 required for the MS degree, for example.

2. Students must be officially accepted into the doctoral program in order to take the Qualifying Exam in August of each year.

3M.3 SWITCHING FROM PHD OR MS TO MChE

A student who has received full tuition support or stipend (or both) from the Department must complete a thesis to receive any chemical engineering degree. Thus a student who has received such support toward either the MS or PhD degree cannot receive the MChE degree except on approval of the Department Head.

3M.4 SWITCHING FROM MChE TO MS

A student in the MChE program who desires to write a thesis can petition the Graduate Advisor to switch to the MS program, but the change is not automatic. The switch depends both on the approval of the Graduate Advisor and the availability of a project. If the Graduate Advisor approves and a project is available, the Department Head will assign the student to an Advisor. The student should realize that this switch likely will increase the time to completion of the degree from nine months to 15 months or more. Since the department normally does not provide financial support for Masters candidates, the student must have his/her own support for the extended period.

3N. CHANGING ACADEMIC REQUIREMENTS AND POLICIES

In the relentless pursuit of excellence, the Department changes its requirements from time to time. The Chemical Engineering Department uses a "grandfather" policy with regard to these changes; that is, every student has the right to graduate under the policies in effect at the time of entry into the graduate program or to graduate under the policy in force at the time of receiving the degree.

4. PREPARATION OF THE THESIS

4A. FORMAT

Each thesis should be double-spaced on 8½" x 11" bond paper. A margin of 1" should be maintained on three sides, with a 2" left side margin (to allow for binding).

Specific details of presentation should be consistent with those recommended by the American Chemical Society (ACS) in *The ACS Style Guide: A Manual for Authors and Editors* (Section III). The *Guide* is available from the department. It contains complete guidelines for tables, figures, references, etc.

Follow the rules about thesis preparation standards at http://www.cit.cmu.edu/current_students/graduates/thesis_dissertation_policies.html.

In particular, note the rules about the Acknowledgments section which, at minimum, requires the source(s) of support for the work even if it is self support. For doctoral dissertations, the doctoral committee must also be listed in the Acknowledgments, and the chair of the committee should be identified. The doctoral committee should **not** be listed on the title page.

4B. COPIES

Copies of the original thesis are required on 100% cotton or non-acidic paper. The copies required are listed below:

- 1 – per advisor
- 1 - department
- 1 - library
- 1 - student

If photographs are used in the thesis, each copy must contain original photographs, not xerographic reproductions.

Students who have been supported by a fellowship or research grant should acknowledge the support and should check with their advisor to see if a copy for the sponsor would be in order. Students with two advisors should have five copies made.

4C. COST

Financial responsibility for typing the manuscript and providing the required number of copies rests entirely with the student. Students should NOT use the department copy machine to produce the thesis copies.

4D. BINDING

The department sends out PhD and MS theses for binding once processing is completed. The department pays for only those copies required by the department (Sec. 4B). Additional copies of a PhD or MS thesis can be sent out for binding at the student's expense.

4E. PROCESSING

All required copies of the thesis must be turned in by the deadline date (see Sec. 4F) to Shannon. Upon receipt of the theses, title pages will be prepared and circulated by the department for signatures. When completed, the title pages will be inserted into the theses and the copies will be distributed appropriately or sent out for binding.

4F. DEADLINE

August and December graduate theses are due in the Dean's office by the date that grades are due for that semester and no more than two weeks after the oral defense. May graduate theses are due in the Dean's office not less than ten days before commencement. If all of the paperwork is not turned in on time, the student must register for the following semester. All students must be registered for at least five units the semester of graduation.

5. GRADUATE STUDENT AWARDS

The Chemical Engineering Department has established the following graduate student awards to recognize research achievement and graduate student service in education.

5A. KEN MEYER AWARD

The Ken Meyer Award was established in 2005 in his memory by the Department of Chemical Engineering and by his family and many friends. Ken was a remarkable member of the department of Chemical Engineering for 28 years. He held Bachelors degrees in Physics and in Philosophy and a Masters degree in Physics from Carnegie Mellon. Ken joined the Department of Chemical Engineering in 1977 and served the department as instrument designer and maker. He made instrumentation used in research and teaching laboratories in the department, throughout the university, and across the country. In 1996 Ken was given Carnegie Mellon's Andy Award for Customer Satisfaction. Ken was a great friend to his colleagues and customers and earned everyone's respect through his commitment not just to excellence but to perfection.

The Ken Meyer Award is presented every year to a senior doctoral student who has demonstrated excellence in graduate research in chemical engineering. The faculty base their selection of the student on research quality, productivity, recognition, and impact.

5B. MARK DENIS KARL TEACHING ASSISTANT AWARD

Mark Denis Karl, a former graduate student, was an outstanding Teaching Assistant whose commitment to education is commemorated by the TA award. Each year the Mark Denis Karl award is given to a student judged by the faculty to have done an outstanding job as a teaching assistant.

6. FACILITIES & SERVICES

6A. HOURS

The Department office in Doherty Hall 1107 is open 8:30-12:00, 1:00-5:00, Monday through Friday.

6B. EQUIPMENT

The office has two Gestetner copiers, a paper cutter, staplers and a paper punch available for your use. No equipment is available outside the regular office hours. However, keys to the copy room may be signed out with Janet for overnight or weekend use of the copy machine.

6C. SUPPLIES

Office supplies are not provided for your use, but the Bookstore carries a wide selection and is conveniently located in the University Center.

6D. ADMINISTRATIVE ASSISTANTS

No administrative services are provided for graduate students.

6E. EMERGENCIES

The University Security Office is equipped to deal with all emergencies or to obtain the aid needed. It is open 24 hours a day. Call 8-2323.

6F. YOUR OFFICE

Desks are available to all full-time PhD graduate students in the Department. If the student is involved in experimental research, the desk will often be located in the assigned lab space. If the student is involved in theoretical research, the desk will generally be in an office. Cindy Vicker makes the room assignment for the first semester. The student's research advisor coordinates the room assignment with Cindy after that time.

Students who are assigned to one of the cubicle areas should note that nothing is permitted to be attached to any laminate or vinyl surface. There are rubber tack boards at each desktop that can be used to attach notes, photos, etc.

Each cubicle has a locking file cabinet and you will be issued a key. You must turn in this key when you leave the space. If not, you will be responsible for the cost of a replacement key.

Please remember that many different students will eventually use your cubicle so take special care to keep it looking clean and undamaged. And because there are a large number of students in each office, please be considerate of your neighbors by talking quietly and keeping walkways clear and clutter free.

6G. KEYS

You will be assigned a key to your office and the mailroom. If you move to a new office you must turn in your keys to Janet, at which time you will be issued new keys. At the termination of your studies, return all your keys to the department.

Do not under any circumstances pass on your keys to another student or lend them to anyone. You are responsible for the keys issued to you and a record is kept in your file until all keys are returned.

6H. COMPUTER SERVICES

Each student is assigned an Andrew account automatically from the university's computing services. Additionally, each student is assigned an account in Chemical Engineering.

Chemical Engineering Computer Services maintains the Computer Laboratories and other Department computer resources including, but not limited to, file, print, and web servers. End-user support is available for all Chemical Engineering faculty, researchers, staff, and students. If you have any questions about computing here in the Department please visit the Chemical Engineering Computing webpage at <http://www.cheme.cmu.edu/facilities/computing/>, or contact the computing staff. All help requests should be sent to the helpdesk email accounts:

cc66.general@gmail.com.

cc66.software@gmail.com,

cc66.hardware@gmail.com.

The Chemical Engineering Computer Consultants are available weekdays from 8:00 A.M. to 6:00 P.M. Please call email the helpdesk, cc66.general@gmail.com, or stop by DH A225. If you have an urgent request you may contact the computing office by telephone at extension 8-7993. In emergency situations, the Director of computing is available 24/7 at extension 8-5437

Additional information regarding computing in the department is available at:

<http://www.cheme.cmu.edu/facilities/computing>

6I. CHEMICAL ENGINEERING COMPUTER LABORATORIES

The Main Computer Laboratory is located in DH A226 and may be used by all faculty, researchers, staff, and students in the Chemical Engineering Department. Undergraduate students who have declared a major in Chemical Engineering are the primary users. All users must abide by the general usage policies posted inside the Computer Laboratory and on the web site given below.

The Computer Laboratory is a two-room collaborative work space. The main room consists of 22 PCs with one available for instructional purposes. Basic multimedia services are available. The smaller room is equipped with 8 PCs, a black and white printer, color printer, and color scanner.

Additionally, four public access computers, a black/white printer, and a scanner are available to students in the first year grad student office (DH A109), and six public access computers, a black/white printer, and a color printer are available in the undergrad lounge (DH2103). The computers in DH2103 should be reserved for undergrad use, or grad use while assisting in undergraduate education.

In order to use any of the computer labs you must have a valid account in the Chemical Engineering Department. Chemical Engineering faculty and staff may reserve either part of the Computer Laboratory. Please see the reservation policy posted on the door and on the web site given below.

More specific information can be found at <http://www.cheme.cmu.edu/facilities/computing>

6J. HOUSEKEEPING

Doherty Hall is an old building. Only the most basic janitorial services are performed. Therefore, many of the housecleaning chores in the space assigned to you are your responsibility.

6K. WORK ORDERS

Maintenance requests are handled by Facilities Management through the departmental FMS contact. To process a work order send e-mail to the departmental FMS contact stating the room and the repair/request. If there is an emergency repair after hours call the Service Response Center directly at 8-2910 or Security at 8-2323. The Service Response center will only accept emergency requests from students – all other requests must be handled through the departmental contact.

If you are cleaning out offices or lab space and have larger items, such as furniture, microwaves, or boxes of materials to discard, you must contact the departmental contact in advance and provide an Oracle string to be charged for these special trash pick-up services. Large items will not be picked up during the regular cleaning schedule.

6L. PAY DAY

For graduate students with financial awards, the University payday is always the last working day of the month. Checks can be picked up from Janet in DH 1107 after 10:00 a.m. on paydays. Direct deposit of your stipend to your checking or savings account is recommended. See Toni McIltrout for an application. All students are advised to pick up their check or advice of pay on payday and to report any problems promptly to Toni.

6M. MAILING

Each graduate student has a mailbox in the mailroom, DH 1108. There is also a box for outgoing campus and stamped mail. Mail is delivered and picked up at the department once each day, usually before 10 a.m. Postage is provided only for official department business.

The gray mailboxes on campus are for campus mail; delivery is guaranteed the following day if mail is deposited before 6 p.m. There is a U.S. Post Office branch in the University Center (lower level), open Monday through Friday from 8:30 a.m. to 4:30 p.m. In addition, the U.S. mailbox outside Baker Hall has a 5:00 p.m. pick-up.

6N. COPYING

All graduate students are required to pay five cents per copy for all copying unless it concerns their research work and has the prior approval of the research advisor. Graduate students pay Cindy directly when doing any personal copying. You must enter a charge number into the Gestetner login system before copying is allowed.

6O. TELEPHONES

Personal telephone calls should not be made from departmental phones

6P. TRAVEL

If you are traveling for departmental business with your advisor's consent, you can purchase your travel ticket(s) through a university-approved travel agent with a Ticket Request form (TR). The TR can be used to purchase airline or railroad tickets for domestic or international travel. When you use a TR you do not have to pay for the ticket from your own pocket. The form can be found at <https://www.as.cmu.edu/~fsg/forms/fmp/TR032304.xls>.

To use this form:

- Call one of the travel agents listed in Section 1 - Travel Agencies.

Work with the travel agent to determine the dates of travel and the price.

- Complete section 2 with your name and Organization name (Chemical Engineering).

- List the purpose of travel in Section 3 - do not use acronyms. If you are attending a conference for an organization - spell it out. Be specific and detailed.

- Write in the amount of the ticket and the dates of the travel in Section 4. You must also put the account you will be charging this ticket to. Get this account number from your Advisor.

If you are charging a GL account it will be one of the long numbers

000001.000 - etc.

Most of the time you will use a GM number (i.e. 2232.1.500000). It is broken down by PROJECT.TASK.AWARD.

The Expenditure Type is the type of travel - Domestic Airline or Foreign Airline.

The Organization Type is again Chemical Engineering.

The ticket price and trip **MUST** be approved by your advisor. Once you have his or her approval, sign the form as the traveler in section 5.

Drop the form off in your advisor's administrative assistant's office. Once the account has been approved, a copy will be put in your mailbox and the original will be put on Janet's counter. Your tickets will be dropped off or mailed to you.

All of these steps must be completed **BEFORE** a ticket can be issued to you.

It is **YOUR** responsibility to get the TR filled out correctly, signed and ready for the travel agent in a timely manner. The travel agencies will not issue a ticket without the completed TR.

6Q. CHEMICAL ENGINEERING AND MATERIALS SCIENCE MACHINE SHOP

- Services Provided

Services provided by the Chemical Engineering (ChemE) and Materials Science and Engineering (MSE) Machine Shop, also referred to as the Collaborative Machining Center (CMC,) include the design and fabricate research equipment and the production of parts and assemblies from specifications. The shop has manual machines, Computer Numerical Control machines and Rapid Prototyping machines and can produce precise parts in large or small quantities. The shop can machine and weld a wide variety of materials to exact tolerances. The staff can make Computer Aided Design drawings for you if needed and act in an advisory capacity to help you with design specifications. In addition, the staff can refer you to technical suppliers to help solve your purchasing problems and has connections with regional manufacturers for subcontracting special work.

- Work Scheduling Policy

As work comes into the shop, it goes onto the queue and is processed on a first-in first-out basis. Special requests for expedited delivery will be handled on a case-by-case basis.

- Material Gathering Policy

If the job requires material from an outside source, the shop staff can handle the purchasing. If you prefer to purchase the material, we can advise you regarding specifications and suppliers. A modest selection of material and hardware is available in the machine shop.

- Education and Training

The philosophy of the CMC includes training and education of students, staff and faculty in actual machine shop practice. The goal is to encourage participation and hands-on experience of machine shop work as a key component of CMU's engineering and arts education, through formal courses, offered in the shop in manufacturing technology, rapid prototyping and agile robotics.

- Website

Visit and contact the machine shop online at: <http://cmc.cheme.cmu.edu>. Phone: 412-268-2817

7. SAFETY PROCEDURES

The Chemical Engineering Department takes safety practices very seriously. The safety practices concerning the handling of laboratory glassware and chemicals, the use of safety glasses and respiratory and fire hazards as set forth in the American Chemical Society publication, "Safety in Academic Chemistry Laboratories," are applicable to all Chemical Engineering laboratories and a copy is available at the door of each laboratory. The department, as a reference and reminder for safety practices, has designed a safety manual called the *Department of Chemical Engineering Safety Policy, which is included in the following section*. Included at the back of the manual is a Safe Laboratory checkout list. Students are required to have a safety inspection prior to graduation. A complete and authorized safety checkout list must be turned in to Shannon along with other graduation papers before the student is considered to have graduated.

What follows is a brief summary of Safety Practices and Procedures.

Upon entering a laboratory, students should familiarize themselves with the safety features available in case of emergency:

1. The location of fire extinguishers, their type and method of operation and fire escape routes.

2. The location of emergency eyewash fountains and safety showers.
3. The location of the nearest telephone. To report a fire or obtain help in other emergencies call Security, ext. 8-2323.

If you feel that additional safety equipment is needed, or if the existing equipment is not working properly, talk to a member of the safety committee (Sec. 7A) about acquisition or replacement of the safety items.

The following safe practices should be observed in the laboratory:

1. Wear proper eye protection. **Safety glasses must be worn in laboratories at all times.** If a faculty member identifies a student in violation of this policy, a warning will be issued and the student will be barred from the laboratory for one week. Repeated violations can result in dismissal from the program.
2. Keep all chemicals away from heat and sunlight.
3. Keep all chemicals and materials out of sinks and drain lines. Disposal of chemicals through sinks can only be authorized by Environmental Health and Safety (EH&S). Check chemical waste disposal manual for listing of authorized chemicals.
4. Good housekeeping is essential for safety and efficiency.
5. Label all bottles and containers. Review the Chemical Hygiene Plan to determine what labeling is required for bottles and chemicals. The plan can be found online at <http://www.cmu.edu/ehs/chemical/index.html>.

WORKING ALONE

Working in a laboratory alone is hazardous. When working outside the hours of 7 a.m. to 10 p.m., Monday through Friday, you **must** either arrange with an associate to check with you frequently or arrange a periodic check by Security, (ext. 8-2323). Not only will this help in dealing with emergency experimental situations, it will also help discourage potential assailants.

OPERATING MACHINES AND EQUIPMENT

You must receive instruction in operating machinery or equipment by the P.I. or the senior lab technician/researcher. Do not use equipment without the permission of the person responsible for

the laboratory. When working around moving machinery, secure hair and loose clothing (ties, sleeves, etc.)

COMPRESSED GAS CYLINDERS

Except when gas cylinders are being moved, they **must** be securely fastened with an approved strap or chain to prevent falling. If a cylinder should fall over and the valve breaks, **the cylinder can become a dangerous, jet-propelled projectile**. A leaking gas cylinder in an enclosed space is a suffocation hazard.

- Cylinders of compressed gas **must not** be placed near sources of heat.
- Do not use pipe wrenches on cylinder valves.
- All valves should be closed tightly on cylinders that are not being used.

If you require gas cylinders for your research, they can be ordered through the department business office (see Gas Cylinders, Section 7G). Cylinders are normally delivered to your laboratory. If not, you will be notified and they may be delivered to an area on the Wean Hall loading dock (get key to freight elevator from Larry Hayhurst). In order to transport these cylinders back to your laboratory use the special carts designed for this purpose. These carts are kept in the machine shop and can be obtained by asking any of the shop personnel. Fasten the cylinder in the cart with the chain. While actually moving the cylinders or while they are stored in your laboratory, make sure that the cylinder cap that protects the valve is firmly secured in place. **NEVER** move a cylinder with a pressure regulator installed on it. Remove the regulator and put the safety cap on the cylinder before releasing it from its safety mooring. All valves should be closed tightly on cylinders that are not being used.

CHEMICAL WASTE DISPOSAL

All chemicals must be stored in the laboratories until removed. The Environmental Health and Safety (EH&S) group at CMU offers **CURBSIDE PICKUP OR TRANSFER**. This is an extremely convenient and cheerful service that makes it easy to dispose of both chemical waste and chemicals still in the jar but no longer being used. The department requires the use of his service to remove chemical waste from the laboratory. The department strongly recommends that when a chemical is no longer going to be used, that it be removed from the lab with this service rather than storing it indefinitely. To access the service, go to <https://ehs->

alert.fms.bap.cmu.edu/forms/WastePickup.php?ahaid=2. Likewise, if you need to have chemicals moved from one lab to another, this can be arranged. You will need to label all separate items. The tags and wires are available in the graduate student lounge on the A level. Advice on handling of waste, containers, etc. can be obtained from EH&S at the above website or by dialing extension 8-8182. When you call, please clearly state your name, department, and the nature of the problem; this will expedite handling of your question.

A special problem occurring frequently in our department is that of unidentified chemicals in unmarked containers. If you find such a situation in your laboratory, it should be corrected immediately.

Graduate students are responsible for disposal or proper storage of all chemicals they have been using. Each student must complete a checkout form signed by the advisor before leaving or graduating. If the advisor is unavailable for an extended time, a member of the Safety Committee can also perform the inspection. See the *Department of Chemical Engineering Safety Policy* manual for details.

7A. SAFETY COMMITTEE

MEMBERS: Bob Tilton, Kris Dahl and Paul Sides.

The Safety Committee serves only an advisory role. As such, the members rely heavily on the comments, questions and concerns of individuals within the department. It should be clearly understood that the individuals involved in research are primarily responsible for the existence of safety equipment in research laboratories and that all activities associated with research projects are safely conducted.

LABORATORY GUIDELINES

Each faculty member involved in research appoints a graduate student as a research group representative. The representative helps to inform the committee about existing situations in each of the faculty member's laboratories. The representative should ensure that each laboratory under his/her jurisdiction meets the following guidelines.

- Each area must have at least one recently inspected (less than 12 months) fire extinguisher. Check the inspection record label on each extinguisher.
- All gas cylinders **must** be secured in a stable manner.

- Emergency numbers where the lab occupants and the lab supervisor can be reached outside working hours should be posted inside the laboratory.
- Each area must have a first aid kit.
- Areas in which flammable gases are used must have posted "No Smoking" and "Flammable Gas" signs on all doors and walls near the apparatus. There should be no smoking in any lab or area adjacent to a lab regardless of the type of materials present.
- Evacuation directions must be posted near each door.
- Each laboratory will make the American Chemical Society publication, *Safety in Academic Chemical Laboratories* available to all workers in the laboratory, as well as CMU's *Chemical Hygiene Plan* and *Guidelines for Hazardous Waste Disposal*.
- Each phone should be labeled the campus emergency number ext. 8-2323 (police, fire, ambulance).
- The Safety Committee will provide each group representative with an inspection checklist; the completed lists are reviewed and then kept on file. Inspections must be performed monthly.

EMERGENCY INFORMATION

Sometimes experimental equipment needs to run unattended. If an emergency situation develops in a laboratory while the laboratory personnel are not present, a method of contacting the parties involved is required. The telephone numbers of the laboratory supervisor and personnel, plus any other pertinent information regarding the operation and shutdown of equipment, **must** be posted inside the laboratory. This will assist campus security, faculty and students in dealing with any situation.

Equipment for which failures can result in a fire, spill of material, explosion, or flood must be attended at all times or provision made for periodic inspections. No equipment should be left unchecked for longer than 8 hours.

DEPARTMENT OF CHEMICAL ENGINEERING: SAFETY POLICY DOCUMENT

The Department of Chemical Engineering fully endorses Carnegie Mellon University's Chemical Hygiene Plan (CHP) as the document that defines its laboratory safety policy. This policy is to be adhered to by all members of the faculty and staff and by graduate and undergraduate students. The plan can be found at <http://www.cmu.edu/ehs/chemical/index.html>.

The issues that are of particular importance to the chemical engineering laboratories and that must be emphasized are:

1. The use of protective eyewear at all times in the laboratories. Repeated violations of this most basic precaution are grounds for dismissal.
2. The maintenance of a current set of MSDS sheets for all chemicals being used or stored in a laboratory.
3. The maintenance of a set of written Standard Operating Procedures (SOP) for all operations that are performed on a routine basis.
4. The maintenance of a set of standard CMU data sheets for all Particularly Hazardous Substances (PHS) that are being used or stored in a laboratory. For guidance see <http://www.cmu.edu/ehs/chemical/program-management/phs.html>.
5. Prior to graduation all students will complete a laboratory checkout form documenting the fact that they have disposed of or stored all chemicals used during their research, repaired or documented all equipment problems, and made adequate copies of all laboratory notebooks and digitally stored data. If a student used other labs, such as the CPS Lab, s/he must fill out a form for each additional lab.

Emergency and Information Contacts

1. Police / Emergency Services - **8-2323**

2. Environmental Health & Safety (Chemicals) - **8-8182**
3. Environmental Health & Safety (Radiation) - **8-7502**
4. Environmental Health & Safety Web page - <http://www.cmu.edu/ehs/>

LABORATORY SAFETY GUIDELINES - DEPARTMENT OF CHEMICAL ENGINEERING

The Department of Chemical Engineering laboratories operate under the safety guidelines and policies described in Carnegie Mellon University's Chemical Hygiene Plan (CHP, a link to the CHP can be found at <http://www.cmu.edu/ehs/chemical/index.html>). In addition, the following guidelines describe the policies of the department and the expectations of all students, faculty, and staff working in laboratory environments.

POLICIES

1. **Eye protection** shall be worn at all times by persons actively performing experiments in the laboratories or working in the laboratories in spaces that are in line-of-sight with experimental work areas. Individuals working at desks that are protected by partitions from the experimental areas of the lab need not wear safety glasses although they are encouraged to do so and must have safety glasses available. Individuals working with lasers shall wear laser safety goggles appropriate for that laser frequency and power.
2. **Materials safety data sheets (MSDS)** must be maintained for all chemicals being used or stored in a laboratory. These should be located somewhere near the entrance to the lab and should be clearly marked as MSDS in case emergency personnel need them. Any person using a chemical is responsible for reading the MSDS and being aware of the safety issues associated with the use of that substance.
3. **Food and drink** shall not be stored, prepared, or consumed in the laboratories. The only exceptions to this are for persons working at desks that are separated from laboratory work areas by partitions.
4. **Emergency contact phone numbers** of all personnel working in the lab and of the professor or staff member with primary responsibility for the lab shall be posted on the door to each lab.

5. **New experiments or new apparatus** being built in the labs will be brought to the attention of the safety committee, who will review the safety issues and the SOP (see next item) associated with that experiment.
6. **Standard operating procedures (SOP)** shall be maintained for all procedures in the laboratory that are performed on a regular basis. These should describe the procedure and the potential hazards associated with that procedure. All personnel performing that procedure are responsible for having read the SOP.
7. **Shutdown procedures** for all apparatus normally left running will be written and posted on the apparatus for emergency personnel.

EDUCATION

The department will offer a safety-training course (06-608, Safety Issues in Science and Engineering Practice) during each academic year. All graduate students, postdocs, and all undergraduates participating in undergraduate experimental research projects are expected to take or audit this course. In addition, they are expected to be aware of the contents of the Chemical Hygiene Plan pertinent to their work and to be aware of the contents of the MSDS sheets for chemicals that they are using. Undergraduates or others who have not taken or audited 06-608 will need to attend, at a minimum, the Laboratory Safety and Hazardous Waste Generation training session by Environmental Health and Safety (for information see <http://www.cmu.edu/ehs/chemical/training.html>). The only exception is for lab students who have successfully completed Carnegie Mellon Course 09-221, Laboratory 1: Introduction to Chemical Analysis. It has been determined that the safety and environmental elements of this course meet the OSHA requirements.

INSPECTION

The departmental safety committee will conduct full inspections of all the laboratories once each year in order to ensure that equipment is being properly maintained and that safe procedures are in practice. In addition there will be several impromptu safety inspections throughout the year in which Environmental Health and Safety personnel will be asked to visit some of the labs in order to evaluate safety practices.

ENFORCEMENT

Personnel working in the laboratories who are found to be using unsafe practices will be reprimanded by a letter from the department head (copied to their advisor) and prohibited from working in the labs for a period of one week. Repeated violations may result in immediate dismissal from the graduate program.

CHECK-OUT

Personnel leaving the department will be responsible for disposal or storage of all chemicals that they have been using. In addition they are expected to make sure that all instrumentation is left in working order and that the laboratory areas are left orderly. Copies of lab notebooks and electronic copies of all data should be made and given to the advisor in a form that

is useful. In the case of graduate students, the following checkout form must be completed and signed by the advisor before the department head signs the thesis. In the case of undergraduates, grades for research will not be assigned until the lab checkout has been completed.

Safety Committee:

Kris Dahl

Paul Sides

Bob Tilton

LABORATORY CHECKOUT FORM

Department of Chemical Engineering Laboratory Checkout Form

Student Name: _____

Date of Graduation: _____

Student and Advisor: Please identify laboratory sites used and check as appropriate, then fill in the requested information and obtain signature(s). Where not relevant, indicate N/A.

_____ Advisor's Lab Space

_____ CPS Lab

_____ Rothfus Lab

_____ Other Lab(s) _____

Laboratory Site #1 (Bldg/Rm) _____

Date of exit inspection: _____

_____ Lab is clean and ready for use by the next person

_____ Office is clean and ready for use by the next person

_____ The computer is ready for the next person; administrator or other passwords are available

_____ Chemicals are stored or disposed properly

_____ Equipment is properly organized and its condition is known

_____ Data and notebooks are properly stored.

Please sign below ONLY if all appropriate inspection points are acceptable. All chemicals must be labeled, properly stored, or disposed.

_____ _____
Lab Supervisor/Advisor Date

If lab is NOT acceptable please write actions to be taken and date of re-inspection:

Actions: _____

Date of re-inspection: _____

8. PURCHASING SUPPLIES

The purchasing of all supplies by members of the Chemical Engineering department is coordinated through the department. All purchases must be properly recorded in the University's purchasing system.

8A. WITH PURCHASE ORDER

All Chemical Engineering Purchase order requests are handled through e-mail. The purchase order request form can be found at <http://www.cheme.cmu.edu/order>. You will need to provide the following information:

- ❖ Requestor name
- ❖ E-mail address
- ❖ Campus telephone number
- ❖ Complete name and address of company
- ❖ Phone number and fax number of company
- ❖ Campus shipping address (DH B211)
- ❖ Office/Lab where equipment will be stored or used
- ❖ Order information

Item #, Catalog #, Complete Description, Unit of Measure (UOM), Price, Total Price,
ACCOUNT NUMBER

- ❖ Special Instructions

The information will be verified and entered into the University purchasing system (Oracle). After the requisition has gone through the proper channels and been approved, a purchase order will be generated. This purchase order will be printed and returned to the requisitioner. It is only at this

time that the purchase may be made. **If any of the information is incorrect or missing, the requisition will be denied.** Please allow a three-day turn around time for purchase orders.

In order for a requisition to be made, the vendor's name and pertinent information (address, billing terms, etc.) must be in the University Purchasing system. Commonly used vendors will be in the purchasing system. If you are using a new or obscure vendor, you will have to obtain their specific information before you can use a purchase order. Forms for this purpose can be found at

<http://www.cmu.edu/finance/forms/>. You can print the forms and fax them to the vendor or instruct the vendor to visit the site. The completed forms should be returned to the Purchasing Department.

The university recommends that you use a preferred vendor when making all purchases. Preferred vendors have agreed-to terms and conditions with the university and the required paperwork is considerably less than using a non-preferred vendor. To view a listing of preferred vendors by both name and commodity visit the purchasing department's web site at <https://www.cmu.edu/finance/procurement/services/supplier-directory/supplier-directory.html>.

A PO Checklist and Bid Summary Form must accompany all federally-funded purchase orders \geq \$2,500. This form requires the solicitation for 3 quotations/proposals. See Shannon Young in DH A207D or go online to <https://www.cmu.edu/finance/forms/procurement/standard.html> for this form. If you are using a preferred vendor, the checklist/bid summary is not required.

Once the purchase has been received, the requestor must immediately deliver the packing slip to DH 1101. When the shipment has been verified and the invoice is OK to pay, send notice to the Chemical Engineering Buyer. The notice should include the PO#, the vendor name, and the office or lab where the item(s) will be used/stored. See the following sample request form.

8B. WITH A DEPARTMENTAL CREDIT CARD

The Chemical Engineering Buyer assistant has a credit card that can be used for purchases that are under \$1,000. To make a purchase via credit card, complete and submit the form located at this site: <http://www.cheme.cmu.edu/order/TCOrder.htm>. You will be able to select the Buyer as the purchasing agent. Once the order is received, give the packing slip and the receipt to the Buyer with the appropriate account number written on it. It is essential that you turn in receipts. If you fail to return the receipt in a timely manner, you will lose the privilege of using a credit card.

8C. WITH CASH

When it is convenient to purchase small items with cash (e.g., batteries, rubber gloves, SOS pads, etc.) from an outside vendor, the department may reimburse you from the petty cash fund. You need to present a receipt to Cindy Vicker for the goods purchased with your name written on the receipt and an account number given to you by your advisor. Petty cash is replenished by charging your purchases against the accounts of your advisor. Cash reimbursements are limited to \$20 or less.

This service is only for legitimate supplies needed for research, lab work, etc., and your advisor must approve every purchase. Sales tax is not reimbursable.

8D. PURCHASING IN UNIVERSITY STORES

Included on this page is a list of those University Stores where various items can be purchased. A few of the items that each store handles are listed to give an idea of the supplies available. Each store handles its own bookkeeping. You need an account number, proper identification and a signed authorization in order to purchase goods. See Cindy Vicker for authorization before going to the University Shoppe, Art Store or Computer Store. Please return the receipt to the department when you have made a purchase.

8E. EXPENSE REPORTS

Students who accrue business-related costs, such as conference and research travel, should seek reimbursement using the following Expense Reimbursement Request form. Submit all original receipts for reimbursement, with the research advisor's approval, to your advisor's administrative assistant. Reference the university policies for travel and non-travel business expenses online at:

<http://www.cmu.edu/finance/ap-er-pcard/er/policies-procedures.html> and Per Diem rates at:
<http://www.gsa.gov/portal/category/21287>.

8F. PROCEDURE FOR PICKING UP PACKAGES

Packages should first be delivered to your office or lab. The machine shop (DH B211) is the secondary delivery location.

- √ If the package is not delivered to your office or lab, it will be delivered to the machine shop. Check for your package periodically. The department checks for packages once a day and will send you e-mail if there is a package with your name on it.
- √ Pick up packages immediately after receiving notice. This will decrease the chance of misplaced merchandise.
- √ Check your package to be sure your order is complete and in good condition.
- √ Bring the packing slip to the Department Buyer.
- √ Once the shipment has been verified for accuracy, submit a notice to the Department Buyer via e-mail stating that the purchase is OK to pay (for purchase orders only).

8G. SHIPPING VIA FREIGHT

For the purpose of this note, freight is considered anything too large to be shipped via UPS or Federal Express. Long sections of Unistrut, sheets of plywood and heavy equipment are examples. Freight arrives at CMU by truck. If you are ordering something large and suspect it may be shipped via freight but are not certain, simply ask the supplier.

When receiving a package via freight, have it shipped directly to:

Carnegie Mellon, Central Receiving
6555 Penn Avenue
Pittsburgh, PA 15206
(Phone: 412-268-3301)

Do **not** have it shipped to Doherty Hall B-211 because:

1) The loading dock at Central Receiving is accessible to large trucks. The Wean Hall loading dock is virtually inaccessible, especially with the construction in progress.

2) Central Receiving has someone available during normal business hours to meet the driver, accept the delivery and help unload the truck.

3) Central Receiving has the mechanism available to unload and temporarily store large, heavy items.

Typically, Central Receiving will bring freight shipments to Doherty Hall with their other deliveries. If the item is of extraordinary size and/or weight, special arrangements will need to be made with a rigger. We can help you make these arrangements if you provide advance notice.

8H.

GAS CYLINDERS

The university maintains a service through the Mellon Institute Store Room for purchasing compressed gas cylinders. Cylinder Request Forms are available in DH 1101. Cindy is the only person in Chemical Engineering who is authorized to order cylinders. **DO NOT order directly from the company. This is against university policy and orders will not be processed.** For common gases that are already in stock, the cylinder usually arrives at your specified lab on Tuesday, Thursday, or Friday of the same week. See Section 6 (**Safety**) for important and essential safety procedures related to cylinder transportation.

When the cylinder is ordered and processed in the system, the cylinder request form will be returned to you. Record the cylinder number inscribed on the barcode onto the form. Return the form to Cindy. The information will be recorded and the form will again be returned to you. Keep this form until you return or exchange the cylinder. When cylinders are empty they must be returned in order to cancel the demurrage charges. Mark them "MT" (empty) and leave them in your lab. Notify Cindy that you have an empty cylinder to return and inform her of the location. Once the empty cylinder has been picked up, complete the return portion of the cylinder request form and return it to Cindy. She can then keep an accurate check of cylinder demurrage charges.

9. LABORATORIES

The Colloids, Polymers and Surfaces (CPS) Program is an interdisciplinary effort of the Chemical Engineering, Chemistry and Physics departments under the direction of Professor Annette Jacobson. The PPG Industries Colloids, Polymers and Surfaces Laboratory operated under this program contains equipment for measuring numerous physical and chemical properties that are important in the characterization of fine particles, macromolecules and interfaces. The primary function of the lab (located in DH 3200/3207) is educational, providing a full year of laboratory instruction and experience at the graduate level (required of MS CPS students), as well as a year of training for undergraduates enrolled in the CPS minor. In addition, training in techniques of polymer characterization provided by the PPG CPS Lab is required of undergraduate Chemistry majors pursuing the polymer option and of all Chemistry graduate students who plan to do a thesis in the polymers area. Priority in the use of the Lab is therefore given to these educational functions. However, the instruments in the laboratory are available to graduate students and faculty for research. If your thesis entails experimentation of the sort that the PPG CPS Lab affords, your advisor will send you to see Professor Annette Jacobson, Mrs. Rosemary Frollini, Associate Director and Lab Manager or Dr. Susana Steppan, Assistant Director and Assistant Lab Manager, for help in gaining access to the available equipment and in obtaining whatever instruction you may require.

Access to the 3200 lab is by card reader only. Students who have completed the required training can request access by contacting Rosemary Frollini.

PPG Industries CPS Laboratory

User Regulations

1. All instrument users must be trained by authorized personnel. Students are not permitted to train others in their research group without permission of CPS staff.
2. You must bring your own glassware, chemicals and supplies, including gloves and paper towels. Please clean up your workspace before you leave the lab.
3. Do not leave anything behind in the lab or it will be discarded. Please remove whatever you brought when you leave. The exception is chemical waste which must remain where it is generated. Please bring an appropriately labeled container. A completed waste tag must be attached, listing contents and responsible party.
4. MSDS sheets must be brought to the lab for each chemical that you are using.

All containers and samples brought into the lab must be labeled with chemical contents and your full name. Anything not in compliance will be removed.

5. Instrument log books must be signed before using the instrument and after completing use.
6. Some instruments have Yahoo calendars for scheduling use time. Please check for availability and schedule your usage. If you are not on the instrument's schedule, you may be asked to leave by CPS staff if another student has signed up. You may schedule up to 48 consecutive hours on an instrument. At the end of your scheduled time, if no one else has reserved the instrument, you may schedule an additional 48 hours.
7. Data should not be stored on CPS Lab computers longer than a few weeks. Make arrangements to retrieve your data ASAP. All data will be purged by CPS staff at the end of each semester.
8. **No instrument, equipment, or supplies may be removed from the CPS labs.**
9. No instrument may be left running unattended. Plan to remain in the lab for the duration of your work. Exceptions are only by permission of the CPS staff. Instruments left unattended will be shut down by CPS staff.
10. The lab is available strictly for use of the instruments there -- other lab work should be done in the space allotted by your advisor.

11. Misuse and/or damage to an instrument will result in loss of privilege to use the CPS Labs. Your advisor will be responsible for the cost of the repair.
12. In scheduling use of the lab equipment, use for the CPS Lab courses is given priority. Researchers are not permitted to be in the lab during scheduled CPS classes.
13. Safety glasses must be worn at all times while in the lab. No opened-toed shoes are permitted.
14. Absolutely, no food or drink is permitted in the lab.

Failure to abide by the rules will result in loss of access to the lab and its equipment.

9B. ROBERT R. ROTHFUS LABORATORY IN CHEMICAL ENGINEERING

The lab maintains a wide array of analytic equipment, laboratory and instrumentation hardware, and miscellaneous parts. These may be used, for special needs, upon arrangement. Cubed ice and filtered water are available in the Lubrizol Lab, located in DH A100, for experimental use. Access to these facilities can be arranged by contacting Matt Cline at x8-2818.

10. CONTACT INFORMATION

<u>What</u>	<u>Whom to See</u>	<u>Room</u>	<u>Ext.</u>
Admissions (Graduate)	Lynn Walker Shannon Young	DH A220 slyoung@andrew.cmu.edu	8-3020
AIChE	Jim Miller	DH A207A	8-9517
Copying/Transparencies	Janet Latini	DH 1107	8-2230
Computer Accounts	Justin Dawber	DH A207D	8-2243
Degree Requirements and Registration	Paul Sides	DH A207C	8-3846

Departmental Programs and Courses	Shannon Young	slyoung@andrew.cmu.edu	
Electives	Thesis Advisor		
Financial Support	Toni McIlltrot	DH 1105	8-3573
CPS	Annette Jacobson	DH 3102B	8-2244
Maintenance	Janet Latini	DH 1107	8-2230
Purchasing	Department Buyer	DH A207D	8-2243
Space	Cindy Vicker	DH 1101	8-1566
Safety	Safety Committee Kris Dahl	DH 3111	8-1159

11. CAMPUS FACILITIES

11A. ATHLETIC FACILITIES

You are welcome to use the athletic and recreational facilities in the gymnasium and University Center, including the swimming pool, handball courts, weight room, golf room and main gym, as well as the tennis courts. These facilities may be used during scheduled periods when they are not in use for instructional purposes. You may be asked to show your I.D. card to identify yourself as a student or to obtain a permit. There is a charge for use of some facilities.

11B. CLEANERS/LAUNDRY

The laundry facility is open 24 hours a day, with validated CMU ID. An attendant is on duty Monday through Friday, 8:00 a.m. to 4:30 p.m. It is located in Margaret Morrison Plaza 4 (phone 8-8878).

11C. CAMPUS DINING SERVICE

CMU Dining Services provide meals at reasonable prices in several locations. Complete menus are posted at each location. Hours of operation may be verified by calling 8-2139 or by checking <http://www.cmu.edu/dining>. Some of the locations include:

- University Center
- Resnik Hall
- Food carts are also scattered around campus, including Wean Hall, Porter Hall, Newell-Simon Hall, Hamburg Hall, and Mellon Institute.

You will find vending machines for snacks and candy located in various buildings across the campus.

11D. HEALTH SERVICES

- **Health Office (x2157)**

The Health Office is located on the first floor of E Tower in Morewood Gardens (Room 144). It is open from 8:00 a.m. until 7:00 p.m. Monday, Tuesday, & Thursday; Wednesday 10:00am – 7:00pm; Friday 8:00 - 5:00 and Saturday from 11:00am until 3:00pm. The services normally expected of a family physician are provided. Gynecological services are available by appointment only.

If an emergency occurs during hours when Health Services is closed, call the after-hours physician on-call service at 412-268-2157 (Identify yourself as a Carnegie Mellon student.) Also, call campus police for transport at 412-268-2323 (on campus, 8-2323)

- **Insurance**

All students are required to have medical insurance. The Associate Dean of Student Affairs, (WH 301) extension 8-2075, has complete information.

11E. LIBRARIES

Students are invited to use the collections in Hunt Library and the Engineering & Science Library. In addition to a large collection of books, the libraries also contain current and past issues of

magazines, newspapers, manuals, encyclopedias and many other reference materials. Circulating material may be borrowed by presenting your I.D. card. Each library has a reserve book room for books designated by a professor as assigned reading in his/her class.

11F. PARKING FACILITIES

A charge is made for use of parking spaces by meter or by permit. Parking tags and key cards (for lots requiring them) are obtained from the Parking Office in the East Campus Garage. Fines are given for meter, general and hazard violations. Many of the local streets near the campus have parking limited to residents.

11G. PUBLICATIONS

The following regular CMU communications are available at the information desk in the University Center.

Tartan - The CMU student weekly publication that reflects student thought, highlights campus activities such as athletic schedules and scores, lectures, seminars and meetings, concerts and art exhibits, and other information.

Campus Calendar - A weekly listing of current campus events (plays, concerts, recitals, seminars, etc.) and local events of special interest to the academic community.

8 1/2 x 11 News - A single-sheet weekly update of news about campus events.

11H. STUDENT PHOTO I.D.

Student I.D.s are necessary for many university services including use of athletic facilities, purchasing meal plans, special events, etc.

12. MISCELLANEOUS ISSUES

12A. POLICY ON "OUTSIDE" EMPLOYMENT

The possibility exists that a student might be approached to consult on a project for an entity outside the university and be offered a fee for services in addition to the stipend. Alternately, a

student conceivably could operate some other extracurricular business. The Department strictly forbids such arrangements while the student is registered full time and pursuing a degree. The student is expected to devote his/her time and energy to timely completion of the degree.

12B. POLICY ON THE AVAILABILITY OF SUMMER EMPLOYMENT

If applicable, the fellowships offered by the Department are full time and paid year round. While the student is registered and receiving a stipend, no summer employment other than full time research is allowed. This is not meant to preclude cases where students are temporarily placed in industries relevant to their thesis work and are paid by a company. In these cases, the student should collect the normal stipend plus an allowance for extra expenses due to any relocation or maintenance of a second dwelling place. Toni McIltrout should be consulted.

12C. POLICY ON OUTSIDE FELLOWSHIPS

A student receiving any kind of fellowship or external support other than through family or prior investments must notify the Department of that support so that appropriate arrangements can be made for equitable pay.

12D. CHEATING, PLAGIARISM, AND RESPONSIBLE CONDUCT OF RESEARCH

- The Department will take strong action consistent with CMU policies against any student who engages in cheating or plagiarism in courses or in research. The web link to the University policy on Cheating and Plagiarism is <http://www.cmu.edu/policies/documents/Cheating.html>.

- The Department of Chemical Engineering embraces requirements for education in Responsible Conduct in Research. All researchers must take the available online course and pass it. New graduate students will take this training and fulfill this requirement as part of the 06-608 Safety course. The website for this training is

<http://www.cmu.edu/osp/regulatory-compliance/research-ethics.html#Online>

12E. POLICY ON VACATION TIME

Research never sleeps, but most people need a periodic rest. As a guideline, each student should plan no more than two weeks of vacation per year in addition to the week between Christmas and New Year, Memorial Day, July 4, Labor Day, and Thanksgiving Day. All vacation time should be

cleared in advance with the student's advisor to make sure that progress is satisfactory and deadlines are being met.