2021-2022 Graduate Student Handbook





Department of CHEMICAL AND BIOMOLECULAR ENGINEERING Clemson[®] University







GRADUATE STUDENT HANDBOOK

2021-2022

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https://www.clemson.edu/cecas/departments/chbe/

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INTRODUCTION

This information manual contains rules and regulations pertaining to graduate students in the Department of Chemical and Biomolecular Engineering, as well as general information for the benefit of the students and faculty. The rules and regulations provided govern our academic program and describe the duties and responsibilities of graduate students in the Department. These rules and regulations developed through the years have proven to benefit the students and the faculty in the Department. Each student is expected to be familiar with the contents of this manual. Please make reading through it a priority as you begin your program of study.

In case of any conflict between statements herein and the Graduate School Policy and Procedures (<u>https://www.clemson.edu/graduate/files/pdfs/gs_policy_handbook.pdf</u>), the Graduate School Policy and Procedures will prevail. The regulations in this edition of the Department manual supersede all previous editions.

Welcome to the Department – we are happy that you chose Clemson for your graduate education.

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DEPARTMENTAL DIRECTORY

DEPARTMENTAL OFFICE: 127 Earle Hall	TELEPHONE: (864) 656-3055 FAX: (864) 656-0784 WEBSITE: https://www.clemson.edu/cecas/departments/chbe/
DEPARTMENT CHAIR:	Dr. David Bruce Enter through 127 Earle Hall (864) 656-5425 <u>dbruce@clemson.edu</u>
GRADUATE COORDINATOR:	Dr. Mark Roberts 208 Earle Hall (864) 6566307 <u>ssarupr@g.clemson.edu</u>
BUSINESS AND FISCAL MANAGER:	Adair Andreasson 127A Earle Hall (864) 656-3056 <u>afloyd@clemson.edu</u>
GRADUATE STUDENT SERVICES COORDINATOR:	Diana Stamey 200 Earle Hall (864) 656-1182 <u>short@clemson.edu</u>
UNDERGRADUATE STUDENT SERVICES COORDINATOR:	Joy Rodatz 127 Earle Hall (864) 656-3055 jrodatz@clemson.edu
UNDERGRADUATE STUDENT SERVICES COORDINATOR/GRAPHICS COMM:	Caitlin Clark 127 Earle Hall (864) 656-0822 <u>cac4@clemson.edu</u>
LAB EQUIPMENT/SAFETY SPECIALISTS:	William (Bill) Coburn <u>wcoburn@clemson.edu</u> William (Chad) Marcengill <u>wmarce@clemson.edu</u> G12 Earle Hall (864) 656-2056
AICHE CHAPTER ADVISOR:	Dr. Chris Kitchens 130 Earle Hall (864) 656-2131 <u>ckitche@clemson.edu</u>

GRADUATE ASSESSMENT PLAN

Doctor of Philosophy Student Outcomes

The Doctor of Philosophy program in Chemical and Biomolecular Engineering at Clemson consists of a blend of classroom instruction and research work designed to prepare graduates to accomplish our Program Educational Objectives. The program is designed to ensure that students achieve the following Student Outcomes by the time they graduate.

- I. Ability to conduct both fundamental and applied research successfully
- II. Ability to conceive a unique research project and formulate a research hypothesis, to design and conduct experiments to test that hypothesis, to analyze and interpret data, and to state the importance of the results/findings in the context of the broader field
- III. Ability to function effectively within a culturally diverse, interdisciplinary educational and research environment
- IV. Understanding of professional and ethical responsibility in the conduct of research
- V. Ability to communicate technical knowledge proficiently both orally and in writing
- VI. Preparedness for service within chosen profession

Indicators

Our PhD graduates will

- 1. publish or submit at least five papers in refereed journals
- 2. present and defend before a faculty committee a research plan and research results, analysis and conclusions
- 3. present three papers at a national, international or regional scientific meeting
- 4. present one departmental seminar or graduate student symposium talk that is judged successful by a faculty panel
- 5. complete at least twelve hours of course work outside of the Department of Chemical and Biomolecular Engineering and have at least one external faculty member, to include an adjunct professor appointed in Chemical and Biomolecular Engineering, on the research advisory committee
- 6. participate in a professional society
- 7. interact professionally and socially with the faculty and their peers
- 8. complete training in the responsible conduct of research
- 9. indicate that they were well prepared to practice chemical engineering at the PhD level
- 10. demonstrate technical knowledge in the discipline pertaining to the three core chemical engineering courses (thermodynamics, kinetics, transport)

Master of Science - Thesis Option Student Outcomes

The Master of Science program in chemical engineering – thesis option – at Clemson consists of a blend of classroom instruction and research work designed to prepare graduates to accomplish our Program Educational Objectives. The program is designed to ensure that students achieve the following Student Outcomes by the time they graduate.

- I. Ability to conduct both fundamental and applied research successfully
- II. Ability to design and conduct experiments to test a hypothesis, to analyze and interpret data, and to state the importance of the results/findings in the context of the broader field
- III. Ability to function effectively within a culturally diverse, interdisciplinary educational and research environment
- IV. Understanding of professional and ethical responsibility in the conduct of research
- V. Ability to communicate technical knowledge proficiently both orally and in writing
- VI. Preparedness for service within chosen profession

Indicators

Our MS graduates will

- 1. publish or submit at least one paper in a refereed journal (unless the research is proprietary)
- 2. define, plan, conduct, and defend a research project successfully before a faculty advising committee
- 3. make at least one research presentation in graduate seminar, a research symposium, regional, national, or international meetings
- 4. complete at least two elective courses outside of the Department of Chemical and Biomolecular Engineering
- 5. participate in a professional society and attend one meeting prior to graduation
- 6. interact professionally and socially with a culturally diverse group of graduate students
- 7. complete training in the responsible conduct of research
- 8. indicate that they were well prepared to practice chemical engineering at the MS level

Master of Science - Non-Thesis Student Outcomes

The Master of Science program in chemical engineering – non-thesis option – at Clemson consists of a classroom instruction designed to prepare graduates to accomplish our Program Educational Objectives. The program is designed to ensure that students achieve the following Student Outcomes by the time they graduate.

- I. Master fundamental principles of chemical engineering
- II. Demonstrate breadth of understanding of engineering principles
- III. Understanding of professional and ethical responsibility in the conduct of research
- IV. Ability to communicate technical knowledge proficiently both orally and in writing
- V. Preparedness for service within chosen profession

Indicators

Our MS graduates will

- 1. complete chemical engineering courses in kinetics, thermodynamics and transport
- 2. complete at least two elective courses outside of the Department of Chemical and Biomolecular Engineering
- 3. interact professionally and socially with a culturally diverse group of graduate students
- 4. complete training in the responsible conduct of research
- 5. indicate that they were well prepared to practice chemical engineering at the MS level

I. GENERAL INFORMATION

Many of the items below are presented in more detail throughout the manual. They are provided here, in alphabetical order, for quick reference.

<u>CEGSO</u>

Graduate students also are encouraged to participate in CEGSO: Chemical Engineering Graduate Student Organization. CEGSO is a student-run organization that represents all Chemical Engineering graduate students.

Computer Access

Each student is provided access to most computer facilities of the University through a User ID number assigned at the time of enrollment. Some mainframe capabilities require special account numbers that may be obtained by securing a request form from the Student Services Coordinator or Clemson Computing & Information Technology (CCIT) and getting it approved by the major advisor or Department Chair. See the Section on computer policies.

Departmental Mail Box

Each graduate student is furnished with an assigned mailbox in the Graduate Student Mailroom (120 Earle Hall). Please check your mailbox regularly to avoid accumulation.

Dress

During normal office hours, students are expected to be neatly dressed. Laboratory attire should be safe and functional, as well as neat.

Equipment Use and Modification

Students may use existing equipment in various laboratories only after obtaining permission from the faculty member in charge of the laboratory, or the Department Chair for equipment in the Unit Operations Laboratory.

No instrument/piece of equipment is to be modified in any way without the express permission of a faculty member.

Faculty Offices

A list of faculty offices is posted at the entrance to Earle Hall. Faculty members are available to students during office hours and by appointment. Please knock before entering faculty offices.

Final Check-out

When a graduate student leaves the University due to graduation or other reason(s), the following steps need to be followed concerning the department:

- a. Turn in all keys to the Security Coordinator.
- b. Be sure that all Department equipment and supplies are returned.
- c. Be sure that any portion of the laboratory/office occupied by the student is clean and ready for another occupant. Please leave your laboratory/office in the condition you would have like to have found it originally.
- d. Inform the Department Chair that you are leaving and confirm that you have complied with all regulations.

- e. Complete the Departmental Graduate Student Final Check-Out Form (see section on forms). Copies may be obtained from the Student Services Coordinator. No student will be cleared with the Graduate School until the Check-Out Form has been completed.
- f. File a change of address with the University post office.

Graduate Assistants

Graduate Assistants normally are appointed within the department as Research Assistants or Grading/Teaching Assistants in adherence with the departmental policy (Appendix G). The specific duties of a Grading/Teaching Assistant are assigned by the Department Chair/Graduate Coordinator.

The Research Assistant works for a faculty member. During semesters when the student is taking courses, the work load is determined in consultation with the advisor. The time spent during a particular week may be allowed to fluctuate as a result of coursework requirements. The Research Assistant works full time during the summer and when not taking courses. In most cases, the work that the student does for a stipend may serve as the basis for the student's own thesis or dissertation. The amount of time allowed for writing the student's thesis or dissertation is determined in consultation with your advisor.

Regardless of a Graduate Assistant's assigned tasks as a Grading/Teaching or Research Assistant, situations will arise when the department may need an extra "pair of hands" to help a technician or faculty member move a piece of equipment, or aid the department in recruiting or conducting a high school program, etc. Graduate students may be asked to help in such situations. It is normal duty for a graduate student to proctor a quiz for a professor who is away from the campus, providing the student's advisor approves. It is department policy that only doctoral students may be asked to lecture in the absence of a professor, and then only with the approval of the student's advisor and the Department Chair.

Graduate Student Offices

Graduate students are assigned office space in Earle Hall. See the Graduate Student Services Coordinator for Office Assignments.

Graduate Student Work Week

The department expects each student to approach his or her graduate study in a professional manner. The department expects all graduate students to put in at least five 8-hour work days per week. Graduate students will <u>not</u> take all holidays allowed to undergraduate students. Graduate students will follow the university employee holiday schedule.

Military or other Leave

If you plan to take such leave at any time, please let the Student Services Coordinator know the inclusive dates. Short periods can be taken as regular vacation with no interruption in pay (see Vacation below), but students leaving the campus for extended periods must obtain written permission from the Graduate Dean to be excused from the continuous enrollment provision.

Office Supplies

Graduate students furnish their own office supplies, as these are not provided by the department. However, if a graduate student needs office supplies to accomplish duties as a teaching assistant, then these are available from the department (see the Student Services Coordinator for assistance).

Ordering Equipment or Supplies

See Appendix on Procurement in this handbook.

Personal Packages Delivered at Earle Hall

The Department assumes no responsibility for personal packages delivered to Earle Hall. The staff will exercise due care with U.S. Mail, especially First Class, but if a student or faculty member gives Earle Hall as an address for the delivery of personal items, he or she assumes responsibility.

Political and Religious Activities

The University cannot engage in political and religious activities. Therefore, it is departmental policy that no political or religious signs will be displayed in Earle Hall.

Research Notebooks

Unless otherwise specified by a research advisor, students will use a Laboratory Notebook 43-649 by National or its equivalent. Notebooks must remain in the building in which the student maintains a research office. Generally this is Earle Hall. Notebooks remain with the faculty advisor upon student graduation.

Student Chapter of AIChE

The meetings of the Clemson Student Chapter are open to all graduate students. Graduate students are invited and encouraged to participate in AIChE social activities. Application forms for membership in AIChE may be obtained from the departmental office or the AIChE chapter advisor. Graduate students are urged to associate themselves with the National Institute (www.aiche.org) and with the Western South Carolina Section (www.wscaiche.org).

Submitting Graduate School Forms

All forms submitted by students to the Graduate School should be typed. Forms can be found at https://www.clemson.edu/graduate/students/forms.html. With the exception of the GS5D and GS7, most forms can be processed on the computer with the final version printed. The GS5D and GS7 are the examination forms that must be filed by the department with the appropriate signatures.

Travel Supplements

Limited funding in the form of travel supplements is available from the Department to support graduate students who wish to attend a conference. These supplements are intended for students who otherwise do not have funding to travel to a conference. Students must meet the strict eligibility requirements given in Section XIV of this manual to be considered for a travel supplement. The Graduate Studies Committee will make decisions on all eligible requests.

Vacation

Graduate students may take 10 days vacation per calendar year. Prior approval must be obtained from the student's advisor before any vacation time is taken. Beware of buying nonrefundable plane tickets for vacation travel without first talking with your advisor. Also refer to Section XIV.

II. REGULATIONS PERTAINING TO EARLE HALL

Building Maintenance

Report any building problems to the Lab Equipment/Safety Specialist. If something major is found wrong outside of normal office hours, call the University Policy at 656-2222 and then inform the Department Chair.

Building Security

Earle Hall is locked at night on weekdays, and all day on weekend days. As you enter and leave the building, be sure that all doors shut behind you. During the work week, the front and side doors on the main level are normally unlocked. <u>On football weekends, the building will be locked from 6:00 PM Friday to 8:00 AM Monday</u>. Persons entering or leaving Earle Hall on those days should ensure that all doors are locked behind them.

Departmental Copiers

Graduate students may use the departmental copiers for necessary research work. However, excessive use should be avoided. In particular, multiple copies of thesis or dissertation drafts should not be made on the departmental copier.

Departmental Files

All departmental files are confidential and should only be accessed by the appropriate faculty or staff.

Departmental Office

The Department Offices are 127 and 200 Earle Hall. Graduate students are welcome to ask the departmental staff for assistance.

Ice and Distilled Water Supply

Ice and distilled water are available. Detailed instructions for operating the still are attached to the unit. If you turn the still on and off, sign the sheet provided by the unit. Please contact the Lab Equipment Specialist, Bill Coburn for training and to report difficulties.

<u>Keys</u>

Each graduate student will be issued a key to his or her office/laboratory and card access to the outside doors. Keys to specific research laboratories will be issued upon obtaining permission from the faculty member in charge of the lab. Students leaving the University through graduation, or for any reason, <u>must return all keys to the Lab Equipment/Safety Specialist</u>. Unauthorized possession of a key to a University building is prohibited by South Carolina Law. Students are responsible for locking all rooms they have been using.

Laboratory and Office Maintenance

The custodian will confine his or her attention to cleaning the lab-office floor and emptying the waste basket. The occupants are required to keep the remainder of the laboratory-office in order. Keep the top of the laboratory bench neat and clean. <u>The small window in the laboratory door is not to be obscured or covered for any reason</u>.

Liquid Nitrogen

Liquid nitrogen is available. Prior to use, you must receive proper training from the Lab Equipment/Safety Specialist. Report any difficulties to the Lab Equipment/Safety Specialist.

Office Telephones

Students should use departmental office telephones for business and emergencies. Personal calls should be taken on mobile phones whenever possible.

III. SAFETY REGULATIONS

Safety is everyone's business and is priority number one. Graduate students are expected to adhere strictly to all safety regulations.

Responsibilities

<u>Lab Equipment/Safety Specialist.</u> The Lab Equipment/Safety Specialist will give overall supervision of Safety Training issues and perform an accuracy audit of the training file twice a year (July and October). The Lab Equipment/Safety Specialist will assist the PIs and employee/students in Safety Training issues, will provide training record forms for each new employee/student, will keep the training file, assure the training records are in place, and assist in the accuracy audit.

<u>Principal Investigators (PIs)</u>. The PI is the faculty member responsible for the research lab. They are ultimately responsible for safety in the lab. The PIs should determine which training is required and assure training is accomplished. PIs should give all new Employees/Students a lab specific orientation including safety concerns.

<u>Employee/Student.</u> The Employee/Student will receive the training, update the office file, and follow the safety procedures.

Chemical Hygiene Plan

Adhere to all safety aspects of the "Chemical Hygiene Plan by Clemson University". The "Chemical Hygiene Plan by Clemson University" can be found in your lab. (Inform the lab PI if no copy is available in a lab.) A copy is also kept in the Chemical Engineering Office. See Lab Equipment/Safety Specialists for additional information.

Comprehensive Environmental Health and Safety Plan

Clemson University has a Comprehensive Environmental Health and Safety Plan. This Plan has been approved by the Clemson University Administrative Council, and applies to all Clemson University Faculty, Staff, and Students, as well as all activities carried out on Clemson property regardless of Clemson affiliation. All sections of the plan, including the chemical hygiene plan, can be found online at https://www.clemson.edu/research/safety/comp_plan.html

Disposal of Solvents

Under no circumstances will organic solvents be dumped down a drain. If you are using solvents, secure a container which can be tightly sealed and store waste in that container until the entire contents can be disposed of by Environmental Health and Safety. University Policies concerning hazardous waste storage and disposal will be followed.

Experimental Work

Before starting experimental work, each student is <u>required</u> to complete the appropriate safety training as designated by the Clemson Hazard Communication Plan and the professor in charge of the lab.

Fire Extinguishers

Only students with proper training may use the fire extinguishers. For details, contact the Lab Equipment/Safety Specialist.

First Aid Kits

First aid kits are located on each level of the Unit Operations Laboratory and in the Shop. Individual research laboratories should maintain first aid kits. If yours does not, then contact the PI of the lab to provide one. Seek further aid at Redfern Student Health Center (phone 656-2233) if needed.

Flammable Chemicals

Only the absolute minimum quantity of any flammable chemical is to be stored in any laboratory. Bulk quantities of such chemicals must be kept in the outside Chemical Storage House behind Earle Hall.

Gas Cylinders

If your work requires the use of a gas cylinder, you must familiarize yourself with the departmental "Standard Operating Procedure" (SOP) on handling these cylinders. A copy of the SOP appears as Appendix A in this manual.

Housekeeping Policy for Earle Hall

See Appendix on Housekeeping.

Mercury

Check with the Lab Equipment/Safety Specialist prior to the use and handling of mercury.

Redfern Student Health Center

In the event of serious injury, immediately notify your faculty advisor and/or Department Chair, and seek assistance by calling 911 or the Student Health Center (phone 656-2233).

Safety Shower Chains

Chains on safety showers are not to be coiled around the valve just to keep them out of the way. If so coiled, the shower is not available for emergency use.

Safety Signs

Safety signs are hung in various places in Earle Hall and must always be obeyed. Safety signs with a yellow background and red lettering are hung in various places in the Unit Operations Laboratory. When equipment having a sign is operated, the cloth covering the sign will be removed. When the equipment is shut-down, the cover will be replaced. If a graduate student erects equipment requiring a safety sign, he or she will arrange with his or her advisor to have a safety sign hung.

Smoking

Smoking is not allowed in any classroom, hallway, laboratory, or other public space. See Appendix F for smoking policy.

Unit Operations Laboratory

Hard-hats <u>must</u> be worn whenever one is working in the Unit Operations Laboratory in the area beyond the "blue line". Hats are stored in a rack on the top level of the laboratory. Safety glasses are stored in the same rack and eye protection <u>is required</u> in the area beyond the blue line. DO NOT wear contact lenses in areas where vapors or fumes may be present.

IV. SAFETY TRAINING

All Clemson employees/students who work in Research Labs in Earle Hall must take the appropriate Safety Training and be oriented by the PI ("Principal Investigator", usually the Professor in charge of research) responsible for the lab. (The only exceptions are Custodial and Facilities Maintenance Staff.) This section will outline the responsibilities to assure proper training is received.

1) General

There is a file in the Lab Equipment/Safety Specialist Office containing Safety Training Records for each Employee/Student, grouped by PI. This file should not leave the office. A Safety Training Record must be completed and placed in the departmental safety training file. A copy of a Training Record is given in the Forms section of this handbook.

2) Questions

Employees/students with questions about safety training can contact the lab PI or the Department Lab Equipment/Safety Specialist.

3) In-House Training

Some training can be received in the building. Contact the Lab PI or the Department Lab Equipment/Safety Specialist.

4) Environmental Health & Safety Training

EH&S training can be received in class form by contacting Jim Greiger (jgriege@clemson.edu), or on-line at https://www.clemson.edu/research/safety/traininggateway.html.

V. INFORMATION ON ACADEMIC PROGRAMS

A complete list of Chemical and Biomolecular Engineering courses generally available for credit to Chemical Engineering graduate students is given in the Graduate Announcements. The course requirements for the MS and PhD programs as well as other information are given below. Note that in all cases the term "credits" refers to semester credit hours. Note also that individual student programs must be recorded with the Graduate School using Form GS-2 (see Section V) found at the following web address https://www.clemson.edu/graduate/students/forms.html

COURSE/CREDIT REQUIREMENTS FOR MS STUDENTS

Undergraduate Background. Although there are no specific undergraduate course requirements for students entering the MS program with a BS degree in Chemical Engineering, it should be clearly understood that many Chemical Engineering graduate courses presume knowledge of corresponding undergraduate material. In addition, evidence of such knowledge may be required of the student at the final oral examination for the MS degree with thesis option. A student may remove deficiencies by auditing the courses. In some cases, the student's committee may require undergraduate courses to be taken for credit.

Students who wish to earn the terminal MS degree in Chemical Engineering after obtaining a BS in Chemistry (or other non-ChE disciplines) will typically be required to take CHE 2110 (Fall 1, F1), CHE 2200 (Spring 1, S1), CHE 2300 (S1), CHE 3210 (Summer 1, Su1), CHE 3300 (Su1), CHE 4070 (F2) and CHE 4500 (F1) for credit. (Required course work for students who wish to earn the PhD degree after obtaining a BS in Chemistry is listed in the next section, "Course/Credit Requirements for PhD students".) Students with other undergraduate majors will be evaluated individually. An average grade of B, with no grade lower than C, is required in undergraduate courses taken for credit. Students must have a background in mathematics equivalent to that required for the BS degree in Chemical Engineering at Clemson (including Multivariable Calculus and Differential Equations), and must present evidence of such competence to their advisors via transcripts. Additional courses may be required and some course requirements may be waived depending on the students background.

MS Course Requirements.

There are two options for obtaining a MS degree in Chemical Engineering, a Thesis option and a Non-Thesis option. The MS program consists of 24 credits of courses, plus 6 additional credits. All MS degree students are required to complete the following:

CHE 8030, Advanced Transport Phenomena 3 cr CHE 8040, Chemical Engineering Thermodynamics 3 cr CHE 8050, Chemical Engineering Kinetics 3 cr Approved Technical Electives 15 cr Of the 15 cr approved technical electives, the following requirements must be met: 6 cr CHE/BMOL, 6 cr 8000 level graduate courses, 6 cr non-CHE/BMOL

Thesis Option: CHE 8910, Research 6 cr

Non-Thesis Option: ChE 8010, Graduate Research Skills & Ethics, 3 cr; plus 8000 level Approved Technical Electives, 3 cr (9 cr total including previous stated requirements).

The elective courses chosen by the student must be approved by the student's advisor, his or her advisory committee (Thesis option), the Chemical Engineering Department Chair, and the Dean of Engineering (use GS Form 2). A minor is not required for the Masters degree, but up to nine credits of approved, technical courses outside of the department may be included in the MS program. If the student chooses to list a formal minor, the courses offered for the degree must be approved by the head of the minor department.

Chemical Engineering graduate students may not apply required undergraduate Chemical Engineering courses which carry 600 level graduate credit to an advanced degree. However, a student may take elective undergraduate Chemical Engineering courses which carry 600 level graduate credit. In addition, courses which are essentially equivalent to required undergraduate courses in the current University catalog cannot be used to satisfy the elective requirements.

COURSE/CREDIT REQUIREMENTS FOR PHD STUDENTS

(Interim policy by Graduate School on PhD degree, length (credit requirements))

The advisory committee aids the student in developing a degree curriculum which includes the selection of specific courses and their sequence (documented using Form GS-2). At Clemson University, a minimum of 30 credits past the masters and 60 credits past the bachelors degree are required for the doctoral degree. A minimum of 24 hours of doctoral research is required. Should the direction of study or research interest change, the student may request the appointment of a new advisor. Coursework leading to the Doctor of Philosophy/Education degree is planned to give the student a comprehensive knowledge of his/her field of specialization and a mastery of the methods of research. The degree is not awarded solely on the basis of coursework completed, residence, or other routine requirements. The final basis of granting the degree is the student's grasp of the subject matter of a broad field of study, competence in planning and conducting research, and ability to express him/herself adequately and professionally orally and in writing.

The PhD is a research degree, and thus specific course requirements are set by the student's advisory committee (using Form GS-2) to prepare the student for research. Nevertheless, all student programs must meet all Graduate School requirements, and the following departmental requirements:

a. Each doctoral student, including those in the direct PhD program, must satisfy the MS course requirements through courses taken at Clemson or elsewhere. Students with a BS in majors other than Chemical Engineering who would like to obtain a direct PhD in Chemical Engineering are required to take these prerequisites: CHE 2110 and 4500 in the fall of the first year, CHE 2200, 2300, in the Spring of the first year and CHE 3300 in the

Summer or Fall of the second year. Students enrolling in the Spring Semester will need to consult with the Grad Coordinator for their plan of study. Upon consultation with the Graduate Studies Committee, prerequisite courses may be waived.

- b. In addition to MS coursework requirements, each doctoral student must complete at least 6 credits of approved graduate courses (800 level) at Clemson.
- c. Each doctoral student must complete at least 30 credits of approved graduate courses beyond the BS, including at least 6 credits of approved graduate courses at Clemson University and at least 12 credits outside CHE/BMOL.
- d. Each doctoral student must satisfactorily complete at least 30 research credits, including at least 24 doctoral dissertation research credits (CHE 9910) taken at Clemson.

These items establish <u>minimum</u> coursework and research credit requirements necessary for the PhD in Chemical Engineering. Each student's advisory committee will prescribe sufficient coursework to supplement and reinforce the student's research effort.

MINIMUM ENROLLMENT

In general, all students must enroll in a minimum number of hours to be eligible to receive financial aid (fellowship and traineeships as well as assistantships.) The following Graduate School policy is in effect:

Graduate Assistants or Fellows enrolled in doctoral programs or in thesis-option master's programs must enroll in at least 9 credits in each of the regular semesters. Minimum enrollment in each summer session is 3 credits regardless of the degree objective. Approved undergraduate courses and research credits (CHE 8910 and 9910) may be included in the minimum credit load.

Graduate students should understand that the assistantship may be withdrawn at any time for failure to maintain satisfactory academic status.

RESPONSIBLE CONDUCT OF RESEARCH

All graduate students <u>must</u> complete training in the Responsible Conduct of Research (RCR). Students first complete online Basic Training on RCR at <u>https://www.citiprogram.org/</u>. Register as a new user and select, 'Take the Course in the Responsible Conduct of Research (RCR) for Engineers.' After completing the Basic Training, fill out the Clemson University RCR Training Form. Submit this form and a copy of your RCR Course Completion Report to the Student Services Coordinator for placement in your student file. Basic training must be completed in the first semester of employment.

In addition to Basic Training, students must complete a minimum of 5 hours of Advanced Training. These advanced training hours must be reported on the same Clemson University RCR Training Form. Advanced training must be completed in the first semester of employment. Students supported on NIH awards must complete 8 hours of Advanced Training within the first 12 months of support by the award(s).

GRADUATE SEMINARS

All doctoral students, except those enrolled in CHE 8010, <u>must</u> enroll in CHE 8950, Graduate Seminar, *each* semester in residence (it need not be listed on the GS-2). Time and place may vary from the schedule to suit outside speakers. Students generally will be required to make at least one presentation in the MS program and at least one presentation per year when enrolled in the PhD program. Appendix B has further information.

REGISTRATION FOR CLASSES

Registration for all classes is done online. It is suggested that new graduate students contact an experienced graduate student to be conducted through the mysteries of matriculation and registration. Graduate students who register late will have to pay the late registration fee.

REMEMBER: You must obtain your advisor's approval for your summer school program before registration dates. Since faculty members may be absent in the summer, be sure to do this sufficiently in advance.

WORK IN ABSENTIA AND INDUSTRIAL INTERSHIP STUDENTS

Graduate students in Chemical Engineering finishing their thesis/dissertation in absentia must register for one (1) credit of CHE 8900, 8910 or 9910 the semester immediately prior to graduation. Except for industrial internship students, work done in absentia will be approved only in exceptional circumstances. Normally a student will complete all work toward a degree before he or she leaves the campus and, in addition, will personally attend to all administrative details required by the Graduate School and the department before he or she leaves the campus (see check-out form in Forms section of this handbook). Doctoral students interested in industrial internships must seek approval from their research advisor.

FREQUENCY OF GRADUATE COURSES

Graduate courses generally are offered once per year, and, in some cases, less frequently. Please plan accordingly when developing a coursework plan.

SELECTED TOPICS COURSES

Under courses numbered CHE 6450 and 8450, the Department is prepared to offer the following topics:

- a. Catalysis
- b. Advanced Numerical Methods in Chemical Engineering
- c. Advanced Mass Transfer
- d. Polymeric fibers and films
- e. Green Engineering
- f. Computational Chemistry
- g. Metabolic Engineering
- h. Energy Storage
- i. Other topics suggested by students are welcome.

PHD COURSES BY MS DEGREE STUDENTS

An MS student may apply for admission to the PhD program and, if admitted, may take courses toward the PhD degree if approved by his or her advisor.

ENGLISH FOR FOREIGN STUDENTS

If the graduate advisor feels a foreign student should improve his or her English skills, the student must register for English 1110 - English as a Second Language.

CONTINUOUS ENROLLMENT

Graduate students who do not maintain continuous enrollment (summers excluded) are subject to the requirements in effect at the time of their return. Only students who are enrolled are eligible to use University facilities and human resources. Note that minimum enrollment requirements must be met to be eligible for financial aid (see MINIMUM ENROLLMENT above). CHE 8900, 8910, or 9910, or GS799, may be used to effect continuous enrollment.

POLICY ON STUDENT DEPARTURE TIME

In the past numerous problems have developed when students have departed prior to completion of their thesis/dissertation. In some instances, the thesis/dissertation was never completed. The following summarizes the departmental position on this matter:

- a. The student is strongly encouraged to remain at the University until all requirements for the degree are met with the exception of the formal awarding of the degree.
- b. The student <u>should</u> remain at the University until a rough draft of his or her thesis/dissertation is approved by the advisory committee.
- c. As long as a student has any phase of his or her work uncompleted, the student must register for the appropriate research course in the department. If the student has completed all degree requirements including the final examination and submission of thesis or dissertation and is awaiting the awarding degree, he or she is not required to be enrolled in the Graduate School.
- d. Once a student leaves the campus, faculty members will not do any work in connection with thesis preparation, etc. That is normally done by the student. The student must make his or her own arrangements to have it done.
- e. It has been our experience that students who leave the campus prior to completing all degree requirements and ask a friend to run their thesis through the red tape mill are asking a lot of a friend.

VI. FACULTY ADVISORS AND ADVISORY COMMITTEES

Each graduate student must have a faculty advisor who also will be the chair of his or her advisory committee. The advisor must be a regular member of the chemical engineering faculty.

ASSIGNMENT OF ADVISORS

Each graduate student will be assigned a research advisor. This advisor will help the graduate student plan his or her degree program and will be available to answer any questions.

In some instances, a student may be assigned to a specific dissertation project before entering the university, in which case the director of the project will be assigned as advisor. Normally, however, the Graduate Coordinator is assigned as temporary advisor for new students. The student must discuss possible projects with faculty members and submit a "Thesis/Dissertation Topic Request" form to the Graduate Coordinator by the announced deadline. The form is given in the Forms section of this handbook. Based on this request and Departmental needs, each student is assigned a research advisor/project.

MS students interested in the Thesis Option must find an adviser to work with on their research project. MS projects and funding are not always available.

APPOINTMENT OF ADVISORY COMMITTEE

An advisory committee will be formed for each student by the advisor in consultation with the student. The advisory committee will approve the student's graduate curriculum, supervise his/her graduate program, administer the final examination, and initiate the recommendation for awarding the degree.

For thesis MS students, the advisory committee will be formed promptly after the appointment of the advisor and in all cases prior to registration for the student's second semester. The committee membership must total at least three, which a majority being regular members of the chemical engineering faculty. For the non-thesis MS degree, one advisor (typically the graduate coordinator) is appointed for guidance on coursework decisions.

For PhD students, the committee formation may be deferred until the beginning of the students 2nd year while the student and advisor make preliminary decisions about the scope of the student's research. Appointment is made (using Form GS-2) by the Department Chair, subject to the approval of the Dean of Engineering and Science and the Dean of the Graduate School. A minimum of four members is required for the PhD committee. The majority of the committee must be regular members of chemical engineering faculty, to include Adjunct professors appointed in Chemical and Biomolecular Engineering, and at least one external tenure-track faculty member is required. If the student declares a minor, a member of the faculty of the minor department must be included.

FILING GRADUATE DEGREE CURRICULUM (FORM GS-2)

A graduate degree curriculum (Form GS-2) must be filed with the Graduate School by each MS student within 4 months of entering the graduate program. PhD students must file the GS-2 Form before the end of their second semester in the PhD program. No pay form will be approved for a student who has not submitted a GS-2 Form by the set deadline. The GS-2 represents the formulation of an individual student's curriculum as approved by the advisory committee. It must adhere to Graduate School and departmental policies. Courses in excess of those required by the advisory committee for the degree should not be listed on the curriculum. The committee determines the plan of study in light of the student's prior education and the proposed thesis problem. Any questions concerning undergraduate deficiencies, transfer of graduate credit, special departmental requirements, etc., should be resolved at this time. Normally, the chair of the student's advisory committee arranges a committee meeting with the student to discuss the plan of study and the proposed thesis project.

Committee approval of the student's plan of study is indicated by signing the GS Form 2. It must also be approved by the Chemical Engineering Department Chair, the Minor Department Chair (if applicable), the Dean of Engineering and Science, and the Graduate School Dean. The forms and instructions for completion are online as a fill-in form at https://www.clemson.edu/graduate/students/forms.html.

REVISION OF COMMITTEE MEMBERSHIP AND GRADUATE CURRICULUM

The graduate degree curriculum may be revised as needed subject to the necessary approvals. Similarly, it is occasionally necessary to change committee membership. In either case, a revised GS-2 must be submitted. However, because of the complexities of funding sources for graduate student support, change of major advisor will be permitted in only the most unusual circumstances.

ADHERENCE TO TIME SCHEDULE

Failure to meet the deadlines given in the sections above is grounds for suspension of the student's stipend. Earlier completion is encouraged.

VII. PROCEDURES FOR CHEMICAL ENGINEERING MS STUDENTS

[as an example, deadlines in square brackets apply to students entering in August]

The complete set of procedures, administrative and otherwise, for MS students are given below. Some duplication between this section and other sections of this manual may occur.

FILING GRADUATE DEGREE CURRICULUM GS-FORM 2

The graduate degree curriculum, the student's specific program of study, must be filed within 6 months of entering the graduate program [Feb. 15]. No pay form will be approved for a student who has not submitted a Form GS-2 by this deadline. See Section V for further information. NOTE: This, and most other graduate forms may be found on the graduate school website https://www.clemson.edu/graduate/students/forms.html_.

APPOINTMENT OF ADVISORY COMMITTEE

Section V of the Manual gives procedures for assignment of the student's advisor and advisory committee.

For MS students with a thesis option, a committee meeting is to be held within 7 months after filing the GS-2 form. In this meeting, the student should present an introduction to the problem, major research objectives, and preliminary plan of investigation. It will be understood by the student and the committee that the direction of the investigation may deviate from the preliminary plan. Student will write a post-meeting memo to the committee members summarizing the main points of the meeting and listing "things to do" (along with estimated completion dates) [July 15].

THESIS PREPARATION

See Section X of this Manual for policies and suggestions on thesis preparation and reproduction.

FINAL EXAMINATION

Each candidate for the Master's degree with the thesis option, after the completion of the required thesis and at least 3 weeks before the degree is to be awarded, must pass a final examination and will notify the Graduate School Office of the place and time at least 10 days prior to the examination.

The examination, which is typically oral, will ascertain the general knowledge of the candidate with particulate reference to the major and minor subject and the thesis. All members of the faculty will be invited to participate in the examination. Within 3 days after the examination, the examining committee will notify the Dean of the Graduate School of its findings using Form GS7M. See Section X for more details.

SUBMITTAL OF THESIS TO GRADUATE OFFICE

Thesis is now submitted online (check <u>https://www.clemson.edu/graduate/students/theses-and-dissertations/index.html</u>). As a courtesy, the student should give a bound copy of the thesis to the advisor and one to the department. If the student desires, he or she may have additional

copies of his or her thesis bound at an additional cost per copy. The responsibility for placing the thesis in proper final form rests with the student.

APPLICATION FOR GRADUATION AND ORDERING OF THE DIPLOMA

A formal application for graduation and ordering of a diploma must be placed by the student with the Dean of Admissions and Registration in accordance with the deadlines established by the Graduate School (form GS4). A diploma fee must also be paid. Arrangements should be made at this time for cap and gown rental.

LENGTH OF TENURE

The Department considers three academic semesters plus a summer or four semesters sufficient time in which to obtain an MS degree with thesis option. Students completing an MS degree with non-thesis option can typically complete their degree requirement in three semesters, one of which may include the summer term. The Graduate School requires that all course work which is to be credited toward any of the master's degrees must have been enrolled in and completed within 6 calendar years prior to the date on which the degree is to be awarded.

CHECK LIST

The MS student check list is included on the following page.

Check List for MS Seeking Students in Chemical Engineering

WHAT	WHEN	HOW	DATE COMPLETED
Appointment of	By the end of the 6 th full	Departmental form in	
advisor	week of residence*	handbook	
DCD training	Duthe and of the 1st	CITI enline training and	
KCK training	regular semester	advanced training. Use	
		RCR form.	
Appointment of	Within 6 months of	In consultation with	
committee	program*	form	
Filing of graduate	Within 6 months of	In concultation with	
degree curriculum	entering graduate	maior advisor and	
(GS-2 form)	program*	committee	
Committee	Within 7 months after	Student sets up meeting	
meeting	filing the GS-2 form	with committee	
Submission of	A minimum of 2 weeks	Student delivers a hard	
thesis to	prior to final exam for	copy to each committee	
committee	committee to review.	member	
Final examination	At least 3 weeks prior to	Scheduled by major	
	expected	Results submitted to	
		Graduate School on GS-	
		7M form	
Submission of	Prior to deadline	Delivered by student	
final thesis to	established by graduate		
graduate school	school		
Application for	By deadline established	By student using GS-4	
diploma order			
Departmental	Before departure	Departmental form in	
check-out		Forms section of this	
		handbook	

* Most deadlines apply to MS students with the thesis option.
** Failure to complete on schedule is grounds for suspension.

VIII. PROCEDURES FOR CHE STUDENTS SEEKING THE PHD DEGREE

[as an example, deadlines in square brackets would apply to student entering in August]

The procedures, administrative and otherwise, for the PhD student are given below. Additional information for the special case of part-time or off-campus PhD students is given in Appendix D. Those students who completed a MS at Clemson and did not indicate on their original application for admission that they would study for the PhD degree, must apply to the Graduate Office through the Department Chair.

APPOINTMENT OF ADVISORY COMMITTEE

As noted in Section V, the student's advisory committee must be appointed prior to registration for his/her third semester. PhD advisory committees must consist of at least four faculty. See current Graduate School Announcements for makeup of committee.

A committee meeting is to be held at least every 12 months after passing oral comprehensive exam. Student will write a post-meeting memo to the committee members summarizing the main points of the meeting and listing "things to do" (along with estimated completion dates).

FILING GRADUATE DEGREE CURRICULUM – FORM GS2

The GS-2 form (graduate curriculum) must be filed no later than the beginning of the Fall semester of the second year in the graduate program. No pay form will be approved for a student who has not submitted a Form GS-2 by this deadline. Note that this form can be revised if the focus of the student's research, or course availability, dictates changes. See Section V for more details.

GUIDELINES FOR ASSESSING STUDENT QUALIFICATION FOR DOCTORAL CANDIDACY

It is the responsibility of the student to become familiar with these guidelines and to complete all requirements described therein.

(a) Criteria

Advancement to doctoral candidacy is obtained through the following criteria:

 Earn grades of B or higher in core graduate chemical engineering courses at Clemson (CHE 8030, CHE 8040, and CHE 8050). Students who have earned MS degrees from other institutions who have earned grades of B or higher in graduate-level chemical engineering transport, thermodynamics, and kinetics courses can petition the GSC to waive this requirement. To do so, they must provide the syllabi from the courses that they would like to use as substitutes. The GSC will consider the syllabi and the student's undergraduate and graduate transcripts in their decision. The GSC will determine if graduate courses taken outside Clemson are suitable substitutes.

- 2. Prepare an original written proposal on the student's research topic that is approved by the examining committee (student PhD Advisory Committee listed on GS-2) using defined evaluation criteria.
- 3. Pass a jointly convened oral defense of the proposal and comprehensive oral examination on the student's research topic using defined evaluation criteria.
- 4. Receive a positive assessment by the research advisor.

(b) Eligibility

Students must be in good academic standing to take the oral comprehensive exam. To remain in good standing, graduate students must maintain an overall 3.0 GPR for all courses taken. Students whose overall graduate GPR falls below 3.0 are placed on academic probation. A student who is placed on academic probation may petition the Graduate Studies Committee to take the oral comprehensive exam. The petition must be submitted in writing to the Graduate Coordinator not later than 2 weeks before the start of the semester in which the exam is planned. A decision will be communicated to the student as soon as possible.

(c) Procedural details

- A student not earning a B or higher in a core graduate chemical engineering course will need to address deficiencies at the undergraduate level and then retake the graduate course and earn a B or higher. The instructor will provide the GSC with feedback on the student deficiency. The GSC will decide which undergraduate course(s) the student must take to demonstrate core competency according to department standards. Failure to earn a C or better in the undergraduate course(s) is considered grounds for dismissal.
- 2. The written proposal will be a justification of the student's research plan. The outcomes to be demonstrated are the understanding of the literature in field, the analysis of preliminary data, and the connection of the proposed work to the fundamentals of chemical engineering.

The format and length restriction of the proposal must follow the "Graduate Research Plan Statement" defined in the Program Solicitation for the National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP). However, there is no length requirement for the written proposal. It is expected that the student and the advisor will have discussed the research topic, including literature studies and preliminary results. However, the student will not receive help from the advisor for the preparation of the written proposal.

The proposal will be evaluated by the student's PhD advisory committee (as listed on the GS-2 form), which includes the research advisor. Additional regular faculty members in the Chemical and Biomolecular Engineering department may also review the proposal. Evaluation will be done in the form of a written review using the National Science Board

approved merit review criteria described in the Program Solicitation for the NSF GRFP. An average review rating of "Good" is required for approval, defined as follows:

Excellent: Outstanding proposal in all respects
Very Good: High quality proposal in nearly all respects
Good: A quality proposal
Fair: Proposal lacking in one or more critical aspects; key issues need to be addressed.
Poor: Proposal has serious deficiencies.

A student not earning an average rating of "Good" *may* be given the opportunity to revise and resubmit the proposal once. The due date for such a revision will be communicated to the student by the review committee, and this will typically be within three to four weeks of receiving the initial review comments.

3. An oral comprehensive examination based on the student's research will follow approval of the written proposal. The exam will consist of a 15-20 min presentation by the student on her/his research topic, followed by a question/answer session lasting for a period of time determined by the examining committee.

Examination will be done by a committee of three faculty members (the student's advisor will not serve on the committee). The student will select the committee chair (preferably from the students GS-2 Committee). The chair must be a tenure-track ChBE professor. This committee chair will assist the student with coordinating the event, give general advice on the format of the exam and presentation, receive and distribute the advisor letter (see below), and ensure that proper forms ('Graduate Student Assessment Form' and 'Results of Doctoral Qualifying Exam Form') are completed by the committee and given to the Graduate Student Services Coordinator. Other members will be appointed by the Graduate Coordinator with advice from the Graduate Studies Committee. One committee member will serve as "expert" (familiar with the research topic area, possibly a student's GS-2 committee member). Two of the three must be tenure-track ChBE professors. The third member may be a tenure-track professor or adjunct faculty in any department (including ChBE).

It is expected that the student and the advisor will have discussed the research topic; however, the student will not receive help from the advisor for the preparation of the comprehensive exam presentation.

Electronic copies of the presentation, the written proposal, and the most relevant paper (from the literature) must be submitted to the examining committee three working days before the exam. Committee members may request hard copies of these documents.

The examining committee will evaluate the student's performance based on the following criteria:

- > The student could define the objectives of his/her research.
- > The student could interpret the work in the context of the broader field.
- The student had reasonable understanding of experimental/ modeling techniques. needed to validate any proposed hypothesis.
- > The student could interpret data and plots.
- > The student could state the significance and impact of the results/findings.
- > The student could propose a research plan for the duration of their PhD.
- > The student could discuss safety issues related to their work.

After a student has successfully passed the Oral Comprehensive, the committee chairman must submit a Form GS5D (results of the doctoral comprehensive exam and candidacy form) to the Dean of the Graduate School. The student will be informed of the results of the Oral Comprehensive by his or her committee chairman.

Should a student fail to pass the Oral Comprehensive, he or she may be given the opportunity to take it again if so recommended by the examining committee. A second failure shall result in the student being declared ineligible for the PhD degree in Chemical Engineering at Clemson University.

- 4. To assist with the evaluation of the student, the advisor should provide a memo to the student's oral comprehensive committee indicating what the student should be expected to know based on the scope of their research project.
- 5. The advisor will provide written feedback to the committee on student progress and aptitude for research. The advisor letter will assess the candidate as being acceptable or unacceptable. This letter will be taken into consideration by the faculty in assessing a student's qualification for doctoral candidacy. The advisor letter must be presented in a sealed envelope to the Oral Comprehensive committee chair prior to the Oral Comprehensive exam.

(d) Timeline

The written proposal will be due in electronic form to the Graduate Coordinator no later than 11:59 p.m. on October 1 of their second academic year in residence (i.e., a student admitted in August 2015 must submit the proposal by October 1, 2016). The research committee will have 2-4 weeks to review the written proposal.

* Students admitted to the program starting in the Spring semester must submit the written proposal in electronic form to the student's research committee no later than 11:59 p.m. on March 1 of their second academic year in residence (i.e., a student admitted in January 2016 must submit the proposal by March 1, 2017). The research committee will have 2-4 weeks to review the written proposal.

** Students entering the program with non-CHE BS degrees must submit the written proposal in electronic form to the student's research committee no later than 11:59 p.m. on March 1 of their second academic year in residence (i.e., a student admitted in August 2015 must submit the proposal by March 1, 2017). The research committee will have 2-4 weeks to review the written proposal.

The oral comprehensive exam must be taken (or scheduled) no sooner than 2 weeks and no later than 4 weeks after the written proposal is approved. Students must identify a chair for the oral comprehensive exam within 1 week after the proposal is approved and communicate their selection to the Graduate Coordinator.

ADMISSION TO CANDIDACY FOR THE DEGREE

Admission to the Graduate School does not qualify a student as a candidate for an advanced degree. Such candidacy depends on the acceptance by the Dean of the Graduate School of a written request for admission to candidacy. The request should be filed on a Form GS5D after successful completion of the oral comprehensive. The form must bear the signed approval of the committee chairman and all members of the exam committee.

The deadline dates for filing Form GS5D are given in the current Graduate School Announcements.

DISSERTATION PREPARATION

Section X of this Manual discusses policies and suggestions for dissertation preparation and reproduction.

FINAL ORAL EXAMINATION

The candidate for the Doctor of Philosophy degree must pass a final oral examination at least 3 weeks prior to the time of the convocation at which he or she plans to obtain the degree. The examination will be conducted by the student's advisory committee, and all faculty members are invited to participate. The student is responsible for notifying the Graduate School Office and the faculty of the Department of Chemical and Biomolecular Engineering of the time and place of the examination at least 10 days prior to the time scheduled.

The examination will begin with an open forum departmental seminar by the candidate. This seminar will be announced broadly. This presentation will be followed by a closed-session examination by the advisory committee and any other faculty members who wish to participate.

The final examination demands a broad and penetrating interpretation by the student of his or her research project and conclusions. It may (and more often does) include the examination of the student in his major and minor field(s) of specialization. See Section VIII for more details.

SUBMITTAL OF DISSERTATION TO GRADUATE OFFICE

Dissertations are submitted online. The student should check with the Graduate School for this date. As a courtesy, the student should present his or her advisor with a bound copy of the dissertation and one to the department. If the student desires, he or she may have additional copies of the dissertation bound at an additional cost per copy. The responsibility for placing the dissertation in the proper final form rests with the student. See Section X.

APPLICATION FOR GRADUATION AND ORDERING OF THE DIPLOMA

A formal application for graduation and ordering of a diploma must be placed by the student with the Dean of Admissions and Registration in accordance with the deadlines established by the Graduate School (Form GS4). A diploma fee must also be paid. Arrangements should be made at this time for cap and gown rental.

TIME REQUIRED FOR PHD DEGREE

Doctoral students normally require 3-4 years beyond the MS degree, or 4-5 years for those students entering the PhD program with only a BS degree. Please note that the Graduate School requires that certain milestones in the doctoral program be completed within a period of 5 years. (See The Graduate School Announcements.)

PHD CHECK LIST

For the convenience of the student, a check list is included on the following page.

WHAT	WHEN	ном	DATE COMPLETED
Appointment of advisor	By the end of the 6 th full week in residence*	Departmental form in Forms section of this handbook	
RCR training	By the end of the 1 st regular semester	CITI online training and advanced training. Use RCR form.	
Appointment of advisory committee	Before beginning of 2 nd regular year in residence*	In consultation with major advisor. Use GS-2 form	
Filing of graduate degree curriculum (GS-2 form)	Before beginning of 2 nd regular semester in residence*	In consultation with major advisor and committee	
Written proposal	October 1 of their second academic year in residence **	Administered by department	
Oral comprehensive	See section VII (c) and (d)	Student selects committee chair. Graduate coordinator selects other members.	
Committee meeting	At least every 1 year after passing the oral comprehensive	Student sets up meeting with committee	
Admission to candidacy for the degree	After successful completion of oral comprehensive	Form GS5D	
Submission of dissertation to committee	A minimum of 3 weeks prior to final exam for committee to review.	Student delivers a hard copy to each committee member	
Final examination (defense)	At least 3 weeks prior to date on which degree is expected	Scheduled by major advisor and student. Results submitted to Graduate School on GS-7D form	
Submission of final thesis to graduate school	Prior to deadline established by graduate school	Delivered by student	
Application for graduation and diploma order	By deadline established by graduate school	By student using Form GS-4	
Departmental check-out	Before departure	Departmental form in Forms section of this handbook	

Check List for PHD Seeking Students in Chemical Engineering

*Failure to complete on schedule is grounds for suspension of stipend.

**See VII(d) for students entering program in spring or with a non-CH E BS degree

IX. FINAL EXAMINATION

GENERAL PROCEDURES AND GUIDELINES

The following procedures and guidelines apply to the final examination for graduate school.

- a. The appointed committee will be the only faculty members to vote on whether or not a student is to be recommended for an advanced degree. Nonetheless, any faculty members attending the examination are entitled to participate in the questioning, and if any faculty member objects to the committee recommendation, such objection should be noted in the report to the Graduate School. In this connection, a minority report of the examining committee (or an outside report) is always in order.
- b. To encourage faculty attendance at student examinations, Chairs of examining committees will issue invitations to all Chemical Engineering faculty, and other faculty members who normally would be interested in the student's study or research area. Students may not attend the examination, **but** they may attend the presentation by the student immediately preceding the examination if they obtain the permission of the major advisor.
- c. A student's final examination is not concerned with the mechanical aspects of the thesis (e.g., grammar and literary style). These matters should have been noted and corrected prior to the examination period.
- d. A student standing an examination is expected to answer questions without the assistance of committee members.
- e. The examining committee must report to the Graduate School Office regardless of the outcome of the examination. The committee chairman should advise the student of the committee action. The student will be excused from the committee room while his or her case in under discussion.

INSTRUCTIONS FOR FINAL ORAL EXAMINATION

In preparing for the final oral examination, the student should note the following:

- a. The student may use over-head transparencies or a computer presentation program.
- b. Set up the projector ahead of time.
- c. Plan to give a presentation of your work in about 30 minutes. Somewhat longer times may be required if the audience contains a member not familiar with your work.
- d. Do not quote from tables, and use tables sparingly if at all in the presentation.
- e. Be sure to practice with some friends as critics.
- f. If a student leaves campus prior to his or her final oral examination he or she <u>must</u> arrange with a fellow student to handle such details as getting the thesis reproduced, assembling the copies in binders and distributing the final copies to committee members. Faculty members have been instructed not to do any of the above. As noted elsewhere in this manual, the department normally expects a student to remain on campus until all arrangements, administrative and otherwise, have been completed.

X. THESES AND DISSERTATIONS

Additional information on theses and dissertations is found in Section VII and VIII.

THESIS AND DISSERTATION FORMATS

A Guide for the Preparation of a Thesis or Dissertation is available at <u>https://www.clemson.edu/graduate/students/theses-and-dissertations/index.html</u>. In addition, the faculty recommends the use of the latest version of *The ACS Style Guide*; Dodd, J. S., ed.; Oxford University Press. The research advisor must be cognizant of departmental practices regarding the quality of the manuscript at the various review stages and of the wishes of the department chair, as an ex-officio committee member, to exercise the option of approving the thesis or dissertation in its final form.

THESIS AND DISSERTATION PREPARATION

Before beginning thesis preparation, the student should consult with his or her advisor. There are several alternative methods of thesis preparation, and the student should carefully consider these alternatives. Computers with word processing software are available in Earle Hall. Students with good typing skills may wish to consider using one of these for the initial draft of the thesis. However, an alternative is to provide the approved or at least improved draft of the thesis to a professional typist to put the thesis in final form. See the Graduate School for a list of recommended typists and the software that is utilized. This means that the student would be wise to make a draft using the same software that will be used by the typist. Copies of the draft thesis are not to be made on the departmental copier.

REPRODUCTION OF THESES AND DISSERTATIONS

A copy presented for reproduction should be the original, with clean, dark type, and containing no smudges. When graphs, charts, or diagrams are presented on the same page with typed text, the drawings and typing should both be done directly on the same sheet of paper, if possible.

SUBMITTAL OF THESIS OR DISSERTATION TO THE GRADUATE DEAN

Please refer to the latest Graduate School Announcements for details.

COST OF REPRODUCTION

The cost of typing and reproduction will be borne by the student unless his or her fellowship, or other support, specifically provides funds for this purpose.

SUBMITTAL OF THESIS OR DISSERTATION TO THE FACULTY COMMITTEE

The research advisor will determine when the manuscript is suitable for initial review by the remaining committee members. Committee members should be provided a <u>minimum</u> of 2 weeks to review an MS thesis and a <u>minimum</u> of 3 weeks to review a PHD dissertation. The defense may not take place prior to a minimum of 2 business days after the completion of the review process. During this time, the student should discuss the thesis or dissertation with the committee members, address any problems or concerns, and prepare for the final oral exam. It should be understood that a vote to pass a student on his or her performance at the final examination does

not imply final approval of the thesis or dissertation. Approval of thesis/dissertation is given by signing the Form GS7.

XI. THE CHEMICAL STORAGE SHED

There is an approved Storage Shed behind Earle Hall that is used for long-term storage of hazardous chemicals.

- 1) <u>Supervision</u>. The Laboratory Technician is the supervisor of the storage areas. In the discharge of his duties, he has the authority of a faculty member. Failure to comply with the rules and procedures associated with the storage area will result in the forfeiture of storage privileges.
- 2) <u>Access.</u> Access to the storage areas is restricted to the owners of the items stored and the students authorized to add or remove items.
- 3) <u>Dispensing.</u> Chemicals should not be dispensed in the sheds. Chemicals must be moved to (using a transportation safety vessel) and dispensed in an approved area.
- 4) <u>Ownership</u>. Chemicals in storage remain in the possession of, and the responsibility of, the owner who places the chemical in storage. Do not remove chemicals that belong to someone else without permission.
- 5) <u>Containers.</u> All chemicals in storage should be in proper containers. Secondary containment is suggested. Secondary containment is required for highly toxic, carcinogenic, reactive, etc., chemicals. Notify the chemical owner and the Department Technician if any container shows signs of failure or leaking, or if there is a spill.
- 6) <u>Segregation and Placement.</u> Chemicals must be segregated by compatibility for storage. There are three chemical storage rooms, one for each hazard class, Flammable, Oxidizer, and Corrosive. Poisonous and other (non-flammable) miscellaneous chemicals are stored in the Corrosive room. Liquid chemicals should not be stored above dry chemicals as to prevent contamination in the event of a leak or spill. Adequate aisle space must be maintained, and all chemicals must be readily accessible.
- 7) <u>Labeling.</u> All chemicals in the storage shed must be properly labeled. Unlabeled or improperly labeled chemicals will be disposed of as waste. A proper label includes the following:
 -Chemical Name
 -Owner
 -Date Received
 -Date Stored
 -Expiration Date
 -Hazards
- 8) <u>Inventory.</u> An accurate inventory is kept of chemicals in storage. Any time chemicals are added or removed from storage the inventory must be updated. MSDS sheets are needed for any chemical in the storage sheds.
- 9) <u>Grounding.</u> Metal containers in the Flammable Shed will be grounded when possible.

10) Procedure for Adding or Removing Chemicals from the Storage Shed.

- a. Obtain permission from the Lab Technician or faculty.
- b. Properly label all chemical containers as outlined above.
- c. Provide secondary containment for highly hazardous chemicals, and label the secondary containment in the same manner as the primary container.
- d. Separate chemicals by hazard type, and place chemicals in the shed using the guidelines listed above.
- e. Complete the Storage Add/Remove Log on the door of the storage room to update the Chemical Inventory.
- f. Provide MSDS Sheets for all new chemical types.
- g. Ground metal containers in the Flammables Shed.
- h. Be sure all doors to the storage shed are locked when leaving the area.
- i. Report any spills or damaged containers to the Lab Technician.

XII. THE DEPARTMENTAL SHOP

The shop exists to serve the faculty and students, but for the safety of personnel and to preserve the equipment, certain rules must be obeyed.

- 1) <u>Normal Working Hours.</u> The normal working hours of the shop is Monday through Thursday, from 9AM to 5PM and Friday 9AM to 4PM. The shop is closed for cleaning on Friday from 4PM to 5PM.
- 2) <u>Shop Supervision.</u> The Departmental Technician is the supervisor of the shop. In the discharge of his duties, he has the authority of a faculty member. Students should realize that the technician is here to be of assistance. Students working in the shop must have supervision from either faculty or the Departmental Technician. Students needing to enter the shop after normal hours must have faculty supervision.
- <u>Safety.</u> All safety rules must be followed in the shop. Failure to comply with normal rules will result in expulsion from the shop and other punitive measures as situations require. <u>Shop Safety Rules</u>
 - 1) Students may not use power tools without permission and supervision.
 - 2) Students must be approved for each power tool or piece of equipment they operate.
 - 3) Eye protection must be worn when operating power tools.
 - 4) Tools must be operated as intended in their design and with all safety devices in place.
 - 5) Projects may not be placed in the shop as to block isle space or hinder egress.
 - 6) Students must put away all projects and tools at the end of the work day.
 - 7) Students must clean up the shop area where they work when they are finished. This includes putting away hand tools, dusting chips from fixed tools, sweeping the floor, etc.
- 4) <u>Tools.</u> Students may not remove shop tools without permission.
- 5) <u>Supplies.</u> Students may not remove hardware items and other shop consumables without permission.
- 6) <u>Documentation</u>. Students should provide adequate drawings or plans for equipment to be built in the shop. A parts list is recommended.
- 7) <u>Painting and Gluing.</u> Painting and gluing is normally done either late in the day or not in the shop for ventilation reasons.
- 8) <u>Injuries.</u> Any injuries or accidents in the shop must be reported to the Laboratory Technician.
- 9) <u>Tool Repair</u>. Any tool that does not work properly or is need of repair should not be used and should be pointed out to the Laboratory Technician.

XIII. DUTIES AND RESPONSIBILITIES OF THE LABORATORY EQUIPMENT SPECIALIST

For the guidance of faculty members and graduate students the following shall define the duties of the Laboratory Equipment Specialist.

1. <u>Normal Work Area</u>. The Laboratory Equipment Specialist will consider his normal work area to be the Departmental Shop, Room G-14.

2. <u>Work Responsibility</u>. He will be responsible for building and maintaining all Unit Operations sized equipment and for building special purpose small items.

3. <u>Issuance of Supplies and Equipment</u>. The Laboratory Equipment Specialist will normally issue all items of hardware associated with pilot plant sized equipment (including pipe fittings, electrical parts, Unistrut, etc.). In addition, he will normally issue all bench scale equipment and supplies to include most glassware and small electronic components.

4. <u>Responsibility to Graduate Students</u>. The Laboratory Equipment Specialist is required to make himself available to graduate students in solving equipment problems. In general, the student is required to do all work on equipment which will contribute to understanding of the working of the apparatus.

5. <u>Responsibility in Coursework</u>. On those afternoons in which laboratory courses in CHE 3070, and 4070 are taught, the Laboratory Equipment Specialist must be immediately available to the professors and undergraduate students to issue materials and make necessary repairs.

6. <u>Allocation of Time</u>. The Laboratory Equipment Specialist has normal duties assigned by the Department Chair. Unless some conflict arises, all work done for faculty and/or graduate students will be on a first-come-first-served basis. If a graduate student has a small problem which will take less than an hour or so, he should contact the Laboratory Equipment Specialist directly. However, if the problem is of some duration such as days, he must have his faculty advisor make the arrangements. Matters of priority will be settled between the faculty member(s) involved and the Department Chair.

7. <u>Responsibility for Receiving and Storing Materials</u>. In general, the Departmental Office (**not** the Laboratory Equipment Specialist) will receive supplies and equipment coming into the Department. For space and safety reasons, please make sure packages are picked up in a timely manner and are not left in the mailroom or front office.

8. <u>Work Beyond Our Capabilities</u>. In some cases, equipment must be fabricated for which the facilities in Earle Hall are inadequate. High precision, or large machine work, and complicated electronic work can be done by Machining/Technology Services. Arrangements should be made in Freeman Hall. Graduate students should complete Service Request forms working with personnel in Machining/Technology Services.

XIV. COMPUTERS

Graduate students will have access to a computer typically through their research group. Personal computers and laptops also are allowed for use in Earle hall.

- 1) Computers used in research labs are paid for through research funding by research professors.
- 2) The Lab Equipment/Safety Specialist will give computer support as needed for computers in Earle Hall, and will notify university computer support personnel if necessary. This includes software and hardware problems. Clemson computer support personnel will not work on a computer unless the primary visible language is English.
- 3) Do not connect a computer to the university network without permission from the Departmental Lab Equipment/Safety Specialist. All computers connected to the university network will have the latest anti-virus software running continuously.
- 4) Some software is available on the Clemson network. See the Departmental Technician for details. Computers in Earle will only run software in which a legal license is obtained. Pirated software is not permitted.
- 5) All Clemson University and CCIT (Clemson Computing and Information Technology) rules concerning computers will be followed.
- Graduate students have access to the printer in the Graduate Student Mailroom (120 Earle). The Departmental Lab Equipment/Safety Specialist can connect your computer to a printer.

XV. FINANCIAL ASSISTANCE

FINANCIAL ASSISTANCE

Many questions regarding financial assistance to graduate students have arisen over the years, and it is the purpose of this section to answer some of the major questions.

1. Generally, prospective students in the PhD program will be offered PhD stipends. The following exceptions apply:

* For various reasons some students may be offered the opportunity to enter the PhD program with a reduced stipend. Generally, these students will be raised to a standard stipend after all of the conditions stated in the initial offer letter are satisfied.

2. The departmental policy requires PhD student to TA two courses. Typically, the student responsibility includes grading assignments.

* TA positions are typically not available for MS students. On occasion, there is a need for additional Tas, which may be offered to MS students.

- 3. In August of each year, stipends of continuing students will be reviewed. If sufficient funds are available, consideration will be given to adjusting these stipends to the current standard rates.
- 4. Your initial appointment is for a 12-month period. The assistantship will be renewable on July 1 of each year provided that you make satisfactory academic and research progress. We anticipate that this appointment will be renewed for the period of time required to complete the degree requirements. Continuation of stipends will be considered by the faculty on a case-by-case basis.
- 5. Students who drop core courses, or whose classroom performance is unsatisfactory (<3.0 in any semester), or whose research progress is unsatisfactory may face reduction or loss of their stipend. On occasion, a student will be allowed one grace semester to recover to satisfactory performance without penalty; however, this grace period is not guaranteed. All cases will be handled individually.</p>
- 6. Financial support is typically not available for MS students. On occasion, financial support may be available for MS students to complete short-term research projects.

STUDENT RESPONSIBILITY

Having accepted financial assistance, a student has an obligation to his or her sponsor, and to the University, to conduct the assigned work professionally and diligently. <u>Graduate students are expected to devote full-time to their studies and/or duties</u>. The department expects and urges graduate students to take short breaks from their routine, but <u>students receiving financial aid are not entitled to take all the class holidays awarded to the undergraduate</u>

<u>student body</u>. Each student must check with his or her advisor as to exactly what is expected of him during "holiday" periods. Do not make travel plans before checking with your advisor. <u>Graduate Assistants and graduate students holding fellowships are not permitted to hold jobs</u> <u>outside the department</u>. Occasionally, with the permission of the student's advisor and the Department Head, students are permitted to engage in appropriate part-time work such as tutoring.

LENGTH OF TIME

Support for doctoral students *normally* will be for at least 2 years beyond the MS degree, or 4 years for those students entering the PhD program with only a BS degree. Continuation of support is based on regular review of academic and research progress. In the case of stipends offered from research grants or contracts held by faculty members, the review will be by the Professor concerned and the Department Chair.

TAX STATUS

As the tax codes are continuously under review as to interpretation at this point, students are advised to consult a reliable tax guide or tax advisor. The Graduate School and the Graduate Student Association may also offer opinions and assistance on tax matters.

TRAVEL SUPPLEMENTS

Limited funding in the form of travel supplements is available from the Department to support graduate students who wish to attend a conference. These supplements are intended for students who otherwise do not have funding to travel to a conference. Students must meet the strict eligibility requirements below to be considered for a travel supplement. The Graduate Studies Committee will make decisions on all eligible requests.

Eligibility requirements

- The student must state the need for the travel supplement. This statement should specify the name and location of the conference; whether the student will give a podium presentation, poster, or both; and justification for the amount of funding requested. Preference will be given to students giving podium presentations.
- The student must secure a letter from the research advisor that states that no other funding is available for travel in existing grants, contracts, incentive return, or start-up.
- Students must first secure a Graduate Travel Grant Service (GTGS) administered by the Clemson Graduate Student Government (<u>https://gtgs.sites.clemson.edu</u>). The Department will provide 1:1 matching of the GTGS grant up to \$500.
- Students may receive only one travel supplement during their program of study.
- The request for a travel supplement must be made at least 2 months before the start of the conference. A request packet should be submitted to the Graduate Coordinator. It must contain (1) statement of need, (2) advisor letter, (3) documentation of GTGS grant award, and (4) statement by the student that she or he has not received a department travel supplement in the past.

XVI. FORMS

Graduate School Forms

All graduate school forms are at https://www.clemson.edu/graduate/students/forms.html

Departmental Forms

The following departmental forms are provided on the next pages

- ✤ CHEMICAL ENGINEERING LABORATORY PERSONNEL SAFETY TRAINING RECORD
- THESIS/DISSERTATION TOPIC REQUEST
- ✤ GRADUATE STUDENT FINAL CHECK-OUT FORM

CHEMICAL ENGINEERING LABORATORY PERSONNEL SAFETY TRAINING RECORD

A) PE	RSONNEL INFORMAT Name: Status: Advisor/PI: Primary Lab(s):	ION	
B) SA	FETY TRAINING RECE	VED	
	Compressed Gas Cylinde	r and Electrical Safety Vide	OS:
	Employee Initials:	Safety Technician:	Date:
	Hazard Communication a (From Clemson Hazard C	and Safety Checklist: ommunication Plan)	
	Employee Initials:	_ Safety Technician:	Date:
	EH&S (Attach Proof of C	ompletion)	
	Chemical Hygiene:		
	Employee Initials:	Safety Technician:	Date:
	Hazardous Waste Manag	gement:	
	Employee Initials:	_ Safety Technician:	Date:
	Additional Training: Title:		
	Employee Initials:	_ Safety Technician:	Date:
	Additional Training: Title:		
	Employee Initials:	_ Safety Technician:	Date:
C) PI	NOTIFICATION Safety Training is complete, a Plan for the labs listed above	adequate and meets the Clemso	on Hazard Communication

Employee Initials: _____ PI: _____ Date: _____

THESIS/DISSERTATION TOPIC REQUEST

Please list ALL faculty members who have a research project available that you are interested in pursuing as part of your PhD studies.

My order of preference (1 = highest preference) for a thesis/dissertation topic would be (<u>at</u> <u>least three different advisors</u> must be indicated):

Rank	Advisor	Topic #1	Topic #2
·			

Please provide any additional comments regarding adviser assignments:

Student Name (print)

Student Signature

Date

GRADUATE STUDENT FINAL CHECK-OUT FORM

Stu	ident:			
Da	te:			
Pre	ferred Mailing Address:			
Ead	ch student must secure the	following certifications	prior to leaving the D)epartment.
1.	All keys for Earle Hall have	e been returned to me.		
	Security Coord	inator	Date	
2.	All supplies and equipmer clean and in good condition	nt issued by me have bee on.	n returned. The stuc	lent's laboratory is
	Laboratory Equ	uipment Specialist	Date	
3.	To my knowledge the stud	dent is cleared for depart	ture.	
	Advisor		Date	
4.	Final certification			

Department Chair

Please share any job data (job interviews, offers, final acceptance, or graduate school):

Date

XVII. APPENDICES

Appendix A: Standard Operating Procedures for Handling Gas Cylinders

For the information of graduate students, the Departmental procedures for handling gas cylinders are as follows (See Lab Safety Specialists for assistance):

1. <u>Ordering</u>. Weekly orders for commonly used gases such as nitrogen, helium, air, hydrogen, and carbon dioxide are placed every Wednesday afternoon for a next-day delivery. (Sometimes the truck does not come until the next Monday.) If you foresee a short-term need for additional cylinders to the standard inventory, email the Lab Equipment Specialist before noon on Wednesday and he will order extra cylinders. He will label these, and you do not have to sign them out. (Do not take a cylinder that has someone else's name on it unless you get permission and you tell the Lab Equipment Specialist about in person.)

2. <u>Procedure After Delivery</u>. Lab Equipment Specialist will receive all gas cylinders on the rear dock. Full, unused cylinders are ALWAYS kept inside the building next to the back door. (The only exception is when a delivery is made and the Lab Equipment Specialist has not had a chance to move the cylinders.) There is a small inventory of cylinders inside the building. If you need a cylinder, take one and sign it out on the sheet provided so the appropriate grant is billed for the cylinder.

3. <u>Installing Cylinders</u>. There are two hand trucks designed for cylinder use. Please return these hand trucks to the back dock when not in use. The Lab Equipment Specialist can move or connect a cylinder for anyone that asks. To save time, most people move their own cylinders. If you move or connect a cylinder, make sure you are briefed on the proper method of safe cylinder handling.

- 4. <u>Disposition After Use</u>. Two conditions are possible here:
 - The cylinder is empty, or
 - Some gas remains in the cylinder
 - a. Empty cylinders are ALWAYS kept outside the building next to the back dock. ALWAYS label empty cylinders ("MT" or "EMPTY").
 - b. The Lab Equipment Specialist will arrange to have the cylinder picked up and shipped. If the cylinder is not empty and contains enough gas to warrant keeping it, the user will estimate the contents and mark the lower left hand corner of the front of the card with ½ full or ¾ full as the case may be. Do not sign out ½ empty canisters if you need to use one.

5. <u>Safety Precautions</u>. Gas cylinders can be extremely dangerous if improperly handled. The following instructions must be obeyed.

- a. A cylinder <u>must</u> be tied down at all times except when being moved.
- b. The user must be <u>absolutely certain</u> that the main cylinder valve is closed when the cylinder is not in use.
- c. Before using a gas cylinder read the chart on gas cylinders posted on the bulletin board outside the Issue-room on the basement level of the Unit Operations Laboratory.
- 6. Additional Notes:
 - a. Never order gases ahead of the time you plan to use them. We will pay unnecessary demurrage charges.
 - b. If a cylinder is not empty but you are sure that neither you nor anyone else will use the gas, ship the cylinder back to the vendor.
 - c. Whenever possible, order the smaller size cylinders.
 - d. Do not separate the cylinder from the cap. Wire the cap to the cylinder when you get it; keep it that way.
 - e. Please note that we can only lease cylinders of oxygen, nitrogen, carbon dioxide, argon, helium and air from State approved vendors. Check with the Lab Equipment Specialist before initiating any purchase or rentals. If you can envision a long term use of one of these, inform the Department Chair.
 - f. Only faculty members can authorize purchase of gases.
 - g. If a cylinder is not empty when you are through with it, please determine whether it is to our economic advantage to put it in our storage or return it to the vendor. Don't let a cylinder sit in your laboratory if you are not using it.
- 7. Gas Cylinder Pressure Regulators.

UNDER NO CIRCUMSTANCES WILL A GAS CYLINDER REGULATOR BE MODIFIED. MODIFICATION WILL NOT BE MADE IN ANY MANNER, FOR ANY REASON BY ANY PERSON IN EARLE HALL.

Appendix B: Graduate Seminar/Graduate Symposium

Graduate Seminar

Graduate seminar, CHE 8950, generally will meet once a week during the academic year at the scheduled time. Alternate times will be announced when necessary to accommodate speakers. A schedule of dates and speakers will be published at the beginning of each semester.

Graduate Symposium

The Chemical and Biomolecular Engineering Department hold a one-day Graduate Symposium during the Spring Semester of each year. All PhD students are required to present talks at this symposium within a year of their graduation or expected graduation year. The subject of the student's seminar talk is usually closely related to his or her research. The subject should be chosen by the student in consultation with his advisor.

PhD students who are not giving oral presentations will be asked to present poster presentations after their first year. Students in the MS program with a thesis option will be required to make one poster presentation after their first year.

For the student presenting talks during the graduate symposium, one purpose is to gain experience in organizing and giving a formal oral presentation on a technical subject. Students are expected to use a computer-aided presentation package (PowerPoint) and/or document camera that is projected or displayed on a screen.

Students presenting posters should prepare standard 3' x 4' posters that fit on easels supplied by the department.

Appendix C: Policy for Part-Time and/or Off-Campus PhD Students

<u>The Graduate School Announcements</u> outlines the requirements for the PhD degree and specifically addresses residency requirements and off-campus research. The following clarification is to supplement the Graduate School explanation and thus form a policy for the Chemical Engineering Department to utilize when it receives a PhD application from a person who is employed outside the University and does not intend to become a full-time student, at least at the outset of his degree program.

RESIDENCY REQUIREMENTS

Under departmental policy, the University PhD residency requirement is interpreted to mean that each PhD student will spend at least one academic year (i.e., August through May) as a fulltime student at the University. During this period the student will attend graduate seminars. Generally this will require that the student not be employed outside the university during this period. If the student is not employed outside the university during this period, he or she will be eligible to apply for financial aid.

OFF-CAMPUS RESEARCH

This policy refers to research actually conducted at an off-campus facility as opposed to research conducted primarily at the university by a part-time student. The department does not encourage off-campus doctoral research, but in unusual circumstances it may be desirable. It is the responsibility of the student desiring such arrangements to propose and obtain approval as required by <u>The Graduate School Announcements</u>. The department requires that the dissertation advisor be a regular member of the chemical engineering faculty, but cannot assure the availability of a faculty member willing to serve as advisor in such a program.

Appendix D: Procurement – Purchasing Equipment and Supplies

Each advisor will instruct their students on their internal policies for purchasing equipment and supplies for their research projects and laboratories. Our departmental finance contact (Earle 127A) can assist with any questions that you have as you begin to make purchases. They will meet with each new student and walk them through how we do purchasing in our department.

South Carolina State purchasing regulations, including travel guidelines, can be found on the Clemson Procurement Website at:

https://www.clemson.edu/procurement/faculty-staff/index.html

It is recommended that you review this site periodically for updates to procedures. Each student, as well as all faculty and staff, will be sent to training on this new system prior to using it. We also will conduct internal, departmental training to ensure that all students, faculty and staff are comfortable with this system.

Appendix E: Smoking Policy for Earle Hall

In the interest of the safety and health of all the occupants of our building the following smoking policy has been adopted and will be enforced.

No smoking is allowed in any classroom, hallway, laboratory, office, or other public spaces.

These rules are necessary not only for health reasons but also for general building safety.

Appendix F: Housekeeping Policy for Earle Hall

In order to keep Earle Hall in excellent condition, students are asked to abide by the following rules:

- 1. Please observe building NO SMOKING POLICY at all times.
- 2. Furniture should only be moved from one room to another by the building Safety Manager and staff.
- 3. Put trash in trash baskets that are provided.
- 4. Do not write or carve on furniture.
- 5. Erase whiteboards after use.
- 6. Soft drinks and food must be consumed only in offices and lounge areas. Do not bring food or drinks into classrooms or laboratories.

All students are reminded that damaging a University building is a violation of South Carolina law. We have an attractive building. Let's all try to keep it that way.

Appendix G: Graduate Teaching Assistant Responsibilities

These rules are intended as a general job description for students employed as Teaching/Lab assistants in the Department of Chemical and Biomolecular Engineering (CHBE). The Graduate Teaching Assistant (referred to as TA) should be sure to discuss any problem or concerns with the Department Chair or Graduate Coordinator. Students will be given advance notice of any significant changes made to the CHBE Teaching Assistant's job description or responsibilities.

TAs enhance the learning experience of Clemson students by complementing the activities of the course instructor. They receive training under the mentorship and supervision of the instructor of record. The TA and the instructor share joint responsibility for ensuring that each understands the division of work responsibilities. TA duties will be agreed upon by the instructor and TA during the first meeting and *may* include the following: facilitate a discussion section or tutorial; hold weekly office hours; develop lab sessions with instructor; manage and instruct labs; grade homework or lab reports; proctor exams or lab projects; keep records; distribute and copy reading materials; prepare answer keys or supplementary notes; and act as the course web-master on blackboard or other. TAs may be required to attend the instructor's lecture regularly.

Training

In accordance with the college rules, all TAs are required to participate in the TA training program provided by the College annually. This requirement will not be waived regardless of prior teaching experience. Faculty should periodically evaluate the TA's performance and provide the TA with constructive feedback.

Workload

TAs with a standard 50% time appointment should normally work between 16 and 20 hours per week (8 to 10 hours for TAs with a part-time 25% appointment). Workload may fluctuate from week to week, but a TA should speak to the instructor if they are unable to complete their work in 20 hours per week (10 hours for 25% time TAs). Both the TA and the instructor are jointly responsible for ensuring that the workload time limit is not exceeded. A TA may not be employed as a substitute instructor, where the effect is to relieve the instructor of his or her teaching responsibilities. In the event that an instructor is absent, they will normally ask another faculty member to act as a substitute. If a TA will deliver lectures during the semester, this must be discussed at the beginning of the semester to allow sufficient time for preparation; the instructor of record is expected to provide the teaching material.

Work Attendance and Preparation

TA course responsibilities begin at the start of the academic semesters and continue until the final grades have been turned in, usually the Tuesday after the end of final exams. TAs are responsible for contacting the instructor for their course prior to the first day of instruction or as soon as their assignment is made by the Graduate Coordinator should assignment occur after the start of instruction. For TAs whose duties include office hours or facilitating a discussion section, the TAs are expected to be present during scheduled office hours or sections. If a TA must cancel office hours or sections due to illness or another conflict, they should notify their students as soon as possible preferably by an announcement in the course lecture, but at least by having a notice posted at the appropriate location. The instructor should also be notified. Canceled office hours or sections should be rescheduled, if possible, in consultation with the instructor. TAs are expected to be adequately prepared for office hours and sections. (For sections, it is common to spend as much time preparing examples or other notes as in the section itself.)

Compliance with Academic Appointment Guidelines

TAs must comply with all the regulations relating to an academic appointment. These include but are not limited to regulations prohibiting Sexual Harassment, misuse of University property, substance abuse, and any violations of the law. The definitive source about such regulations is the CLEMSON POLICIES AND PROCEDURES MANUAL, URL: http://www.clemson.edu/faculty-staff/policies.html.

Graduate students who accept an offer of a teaching assistantship have a professional obligation to serve during that period. Students who are not able to fulfill their commitment should notify the Department as early as possible so that a qualified replacement may be found.

Confidentiality

TAs must complete yearly before the first day of class, the FERPA (Family Educational Rights and Privacy Act (20 U.S.C. 1232g, 34 CFR 99) online training.

Please see a few different instructions below for accessing the FERPA training:

- Login to <u>Bridge (http://clemson.bridgeapp.com</u>) using your Clemson username and password.
- Navigate to the Learning Library button (Top of page).
- Locate the FERPA Training Course within your Learning Library.
- Click the "Start" or "Continue" button to complete the course.

Additionally, they can complete the course using the following link: <u>https://clemson.bridgeapp.com/learner/courses/60cb2f46/enroll</u>

All completed assignments, exams, grades, correspondence, and other information about individual students in the class shall be kept confidential except where the student has given written consent. In particular:

- No student in the class should ever be allowed access to a TA computer account or to TA files. Grade files on the computer should be kept protected.
- Grades should never be posted by name, or by any identifying number such as a student ID or other source of identification.
- Graded assignments should not be left in a public place.
- Answer keys or exam materials should be kept secure in a locked drawer.
- These provisions are consistent with Federal and State privacy laws.

Use of Authority

Decisions made by TAs have a significant effect on their students' grades. TAs should carry out their responsibilities professionally and be especially careful not to abuse their authority. TAs should evaluate student work objectively and fairly. In particular:

- TAs may not agree to be paid as tutors for students in their class. These students would by definition receive preferential access to the TA.
- TAs should not become romantically involved with students in their class. Such involvement makes objective evaluation difficult and also raises questions of sexual harassment.

• If a TA has a friend or partner who is a student in the class, then they should not grade that student's papers.

Safety

Threats or harassment to a TA by a student, either in person or by electronic mail, should be taken seriously. The TA must immediately report the incident to the instructor and to the Graduate Coordinator.

GTA/GLA Effectiveness

GTA/GLA effectiveness is rated at the end of each semester by the enrolled students and the instructor; instructors may elect to conduct a mid-semester evaluation.

Appendix H: Academic Integrity, Graduate Philosophy

The following is the academic integrity policy for Clemson University. It along with the academic integrity policies and procedures can be found in the Clemson's on-line academic regulations at http://www.clemson.edu/studentaffairs/student-handbook/.

ACADEMIC INTEGRITY, GRADUATE PHILOSOPHY

An academic environment of integrity is one in which students, faculty and staff interact with each other from a position of mutual trustworthiness. Clemson University has committed itself to preparing a community of scholars dedicated to integrity in teaching, research, scholarship, mentorship and the acquisition and display of professional values of trust, honesty, fairness, responsibility and respect. It is an expectation that Clemson graduate students avail themselves of the many opportunities and resources both on and off campus to learn how to engage in professional practice with integrity. The Graduate School and the community of scholars engaged in graduate-level education will vigorously and expeditiously respond to charges of violations of academic integrity.

In order to promote an academic environment of integrity, all students, faculty and staff must commit to fostering honesty in academic work. Each individual has an important role in ensuring that Clemson's policy on academic integrity is respected and used most effectively as a mechanism for teaching versus a mechanism for punishment. The Graduate School encourages all faculty and students to take a proactive role in eradicating ignorance of violations of academic integrity. Faculty must be clear on syllabi and in verbal instructions to students on the academic expectations for completing assignments. Graduate programs must engage students in discussions about disciplinary-specific issues and professional practice relative to academic integrity, and may include expectations, procedures and consequences aligned with professional licensing or certification requirements beyond those listed here. Faculty might inform students of national cases of academic dishonesty by other faculty and graduate students so as to heighten students' awareness of the necessary seriousness of making a commitment to honesty in their work and implications of not doing so. Students must be proactive in asking for clarification on procedures for completing assigned work. As plagiarism appears to be the most prevalent type of violation of academic integrity observed and reported at Clemson University among graduate students, the Graduate School, in conjunction with the Rutland Center for Ethics and the Office for Teaching Effectiveness, will convene and encourage departments to convene seminars and workshops that all newly incoming graduate students attend as a requirement for receipt of a degree from Clemson.