

# Graduate Student Handbook

## Department of Chemical Engineering University of Arkansas

General Information, Admission and Degree Requirements



Department of Chemical Engineering  
3202 Bell Engineering Center  
University of Arkansas  
Fayetteville, Arkansas 72701  
<http://www.cheq.uark.edu>  
(479) 575-4951

Chemical Engineering Graduate Program Information:  
<http://chemical-engineering.uark.edu/academics/graduate-program/index.php>

Chemical Engineering Graduate Coordinator:  
Dr. Christa Hestekin  
[chesteki@uark.edu](mailto:chesteki@uark.edu)  
(479) 575-3416

University of Arkansas general website: <http://www.uark.edu/>

The Graduate School website: <http://grad.uark.edu/>

Information for International Students:  
<http://graduate-and-international.uark.edu/international/index.php>

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## **ADMISSION**

The following procedures are for applicants wishing to enter the graduate program in chemical engineering that already have a BS or an MS degree in chemical engineering. **Applicants that do not have a chemical engineering degree should skip to p. 17 of this document to the section “Getting Into the Graduate Program if Without a Chemical Engineering Degree”.**

There are three types of graduate Chemical Engineering degrees offered: a non-thesis MS, a thesis-based MS and a PhD. The non-thesis MS has a different application procedure from the two research-based degrees. Also, there is no funding available for the non-thesis MS, you must pay your own tuition and living expenses.

### **Admission Requirements**

The admission requirements are:

- A grade point average of 3.0 out of 4.0 earned in a BS chemical engineering degree, to be completed before you start grad school here. If your previous school uses a grade scale not based on 4.0, we will convert your grades to a 4.0 scale.
- A minimum GRE score with at least 155 on the quantitative portion and quantitative plus verbal score of at least 307. The exam score counted for admission must have been taken within five years prior to application. We have to have an official score from the ETS, so tell them to send them your GRE score directly to the University of Arkansas at Fayetteville, institution code 6866, dept code 1001.
- If you do not have a bachelor's degree from a U.S. university, you'll need a minimum score on one of the following English proficiency exams:
  - TOEFL paper exam: 550
  - TOEFL internet based: 79
  - PTE-A: 58
  - IELTS: 6.5

The test must have been taken within two years prior to application.

For more details on English proficiency requirements: <http://international-admissions.uark.edu/graduate-studies/english-proficiency.php>

### **Application Procedure for a Non-Thesis MS**

Contact Dr. Hestekin at [chesteki@uark.edu](mailto:chesteki@uark.edu) to apply. The deadline for domestic students to apply to enter in the Fall semester is July 1 and for the Spring semester, Dec 1. For international students it is April 1 for Fall semester and Oct 1 for Spring semester, since they will need to obtain a visa.

### **Application Procedure for a Thesis MS or a PhD**

To enter the research-based graduate program you must first submit a complete application to the graduate school: <https://application.uark.edu/>. When the complete application is received, you are then considered for acceptance into the Chemical Engineering Department.

You can view the department faculty's research areas at:

<http://chemical-engineering.uark.edu/research/index.php>

The complete application consists of a resume containing all required information, a statement of purpose, transcripts from all undergraduate and graduate institutions attended, and two letters of reference. Contact Dr. Hestekin at [chesteki@uark.edu](mailto:chesteki@uark.edu) to obtain a list of the information required and complete instructions on the application requirements. The deadline for domestic students to apply to enter in the Fall semester is July 1

and for the Spring semester, Dec 1. For international students it is April 1 for Fall semester and Oct 1 for Spring semester, since they will need to obtain a visa.

## FINANCIAL AID

### Teaching Assistantships and Research Assistantships

Financial aid typically comes in the form of a “research assistantship” (paid by individual professors from their own research money). The assistantship pays all tuition and provides a living stipend paid monthly directly to the student in the amounts shown below. The student pays about \$65/hr in university fees that cannot be covered by either a TA or an RA. Therefore, assistantship support relies on you to find a research advisor to support you.

Note: strong preference in funding is given to PhD students over MS students. There is no financial aid available for the non-thesis MS program.

	<b>Research Assistantship (RA)</b>
<b>source of funds</b>	individual professor's research budget
<b>amount</b>	MS: \$12,000/yr PhD: \$20,000/yr (base) \$30,000/yr or 42,000/yr (with fellowship)
<b>pays all tuition?</b>	Yes, this benefit amounts to about \$7000/year.
<b>pays fees?</b>	No, you'll pay \$65/hr.
<b>funding time limit</b>	entering with BS, leaving with MS: 4 semesters (1 year + 1 semester) entering with BS, leaving with PhD: 11 semesters (3 years + 2 semesters) entering with MS, leaving with PhD: 7 semesters (2 years + 1 semester) (note: all summer = 1 “semester”)

According to 1987 changes in the tax laws, all assistantships and fellowships are considered to be taxable income, but the tax rates are very low for these amounts. For more information see: [http://graduate-and-international.uark.edu/\\_resources/forms/tax-guidelines-grad-students.pdf](http://graduate-and-international.uark.edu/_resources/forms/tax-guidelines-grad-students.pdf)

### Walton Fellowships

There are two rather large graduate fellowships available primarily to U.S. students, but a few international students have received it as well:

#### **Doctoral Academy Fellowships (DAF) - \$30,000 per year plus tuition**

GPA: 3.50/4.00 if entering with a BS in chemical engineering, natural science, or other engineering program. 3.65/4.00 if entering with a MS in a similar subject area.

GRE: verbal plus quantitative score of at least 307 with a GRE writing score of 4.0 or higher

#### **Distinguished Doctoral Fellowships (DDF), \$42,000 per year plus tuition**

GPA: 3.65/4.00 if entering with a BS in chemical engineering, natural science, or other engineering program. 3.85/4.00 if entering with a MS in a similar subject area.

GRE: verbal plus quantitative score of at least 314 with a GRE writing score of 4.5 or higher

Neither one pays university fees, which amount to about \$65/hr. You need to apply by February 1 (for Fall admission) to be considered for a DDF. A DAF may be awarded at any time and has no deadline. However, both fellowships must be applied for before starting on the University of Arkansas campus. Email Dr. Hestekin ([chesteki@uark.edu](mailto:chesteki@uark.edu)) for more details.

### **Procedure for Applying for Financial Aid**

**You don't need to apply for financial aid. All students who are accepted for study are automatically considered.** There are no additional forms to fill out and no letters of recommendation are needed. The financial aid decision is made by the Graduate Studies Committee in the Department. The graduate coordinator (Dr. Hestekin) is the chairperson of this committee and you can send questions to her. When you are informed that you have been accepted into the graduate program you will be told if you have received financial aid. If you are interested in applying for a Walton Fellowship, apply by January 15 and contact Dr. Hestekin for more details; this application is not automatic.

Not all graduate students will be offered financial support. MS students are rarely offered financial support. If you are accepted into our graduate program and are not offered funding at that time, feel free to contact individual professors with research interests similar to yours to see if they have any extra money in their private research funds. Our faculty and their research areas are listed at <http://chemical-engineering.uark.edu/research/index.php>

### **Employment Outside of the Department**

No student on any kind of graduate financial aid may work at any outside full or part-time employment. Any student working outside the Department while on an assistantship or fellowship will immediately lose financial aid and may be terminated from the graduate program.

### **Conditions for PhD Funding**

If you have entered the PhD program on any kind of financial aid, you can lose that funding immediately if you show any indication of leaving the program without finishing your PhD degree.

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## **COURSEWORK**

The coursework requirements are satisfied by a combination of departmental and approved non-departmental courses, thesis and dissertation hours, and seminars. The specific selection of courses should be made in consultation with your research advisor. No course taken for undergraduate credit may be used for graduate credit. It's generally a good idea to get the courses done as quickly as possible in order to free up time for your research project.

You must have a cumulative GPA of at least 3.0 in order to graduate. Any semester in which your semester GPA is below 3.0 does not constitute acceptable progress and your grades must improve to stay in the program. Two consecutive semesters with averages below 3.0 may be grounds for termination from the program. No class with a D or F can count for graduate credit.

The complete University of Arkansas Schedule of Classes is at: <http://registrar.uark.edu/>.

### **Course Designations**

At the University of Arkansas, the courses are identified as follows:

**1000, 2000, 3000 and 4000** (such as CHEG 2133 or MATH 4163):

These are undergraduate courses.

1000 and 2000, 3000 level courses can never be used for graduate credit

4000 level courses can be used for graduate credit for MS students, but not PhD students

In order to register for these courses you will need to fill out an Out of Career Registration form:

<http://graduate-and-international.uark.edu/resources/forms/3000-4000-level.pdf>

**5000 and 6000** are graduate-level courses and can be used for graduate credit.

The last digit is the number of semester hours the course provides.

**Lecture Course** - A course with lectures, homework, exams just like you're used to with most of your undergraduate courses. Most of these carry 3 hours of credit, but there are a few 4 hour classes in this category.

**Non-Lecture Course** - A course that requires your participation but little actual effort. Examples include:

600V: Master's thesis. No grade is given in this course, there are no class meetings and nothing to hand in. It is used to reflect time spent on research on Master's degree projects. V = number of hour credit such as 6003 for three hours.

700V: PhD Dissertation. No grade is given in this course, there are no class meetings and nothing to hand in. It is used to reflect time spent on research on PhD degree projects. V = number of hour credit such as 7003 for three hours.

CHEG 6801 or 5801 is a seminar course where you'll hear about the various graduate research projects and outside speakers and will have the opportunity to report on your own work. These two classes meet at the same time in the same place and are run by the graduate coordinator.

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## **Grad Course Checklist: PhD**

### **MATH 3423 Advanced Applied Math**

You need to fill out a form to register for this class, you can get it from here:

<http://graduate-and-international.uark.edu/resources/forms/3000-4000-level.pdf>

**CHEG 5113 Transport Process I** (Advanced Applied Math is prerequisite or corequisite)

**CHEG 5133 Advanced Reactor Design**

**CHEG 5333 Advanced Thermodynamics**

**CHEG 6123 Transport Processes II**

### **Chemical Engineering Electives - 6 hrs**

Any 4000 or 5000 CHEG level course.

### **Electives - 18 hrs**

5000 or 6000 level; must be approved by your advisor. Must be a lecture course, not a special project, seminar or independent research topic.

**CHEG 5801 or 6801 Graduate Seminar or CHEG 688V Special Topics in CHEG – every semester**

### **CHEG 700V Dissertation - 30 hrs**

You must take at least one hour of CHEG 7001 every semester after you become a PhD candidate. This is a Grad School rule that they take very seriously.

### **Plant Design Requirement for International PhD Students only**

If you have a BS CHEG from a non-U.S. university and you are seeking a PhD here, you will be required to take our senior-level plant design course, CHEG 4443, in order to come up to speed on our philosophy of plant design.

If you enter our PhD program and already have an MS in Chemical Engineering, the department's Graduate Coordinator will subtract your MS courses from the above requirements up to a total of 24 credit hours, thus lowering the hours you need at Arkansas to complete your PhD. You will also need to take 18 hrs of dissertation instead of the 30 listed above.



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## **Grad Course Checklist: Thesis MS**

### **MATH 3423 Advanced Applied Math - 3 hrs**

You need to fill out a form to register for this class, you can get it from here:

<http://graduate-and-international.uark.edu/resources/forms/3000-4000-level.pdf>

### **CHEG 5113 Transport Process I - 3 hrs**

Advanced Applied Math is prerequisite or corequisite.

### **Other Chemical Engineering Core Courses - 6 hrs from this list**

CHEG 5133 Advanced Reactor Design

CHEG 5333 Advanced Thermodynamics

CHEG 6123 Transport Processes II

### **Chemical Engineering Electives - 6 hrs**

Any 4000 or 5000 CHEG level course. The 4000 level classes must be approved for grad credit. This may be a CHEG core course that you didn't take to satisfy the core requirement.

### **Electives - 6 hrs**

4000, 5000 or 6000 level. Must be a lecture course, not a special project, seminar or independent research topic. These may be CHEG core courses that you didn't take to satisfy the core requirement. Other courses must be approved by your advisor.

### **CHEG 600V Thesis - 6 hrs**

### **CHEG 5801 Graduate Seminar - every semester**

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## **Grad Course Checklist: Non-Thesis MS**

### **MATH 3423 Advanced Applied Math**

You need to fill out a form to register for this class, you can get it from here:

<http://graduate-and-international.uark.edu/resources/forms/3000-4000-level.pdf>

**CHEG 5113 Transport Process I** (Advanced Applied Math is prerequisite or corequisite)

**CHEG 5133 Advanced Reactor Design**

**CHEG 6123 Transport Processes II**

**CHEG 5333 Advanced Thermodynamics**

### **Chemical Engineering Electives - 9 hrs**

Any 4000 or 5000 CHEG level course. The 4000 level classes must be approved for grad credit.

### **Electives - 6 hrs**

4000, 5000 or 6000 level.

Must be a lecture course, not a special project, seminar or independent research topic.

**CHEG 5801 Graduate Seminar - every semester**

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## **Coursework Loads**

If you are on any kind of financial aid, such as a TA, RA or Walton, then you have to take at least:

Spring or Fall Semesters: 6 hours minimum, 15 hours maximum  
Total for Summer Semesters: 3 hours minimum, 9 hours maximum

If you are not on any kind of financial aid but, instead, are paying for your education out of your own pocket, the requirements are relaxed and there is no minimum.

If you are an MS student who has finished all the lab work and is only writing your thesis, the minimum is zero; you don't even have to be enrolled. But, if you are a PhD student, you have to be enrolled every semester and take at least one hour a semester of Doctoral Dissertation (CHEG 700V) each time. You can even defend your thesis for the MS and not be registered, but you do have to be registered to defend your dissertation for the PhD.

These course load hours include all courses, lecture and non-lecture. For the spring or fall semesters, a course load of 9 hours of lecture courses is normal but 12 is reasonable, although it may be difficult to perform much research with that amount of homework and exams. It's best to get your lecture classes out of the way as quickly as possible to leave time for research as your project becomes better defined. MS students should complete them in about a year and PhD students in about two years.

## **Extra Coursework**

You may not take courses beyond the minimum degree requirements without the approval of both your research advisor and the graduate student coordinator. The 6 hours of outside electives for the Master's degree and 18 for the PhD and should enable you to at least sample any area of you want to study.

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## **RESEARCH PROJECTS**

Your research advisor and you will work closely together to help plan your overall program and coordinate the course work and research activities. Frequent contact between you and your advisor is necessary to ensure the success of your project. The research can be either analytical or experimental in the MS program but an advanced-level experimental or theoretical component is required for PhD students. Research, by nature, cannot be precisely programmed. The first experimental design and/or technique is frequently unsuccessful, requiring the application of different procedures. You are therefore encouraged to initiate your research activities early in your graduate residency.

Soon after you and your advisor choose a research topic, the two of you will select a research committee consisting of faculty inside and outside of the Chemical Engineering Department. The committee makeup is as follows:

MS: at least three members:  
the advisor  
one other CHEG professor  
one professor from outside of the Department

PhD: at least five members:  
the advisor  
two or three other CHEG professors  
one or two professors from outside of the Department

Extra members are fine. No later than the end of the first year you, along with your advisor's help, should propose the research project to the committee for their approval and suggestions. The day-to-day performance of the research project will be supervised by your research advisor.

A written thesis or dissertation must be prepared to provide a detailed documentation of the research activities and their results. This document is prepared in accordance with Graduate School format and procedures, and must be comprehensive in covering the work that was done from problem definition, through experimental procedure, to results and discussion.

Finally, your committee gets back together so you can present the results of your work, event called your thesis or dissertation defense. They may require some changes to your thesis or dissertation document before passing you. Although it rarely happens, it is possible to fail this oral examination and have to go back to the lab for more work, followed by another defense in front of your committee.

### **Thesis and Dissertation Preparation**

Thesis and dissertation preparation should be done carefully to ensure that the final document meets Graduate School specifications, described at: <http://graduate-and-international.uark.edu/resources/forms/thesis-dissertation-guide.pdf>

You need to get your thesis or dissertation document printed out, have the Grad School check it to make sure the format is OK, then submit one copy on any kind of paper to the Department.

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## **GETTING YOUR DEGREE**

We want you to complete your graduate degree without undue delay and move on to the first phase of your career as an MS or PhD chemical engineer. To help ensure that, there are certain milestones and objectives that you need to meet in order to make acceptable progress.

### **Coursework**

It is recommended that you complete your coursework as soon as possible to avoid it from getting in the way as your research project ramps up. As a guideline for full-time students, you should be able to finish the 24 hours of lecture courses required for the MS degree in one calendar year or the 48 hours for the PhD in two years. Of course, specific research commitments, co-op assignments and other extenuating circumstances can force you to extend your classes beyond these times. Your committee will look to see if you are on schedule to finish your coursework in a timely fashion taking into consideration any other research and service tasks you may also have.

You must have a cumulative GPA of at least 3.0 in order to graduate. Any semester in which your semester GPA is below 3.0 does not constitute acceptable progress and your grades must improve to stay in the program. Two consecutive semesters with averages below 3.0 may be grounds for termination from the program. No class with a D or F can count for graduate credit.

### **Research**

As with coursework, the appropriate rate of progress in research depends on many circumstances such as funding, equipment issues, and the risks taken in the project's scope. Good research pushes the envelope of knowledge and technique, and this can sometimes cause unexpected delays. However, there are some milestones for which you should aim:

During your first semester:

- Select a graduate advisor and define a project topic
- Select a research advisory committee

During your second semester:

- Present your research proposal to your committee

After your proposal is completed, acceptable progress in research activities will be defined by your research advisor and your committee. There are many potential problems in any research program that can cause your intended schedule to be unavoidably delayed. If this is the case, your graduate advisor will inform the committee and these factors will be taken into consideration.

### **Proposal to the Student's Committee**

It is the policy of this department that all PhD graduate students present a written and an oral proposal to their committee for the purpose of defining their research program. The written part will constitute the exam for PhD candidacy, with the major professor and the committee determining what constitutes a "pass" for that test. After passing the exam, the major professor should inform the graduate coordinator and the coordinator will write the required memo to the Grad School declaring that the student is now a PhD candidate.

## **Laboratory Safety Practices**

Chemical engineering research often involves handling and disposing of hazardous materials. Graduate students must follow safe laboratory practices as well as attend a basic safety training seminar before starting any laboratory work. In order to promote a culture of safety, the department maintains an active Laboratory Safety Committee composed of the department head, faculty, staff and a student member which meets each semester. Students are expected to be responsive to the safety improvements suggested by the committee, to serve on the committee when asked, and utilize the committee members as a resource for lab safety communication.

Each semester, you will receive instruction in safety practices as part of your Graduate Seminar Course. The training covers general safety issues including: Hazard Awareness and Chemical Safety, the new Global Harmonization Standard (GHS) by OSHA, Safety Data Sheets (SDS), Chemical and Biological Waste Disposal, Emergency Preparedness, Accident Prevention, and Chemical Spill Response. You will be expected to take what you learn in safety training seminars into the lab and conduct your daily research activities at a level of safety performance equal to or exceeding standards common in the U.S. chemical industry. All general laboratory safety rules must be followed including wearing appropriate laboratory clothing such as long pants, closed shoes and safety glasses. **Violations of safety practices are absolutely unacceptable and may result in you losing lab privileges or even termination from the graduate program.**

The University of Arkansas also requires that each lab train its users in all safety procedures relevant to that lab. Upon joining a research group, be sure to ask about safety training specific to their research. Additional information can be obtained from the University's Environmental Health and Safety Website <http://ehs.uark.edu/>.

## **Assisting in Undergraduate Teaching**

Grading papers, overseeing lab sessions, and giving an occasional lecture when the professor is out of town are valuable services to the Department, a useful technical review for you, and good practice for a career in academia. All grad students are required to participate in these activities.

## **Forms for the Graduate School**

There are several forms that the Grad School is going to want you to turn in during your time here. Links are provided in this handbook to many of these so you can download them. The Grad School seems to change the links from time to time and, if the provided links don't work, you can probably go to the Grad School's website and find the right path. Also, let Dr. Hestekin know if a link in this document is bad so it can be fixed.

Most of these forms require signatures from various people:

“Chair of the Committee” = your research advisor or Dr. Christa Hestekin

“Department Head/Chair” = Dr. Ed Clausen

“Office of the Graduate Dean” - you never need to get this one; the Grad School will take care of it

It would probably be a good idea to make a copy of any form you turn in to the Grad School in case it gets lost. If you want, Dr. Hestekin can put it in your student file for safekeeping.

You can find most of their forms at: <http://graduate-and-international.uark.edu/graduate/current-students/forms.php>

More specific links are provided in the *Checklist for the MS* and *Checklist for the PhD* in the following sections.

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## **Acceptable Progress Toward the Degree**

Acceptable progress toward degree completion is required to maintain a student's status in the department. Measures of progress include:

- (1) Finding an advisor within four months after either entering the graduate program or after leaving another advisor's research group. Non-thesis MS students are advised by the Graduate Program Coordinator.
- (2) Acceptable grades in coursework.
- (3) Acceptable progress in research work toward a thesis or dissertation, if applicable.

Students who do not make acceptable progress toward degree completion by these standards will be informed of the actions they must take to remain in the program. Lack of a timely, adequate response to this communication may be grounds for dismissal by vote of the Graduate Studies Committee.

## **Annual Progress Evaluation**

Each year you'll meet with your advisor to determine if your progress has been acceptable. If it is unacceptable, they will also tell you in writing exactly what you need to do to remedy the situation and to bring your performance up to a satisfactory level. In that case, a second special review will be scheduled six months later. If your performance has not sufficiently improved, you may be terminated from the program at that time. If you refuse to participate in the review process, you can also be terminated immediately. For thesis students, it is also recommended that you meet each year with your advisor and thesis committee. The form for the annual review can be found at: <http://graduate-and-international.uark.edu/resources/forms/grad-student-review.pdf>

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## **DEGREE REQUIREMENTS FOR THE PhD**

The PhD in Chemical Engineering program consists of the following components:

- coursework, see page 6
- assisting in departmental teaching
- proposal of your research plans to your committee
- research resulting in a successfully-defended dissertation

You should be able to finish the lecture coursework requirement in 2.0 to 2.5 calendar years by taking 9 hours each Spring and Fall plus 6 in the Summers. This leaves a couple of years at the end of your residency to dedicate for research activities.

Upon entering the PhD program you are a "PhD applicant" and, upon completion of all coursework and the proposal, you are a "PhD candidate".

### **Getting an MS on the Way to a PhD**

It is not necessary to obtain an MS degree in this department on the way to a PhD but it may be desirable for you and/or your advisor. This is a decision for the two of you to make. If a thesis MS in CHEG is sought, all requirements for that degree, as described earlier in this document, must be satisfied including defending your thesis in front of your committee and later having that thesis accepted at the Grad School. A non-thesis MS can be earned in the PhD program if you satisfy all of the requirements for the non-thesis MS degree as described later in this handbook. If you are on departmental funding, you need your committee's permission to get a non-thesis MS.

### **Checklist for the PhD**

- Select a graduate advisor during firstsemester.
- Select a graduate advisory committee. For the PhD degree, this committee consists of at least five members: the advisor, at least two other CHEG representatives, and at least one representative from outside of the Department.
- Fill out the form for *Doctoral Committee*. This should be done during the first year. E-mail an electronic copy of the form (signed) to the grad coordinator.  
<http://graduate-and-international.uark.edu/resources/forms/doctoral-committee.pdf>
- Select a dissertation topic and title.
- Fill out the *Doctoral Thesis Title* form and give them to the Grad School, preferably in the first year, but at least one year prior to the dissertation defense. E-mail an electronic copy of this form (signed) to the grad coordinator.  
<http://graduate-and-international.uark.edu/resources/forms/doctoral-title.pdf>
- Present a formal proposal of research to your committee for approval and suggestions. When you pass, have your advisor sign the Candidacy Exam Notification Form. E-mail an electronic copy of this form (signed) to the grad coordinator.  
<http://graduate-and-international.uark.edu/resources/forms/candidacy-exam-notice.pdf>
- Apply for graduation at the beginning of your last semester: <http://registrar.uark.edu/graduation/applying-to-graduate.php>



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- Consult the graduation checklist appropriate for your graduating semester:  
Fall: <http://graduate-and-international.uark.edu/resources/forms/fall-graduation-checklist.pdf>  
Spring: <http://graduate-and-international.uark.edu/resources/forms/spring-graduation-checklist.pdf>  
Summer: <http://graduate-and-international.uark.edu/graduate/current-students/summergradchecklist-2016.pdf>
  - Prepare the dissertation in accordance with the Graduate School format, described at:  
<http://graduate-and-international.uark.edu/resources/forms/thesis-dissertation-guide.pdf>
  - **Two weeks before your defense**, fill out the *Dissertation Defense Announcement* at:  
<http://graduate-and-international.uark.edu/graduate/current-students/dissertation-defense-form.php>  
In addition, you will need to fill out a *Doctoral Record of Progress* at:  
<http://graduate-and-international.uark.edu/resources/forms/phd-progress-record.pdf>
  - Submit your dissertation to your advisory committee at least one week prior to your defense.
  - Pass the dissertation defense, and complete and file the cardboard form *Doctoral Record of Progress Degree*. The entire committee will sign this. Give the completed form to the Graduate School. It's a good idea for you to have this form ready to be signed at the defense.
  - The dissertation packet is submitted electronically to the Graduate School.

## **DEGREE REQUIREMENTS FOR THE THESIS MS**

The thesis MS in Chemical Engineering consists of the following components:

- coursework, see page 7
- assisting in departmental teaching
- proposal of your research plans to your committee
- research resulting in a successfully-defended thesis

You should be able to finish the lecture coursework requirement in one calendar year by taking 9 hours in the Fall, 9 in Spring and 6 in summer. This leaves time at the end of your residency to dedicate for research activities.

### **Checklist for the Thesis MS**

- Select a graduate advisor during first semester.
- Select a graduate advisory committee. For the master's degree, this committee consists of at least three members: the advisor, at least one other CHEG representative, and at least one representative from outside of the Department.
- Fill out the form *Master's Committee* and give it to the Grad School. E-mail an electronic copy of each form (signed) to the grad coordinator.

<http://graduate-and-international.uark.edu/resources/forms/masters-committee.pdf>

- Select a thesis topic and title.
- Fill out the *Master's Thesis Title* form and give it to the Grad School. Do this preferably in the first semester, but at least one year prior to the thesis defense. E-mail an electronic copy of this form (signed) to the grad coordinator.

<http://graduate-and-international.uark.edu/resources/forms/masters-thesis-title.pdf>

- Apply for graduation at the beginning of your last semester: <http://registrar.uark.edu/graduation/applying-to-graduate.php>

- Consult the graduation checklist appropriate for your graduating semester:

Fall: <http://graduate-and-international.uark.edu/resources/forms/fall-graduation-checklist.pdf>

Spring: <http://graduate-and-international.uark.edu/resources/forms/spring-graduation-checklist.pdf>

Summer: <http://graduate-and-international.uark.edu/graduate/current-students/summergradchecklist-2016.pdf>

- Prepare the thesis in accordance with the Graduate School format, described at: <http://graduate-and-international.uark.edu/resources/forms/thesis-dissertation-guide.pdf>
- Submit your thesis to your advisory committee at least one week prior to your oral defense.
- Pass the thesis defense, and complete and file the cardboard form *Master's Record of Progress*. <http://graduate-and-international.uark.edu/resources/forms/progress-record-masters.pdf>

The entire committee will sign this. Give the completed form to the Graduate School. It's a good idea for you to have this form ready to be signed at the defense.

- The thesis packet is submitted electronically to the Graduate School.

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## **DEGREE REQUIREMENTS FOR THE NON-THESIS MS**

The non-thesis MS in Chemical Engineering consists of the following components:

- coursework, see page 8
- assisting in departmental teaching
- master's comprehensive examination complete by date of graduation (required by the graduate school for the M.S. degree). See the graduate coordinator for details.

You should be able to finish in 1.5 - 2 years

Students in the non-thesis MS program who are not on funding (RA or TA) can serve as course graders and will be paid for their efforts.

Students on funding (RA or TA) must receive approval of their committee or, if they don't have a committee, of the Grad Studies Committee, to get this degree.

## **GETTING INTO THE PROGRAM WITHOUT A CHEMICAL ENGINEERING DEGREE**

The Department offers Master's and PhD degrees for students who do not have a BS in chemical engineering but have a Bachelor's degree in another subject. This program enables a student to build on his/her background in other fields of engineering, mathematics, chemistry, physics, and the humanities or social sciences to obtain an advanced chemical engineering degree. However, the graduate degrees will be obtained without ever having achieved a BS in CHEG.

Students seeking admission to the program should have earned a BS in Chemistry, Math, Physics or related scientific field. The undergraduate degree program should include at least two semesters of calculus, two semesters of calculus-based physics, two semesters of general chemistry, a semester of organic chemistry and at least six hours of upper-level chemistry or physics. Students seeking admission to the accelerated program must have a GPA of at least 3.5 in their undergraduate degree programs.

This program is administered by Dr. Christa Hestekin [chesteki@uark.edu](mailto:chesteki@uark.edu) and you should contact her for more information about it, especially if you do not meet all of the above requirement.

### **Approximate Completion Time from the time you enter the program.**

**PhD** 5½ years

**MS** 2½ years

*NOTE: You should understand that your participation in this program with a Bachelor's degree in anything besides engineering makes you ineligible to take the Fundamentals of Engineering exam and thus to become a licensed Professional Engineer. Only graduates from an ABET accredited BS engineering program (such as our BSChE program or any other school's ABET accredited BS in any field of engineering) are eligible to take the Fundamentals of Engineering exam.*

### **Progress Toward Degree**

#### **First Semester Coursework (MSChE or PhD)**

CHEG 2313 (Thermodynamics of Single Component Systems)

CHEG 2133 (Fluid Mechanics)

MATH 3404 (Differential Equations)

Graduate Elective

#### **Meeting of Graduate Committee to Discuss First Semester Progress**

If the student earns at least a 3.4 GPA, with no C's, in their first semester, he/she is qualified to continue in the accelerated program. If the student earns less than a 3.4 GPA or earns a C in one or more of the courses, additional courses will likely be required before the student is allowed to enter the graduate program. The number of undergraduate chemical engineering courses will not exceed the number of courses listed in the attached document of undergraduate courses required for chemical engineering. The student must earn at least a 3.0 GPA on all undergraduate chemical engineering courses to be admitted to the graduate program.

If the student is qualified to continue with the accelerated program, he/she will choose between the Accelerated MSChE program and the Accelerated PhD program. The requirements for the two programs are detailed below. If the student is not qualified to continue with the accelerated program, a plan of study will be developed for the student by the graduate program coordinator.

#### **PhD Program**

1. Upon satisfying the requirements of the first semester of the program, the student is eligible for departmental financial aid.
2. In the second semester, the student must take CHEG 3323 (Thermodynamics of Multicomponent Systems) and CHEG 3144 (Heat / Mass Transfer) and receive a B or better in both courses. If either

of the courses is not offered in the second semester, the student must take them on the first date they are offered. These may not be counted for graduate credit.

3. The student may take, with advisory committee consent, up to six additional hours of graduate courses during this second semester.
4. The student must take CHEG 4443 (Design II) for graduate credit before graduation.

### **MSChE Program**

1. In the second semester, the student must take CHEG 3323 (Thermodynamics of Multicomponent Systems) and CHEG 3144 (Heat / Mass Transfer) and receive a B or better in both courses. If either of the courses is not offered in the second semester, the student must take them on the first date they are offered. These may not be counted for graduate credit.
2. The student may take, with advisory committee consent, up to six additional hours of graduate courses during this second semester.
3. The student must take CHEG 4443 (Design II) for graduate credit prior to graduation.

### **Financial Aid**

Students may go onto research assistantship money at any time if they can find a research advisor willing to pay them. Departmental funding is given on a case-by-case basis.

**UNIVERSITY OF ARKANSAS**  
**Ralph E. Martin Department of Chemical Engineering**  
**EVALUATION OF GRADUATE EDUCATIONAL OUTCOMES**

Student's Name: \_\_\_\_\_ Date: \_\_\_\_\_

Degree: \_\_\_\_\_ Degree Program: \_\_\_\_\_

Student has shown the ability to critically analyze meaningful and technologically relevant data, and for thesis students, plan and safely conduct research.

Excellent	Good	Fair	Poor
3	2	1	0

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Student has demonstrated proficiency in fundamental mathematics and chemical engineering problem solving.

Excellent	Good	Fair	Poor
3	2	1	0

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Student has developed and used effective written and oral communication skills.

Excellent	Good	Fair	Poor
3	2	1	0

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Committee Member Signature: \_\_\_\_\_

Committee Member Name: \_\_\_\_\_

**Laboratory Check-Out Procedures  
For Departing Researchers**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Reason for leaving: \_\_\_\_\_

Laboratories Effected: (building and room number) \_\_\_\_\_

**I. Purpose**

The intent of this program is to ensure that all hazardous materials used in laboratories and waste generated by researchers are disposed of properly when a research faculty, staff or student leaves CHEG UARK. Proper disposition of hazardous materials is the responsibility of the principal investigator or researcher and ultimately becomes the responsibility of the department. Proper disposition of hazardous materials is required whenever a responsible individual leaves UARK or transfers to a different laboratory. If improper management of hazardous materials occurs, the responsible department may be charged for any analytical and/or disposal costs associated with those materials.

Any regulatory action or fines resulting from improper management or disposal of hazardous materials will be the responsibility of the generating department.

**II. Closeout Procedures for Hazardous Materials in Laboratories.**

The responsible individual must complete the following steps. The checkout sheet must be completed and signed and will be kept on file in the CHEG safety files.

**A. Chemicals**

D Ensure that all containers of chemicals are labeled with the name of the chemical and other CHEG required information such as NFPA, date, & initials.

D All containers must be securely closed.(no parafilm or aluminum foil)

D Beakers, flasks, evaporating dishes, etc. should be emptied and cleaned.

D Hazardous chemical waste must be labeled with Hazardous Waste sticker, filled-out, and an on-line pick-up request submitted to UARK EH&S.

D Check refrigerators, freezers, fume hoods and bench tops as well as storage cabinets for chemical containers.

D Determine which chemicals are useable or should be retained and transfer responsibility for these materials to another party who is willing to take charge of them along with the SDS. If a new user cannot be found, the materials must be properly disposed of through UARKEH&S.

D All other materials should be prepared for disposal. Refer to the UARK Chemical Hygeine Plan. This process can take some time and should be started at least a month before departure from the laboratory. Contact your CHEG Safety Officer for help.

D Any containers whose contents cannot be identified must be analyzed before disposal can take place. The generator is responsible for arranging and paying for analysis of unknowns. UARK EH&S will not accept any unidentified chemicals. These chemicals might need to be sent to a certified laboratory for analysis. CHEG safety officer will provide assistance if needed.

D Notify department head and CHEG safety officer when laboratory is ready for inspection.

Inspected by \_\_\_\_\_ Date \_\_\_\_\_

**B. Gas Cylinders**

D Remove gas connections, replace cylinder caps, and return cylinders to suppliers or transfer responsibility to another party.

D If cylinders are non-returnable, contact UARKEH&S.

**C. Microorganisms and Cultures**

D If an autoclave is available, decontaminate waste and dispose in regular trash.

D If material cannot be decontaminated, place in biohazard bag for incineration. Fill-out on-line pick-up form on UARK EH&S website.

D Clean incubators, drying or curing ovens, refrigerators and freezers.

D If samples need to be saved, locate appropriate person to take responsibility for them and notify Supervisor or Department Head if appropriate.

Inspected by \_\_\_\_\_ Date \_\_\_\_\_

#### D. Equipment

D Equipment left for others. Please specify and contact Harold Watson, CHEG.

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If laboratory equipment is to be left for the next occupant, clean or decontaminate it before departing the laboratory. If exhaust or filtration equipment has been used with extremely hazardous substances or organisms, alert the Department Head and CHEG Safety Officer.

D Equipment to be discarded. Please specify and contact Harold Watson, CHEG.

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If laboratory equipment is to be discarded, be aware that capacitors, circuit boards, transformers, mercury switches, mercury thermometers, radioactive sources and chemicals must be removed before disposal. Contact Harold Watson in CHEG these items must also be removed from CHEG inventory and may require special procedures.

D Equipment potentially contaminated with radioisotopes or biohazards should be surveyed by UARK EH&S and CHEG safety.

D Equipment that is damaged or not working properly. Please contact lab supervisor, department head, and Harold Watson. Please specify.

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D Equipment potentially hidden from view or in storage. Please contact lab supervisor, department head, and Harold Watson. Please specify.

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D Equipment checkout by Harold Watson

Signature \_\_\_\_\_ Date \_\_\_\_\_

#### E. Other areas of Concern

##### Controlled Substances

Controlled substance permits are issued by the U.S. Drug Enforcement Agency (DEA) and are issued to individual researchers. Abandonment of a controlled substance is a violation of the DEA permit under which it was held. If the responsible individual wishes to transfer ownership of the controlled substance to another person, he or she must obtain permission from the DEA office. If controlled substances are found for which the licensee is unknown, contact DEA at the above number. In most instances, if the controlled substance is to be disposed of, local law enforcement will assist with the disposal. Notify Department Head and DEA on disposition of controlled substances.

##### Shared Storage Areas



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One of the most problematic situations is the sharing of storage units such as refrigerators, freezers, cold rooms, stock rooms, waste collection areas, etc., particularly if no one has been assigned to manage the unit. Departing researchers must carefully survey any shared facility in order to locate and appropriately dispose of their hazardous materials.

All of Part II has been completed

Advisor Signature \_\_\_\_\_ Date \_\_\_\_\_

### III. Regulatory Impact

Mishandling of hazardous materials can result in citations, fines, and/or loss of right to use hazardous materials. Fines are paid by the department incurring them. Please do not leave our department without handling your research equipment and materials appropriately.

### IV. Personal Items

D Return any keys that were issued to you to the Key Office 575-2255.

D To avoid further billing for campus parking, please return your parking permit to the Transit and Parking Dept. 575-7275. You may be eligible for a partial refund if over \$25.

D Submit a "change of address" form with the Post Office (<https://moversguide.usps.com>). Be sure to pick up all remaining mail before you leave.

D Contact the main circulation desk of the Library to make sure that all items have been returned before you leave campus.

D UARK students are expected to participate in an exit interview process with financial staff before leaving campus. This process is designed to inform students of their rights and responsibilities, furnish loan and other fiscal data, notify students of federal regulations where applicable, update information and address questions students may have regarding their personal accounts.

D Your UARK email will be disabled within 30 days to one year depending on your status. Please arrange to forward all inbound email to an account on a service provider outside of UARK, e.g., a Google (Gmail) account. Effective immediately, please use your new e-mail address for all future correspondence.

D Provide a forwarding address (including your new e-mail address) to the Registrar, International Student Programs (if applicable) and the Graduate Studies Office.

D If you have an account at the UARK Credit Union or other bank, please be sure to provide them with a forwarding address.

### V. Exit Interview

An exit interview with the CHEG department head is required before leaving. Bring this form to your exit interview.