



UNIVERSITY OF  
ARKANSAS

COLLEGE OF  
ENGINEERING

2015  
2016

Civil Engineering Graduate Student

# HAND BOOK

Not all Engineers are *Civil*

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## WHY THIS HANDBOOK?

The purposes of this Graduate Student Handbook are to:

- Help prospective students understand what is involved in a graduate program;
- Provide information about the Civil Engineering Graduate Programs, course requirements, and procedural matters.

This handbook supplements the Graduate School Catalog and other materials provided by the Graduate School and the College of Engineering.

As a core of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.

- Each University of Arkansas student is required to be familiar with and abide by the University's Academic Integrity Policy which may be found at <http://provost.uark.edu/>. Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

The Civil Engineering Department offers two Masters of Science graduate programs:

- Master of Science in Civil Engineering (MSCE)
- Master of Science in Environmental Engineering (MSEnE)

These programs are designed to:

- Broaden a student's knowledge of the principles and practices of Civil Engineering;
- Allow a student to develop a level of specialization in one aspect of Engineering practice;
- Expose a student to testing, design, and analytical procedures through hands-on research activities;
- Improve a student's report writing and oral presentation skills

A coursework-only Master of Science in Engineering (MSE) degree is offered only to students pursuing the degree through distance education. The MSE program is administered through the College of Engineering.

The Civil Engineering Department also offers the Doctoral (Ph.D.) degree. This degree is research oriented and designed to teach the individual how to explore new frontiers in Civil Engineering, organize and conduct an intensive research study in a specific problem area, and compile and organize data and its analysis in a form suitable for publication in circulated literature. The Ph.D. candidate is expected to be capable of independent scholarly study and to possess the ability to further engineering practice through research and other creative pursuits.

The MSCE and the Ph.D. programs that we offer typically emphasize one of the following areas:

- Environmental Engineering
- Geotechnical Engineering
- Structural Engineering
- Transportation Engineering

**MESSAGE FROM THE DEPARTMENT HEAD**



**Kevin D. Hall, Ph.D., P.E.**

Professor and Department Head  
21<sup>st</sup> Leadership Chair in Civil Engineering  
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Welcome to the University of Arkansas graduate program in Civil Engineering. An advanced degree is becoming increasingly important to the practice of engineering and should be very valuable to you in your career. We are devoted to providing a solid academic experience so that your degree will be of maximum benefit to you, and are committed to putting you in a position to succeed.

We ask that you read this Handbook carefully. It will serve as your guide to navigate the various policies and procedures of the Department, the College, and the University. It also will provide you with valuable information for planning, executing, and completing your graduate program. In many cases, this Handbook will reference College of Engineering and/or Graduate School policies. I urge you to locate and read all applicable policies, so that your primary focus will be properly placed on your studies and research activities, rather than with administrative logistics.

Ultimately, your experience in Graduate School will be largely determined by your own drive and passion. We are excited and honored to help you discover and nurture that passion. The global society needs engineers to address and solve significant issues facing people each day. Your graduate degree will enable you to step into a leadership role as that problem solver.

We look forward to working with you throughout your degree program. *We are here to help!* If any of the faculty or staff can be of assistance, please do not hesitate to ask.

MEET THE FACULTY

Environmental



FINDLAY EDWARDS



JULIAN FAIREY



RODNEY WILLIAMS



WEN ZHANG

Geotechnical



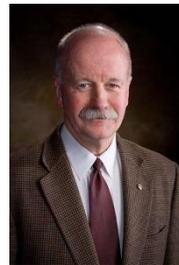
MICHELLE BERNHARDT



RICK COFFMAN



NORM DENNIS



MIKE JOHNSON



CLINT WOOD

Structural



MICAH HALE



ERNIE HEYMSFIELD



GARY PRINZ



PANNEER SELVAM

Transportation



NATALIE BECKNELL



ANDREW BRAHAM



JIM GATTIS



KEVIN HALL



SARAH HERNANDEZ



STACY WILLIAMS

## REQUIREMENTS TO ENROLL IN A GRADUATE PROGRAM

To be considered for regular admission to graduate standing, applicants must comply with all general requirements of the Graduate School. In addition to the general Graduate School requirements, applicants must meet the following specific requirements to be accepted for graduate study in the Department of Civil Engineering.

When evaluating applicants for graduate programs, the factors considered include:

- the applicant's grades in their previous University classes;
- GRE (Graduate Record Examination) verbal, quantitative, and analytical scores;
  - minimum required GRE score for the department is: Old Score (Quantitative + Verbal-1100 & Writing 3.5) and new score (Q + V = 302 and WR = 3.5)
- for foreign applicants, TOEFL (Test of English as a Foreign Language) scores as required by the Graduate School;
- Statement of purpose and/or research area of interest to be sent to the CVEG graduate coordinator or graduate admissions with the application document.

### Undergraduate Degree Requirements

Applicants possessing an accredited<sup>1</sup> undergraduate engineering degree, and applicants with an undergraduate engineering degree from a foreign university are typically accepted into the graduate program.

Applicants who do not have an undergraduate engineering degree are not typically accepted into the Master of Science in Civil Engineering (MSCE) or Master of Science in Engineering (MSE) programs. However they can be accepted into the Master of Science in Environmental Engineering (MSEnE) program on the condition that they satisfy all prerequisite and degree requirements. In all cases, a student's major adviser and graduate study committee may identify topics that were not included in a student's undergraduate or other previous programs that will require additional study.

### Transfer of Credit from Other Universities

A Masters or a Ph.D. student may apply to receive transfer credit for one or more classes from another recognized graduate school in the United States, provided the class grade was B or better, all residency requirements have been met, and the student's Graduate Program of Study Committee approves. Graduate courses taken at Graduate Residence Centers of the University of Arkansas System may be transferred to a Masters or a Ph.D. program.

Master's Degree candidates may transfer up to 6 semester credit hours of graduate course work. Courses Taken through Graduate Residence Centers may not be used to satisfy residency requirements for the Ph.D. degree in Engineering.

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<sup>1</sup>Accreditation by the Engineering Accreditation Commission (EAC) of ABET, Inc.

## FINANCIAL ASSISTANCE: SCHOLARSHIPS AND ASSISTANTSHIPS

Financial assistance is available to qualified students working in M.S. and Ph.D. degree programs. Financial assistance for students taking only background or pre-requisite courses generally will not be considered until these courses have been substantially completed.

Scholarships and assistantships are two types of financial assistance available to graduate students. A **scholarship** is awarded to help a student pay for costs associated with obtaining a degree, and may have certain stipulations attached. On the other hand, an **assistantship** is a job -- a student is being paid to perform work. Scholarships and assistantships often also pay for some tuition or fees, the amount of which varies according to the type of scholarship or assistantship.

Graduate students may be employed as either research or teaching assistants. Normally, students working on research projects will be employed as research assistants. Teaching assistantships are available for those students assisting faculty in classroom or laboratory activities. Requests for financial assistance should be made at the time of application to the program, and near the end of each semester after entering the program. Requests for re-appointment must be initiated by the student's major professor and should be accompanied by a work and study plan showing the proposed schedule needed to complete the degree requirements, including thesis or dissertation and final oral exam.

### Duration of Financial Assistance

A graduate student assistantship typically lasts for one semester, and that appointment expires at the end of that semester. If the employment is to extend to the next semester, then a new appointment is made. The maximum duration of graduate assistantship employment is generally limited to two years for M.S. candidates and three years beyond the M.S. degree for Ph.D. candidates. Special circumstances may warrant additional extensions, with the approval of the student's major professor and the Department Head.

An assistantship or other financial support may be terminated for failure to maintain acceptable academic standards (GPA 3.00 and a grade of C or better in all graduate courses), failure to satisfactorily perform assigned duties, or failure to otherwise make satisfactory progress toward the degree. If the agency funding the research or assistantship terminates the project and the funding, then the assistantship will also terminate (this is extremely rare).

### Number of Class Hours and Work Hours

To be appointed on an assistantship or to receive a scholarship, you are required to be enrolled in a certain number of class hours for that semester. If you are not enrolled in the proper number of hours before the first day of classes, you may lose your assistantship or scholarship.

Level of Appointment	Required Work Hours	Minimum Credit Hours	Maximum Credit Hours
One Quarter (25%)	10 hours per week	9	18
One Half (50%)	20 hours per week	6	15
Three Quarters (75%)	30 hours per week	3	6

Doctoral Students who have completed their course work and are working only on a research component must register for at least one credit hour of research (dissertation) each semester until the degree is completed.

### Obligations of Those Receiving Financial Assistance

Graduate assistantships are provided to help students complete their degree programs, to provide opportunities for learning experiences through participation in teaching and research projects, and to assist the faculty in meeting research and teaching responsibilities.

Assistantships are intended for students who will complete their classes and thesis/dissertation before leaving campus and beginning a job. The policy of the department is that any degree candidate who has been employed as a graduate assistant funded from departmental or research project sources is expected to conduct research having a significant creative component and to prepare a thesis or dissertation.

If you accept employment as a graduate assistant, you are not to have any other employment unless you have first obtained written permission from your adviser and the Department Head. Permission is rarely given for a student employed as an assistant to also have another job. Other University policies regarding employment may also apply.

Graduate assistants are employees of the Department, and are expected to adhere to the University's faculty and staff work calendar. Time off is normally allowed only on scheduled University holidays. The weeks between semesters and Spring Break week are not holidays, and employees are expected to work during those times. A student's supervisor may approve exceptions.

A graduate assistant should also recognize that, as an employee of the Department, he or she represents the Department to the public when working on a research project. Therefore, each person should strive to present himself/herself in a professional manner – including actions, words, and appearance/proper dress.

When a graduate student is or has been employed on a graduate assistantship, he/she is being paid to complete specified work. Before such a student leaves the University, they are expected to complete the work, including writing the thesis or dissertation. Therefore, the department will not sign any Immigration and Naturalization Service Optional Practical Training (OPT) forms until after you have submitted a complete final draft of your thesis or dissertation.

**PROGRAM DESCRIPTIONS & GENERAL REQUIREMENTS**

Both the Masters and the Doctoral programs typically include the following two components;

- Classroom component: A student completes a specified number of advanced classes;
- Research component: A student conducts a research effort and writes a thesis/dissertation that describes the research.

To successfully complete any graduate program, a student must be able to not only successfully complete classes, but also conduct research and write well in English.

With the full approval of a student’s Program of Study Committee, a student in a Master's program will select either the "**thesis option**" (conduct a substantial research effort and writes a thesis) or the "**coursework only**" option.

*Graduate students may be required to attend certain programs or seminars. In some instances, a graduate student will present a seminar, explaining their research activities.*

**Master of Science in Civil Engineering (MSCE)**

The chart which follows contains program options.

MSCE		
Master of Science in Civil Engineering		
Thesis Option		Coursework Option
Course Work 24 Hours*		Course Work: 36 Hours*
Thesis	6 Hours*	
Total	30 Hours*	
		Total 36 Hours*
<b>Available starting Fall 2015</b>		

\*The number of hours listed are minimums

\*Limit of 9 hours of CVEG 400 classes

**Master of Science in Environmental Engineering (MSEnE)**

All MSEnE degree candidates, regardless of previous degree status, must demonstrate completion of all Basic Engineering Education, Environmental Engineering Breadth, and Environmental Engineering Specialization. Specialization requirements are listed below, under MSEnE Program Requirements.

MSEnE Program Requirements

All MSEnE degree candidates, regardless of previous degree status, must demonstrate completion of the Basic Engineering Education and Environmental Engineering Breadth requirements listed below.

Basic Engineering Education Requirements

<u>General Education Topics</u>	<u>Credit Hours</u>	<u>Recommended Courses</u>
Humanities/Social Science	15	Acceptable to Undergraduate Program
English Composition I and Technical Composition II	6	ENGL 1013 and 1023
<u>Mathematics and Basic Science</u>	<u>Credit Hours</u>	<u>Recommended Courses</u>
Calculus & Differential Equations	16	MATH 2554 & 2564 & 2574 & 3404
Engineering Statistics	3	INEG 2313 <b>OR</b> STAT 3013
University Chemistry 1	4	CHEM 1123 & 1121L
University Physics I (calculus based)	4	PHYS 2054 & 2054L
General Microbiology	4	BIOL 2013 & 2011L
Physical Chemistry <b>OR</b> Organic Chemistry	4	CHEM 3504 <b>OR</b> CHEM 3603 & 3601L
Geology for Engineers <b>OR</b> Soil Science	2	GEOL 3002 <b>OR</b> CSES/ENSE 2203
<u>Basic Engineering Topics</u>	<u>Credit Hours</u>	<u>Recommended Courses</u>
Statics	3	MEEG 2003
Fluid Mechanics <b>OR</b> Hydraulics		
Mechanics of Fluids	3	CHEG 2133 <b>OR</b> CVEG 3213 <b>OR</b> MEEG 3503
Public Works Economics <b>OR</b> Engineering Economic Analysis	2	CVEG 3022 or INEG 3413
Computer Applications	3	

Environmental Engineering Breadth Requirements (18 hours required)

<u>Required Topics</u>	<u>Credit Hours</u>	<u>Recommended Courses</u>
Fundamentals of Environmental Eng.	3	CVEG 3243
Reactor Design	3	CHEG 3333 <b>OR</b> BENG 3733
Thermodynamics	3	MEEG 2403
<u>Elective Topics (6 hours required)</u>	<u>Credit Hours</u>	<u>Recommended Courses</u>
Heat Transport	3	CHEG 3143
Chemical Process Safety	3	CHEG 4813
Hydrology	3	CVEG 3223
Environmental Eng. Design	3	CVEG 4243
Occupational Safety and Health Standards	3	INEG 4223
Principles of Epidemiology	3	HLSC 4613
Environmental Health	3	HLSC 6553
Non-Equil. Mass Transfer	3	CHEG 3153
Thermal System Analysis and Design	3	MEEG 4483

Note: The 4000-level and 5000-level courses listed previously carry graduate credit and may be used in partial fulfillment of the graduate degree requirement provided they have not previously been used for credit toward a BS degree and they are approved by the student’s graduate study committee.

Environmental Engineering Specialization (MSEnE Graduate Program)

The following chart lists options for the MSEnE degree.

MSEnE		
Master of Science in Environmental Engineering		
Thesis Option		Coursework Option
Course Work 24 Hours*		Course Work: 36 Hours*
Thesis	6 Hours*	
Total	30 Hours*	Total 36 Hours*
<b>Available starting Fall 2015</b>		

\*The number of hours listed are minimums

\*Limit of 9 hours of CVEG 400 classes

Specialty Areas and Approved Courses:

Students are expected to select the required hours of graduate courses from one of the two following specialty areas and listing of approved courses. Other courses will be considered on petition to the student’s graduate study committee and the Coordinator of Environmental Engineering Studies.

Pollution Prevention and Control Specialty Area

CHEG 4263, Environmental Experimental Methodology  
CHEG 4813, Chemical Process Safety  
CHEG 5513, Biochemical Engineering Fundamentals  
CVEG 4243, Environmental Engineering Design  
CVEG 4263 Environmental Regulations and Permits  
CVEG 5234, Water and Wastewater Analysis  
CVEG 5243 Groundwater Hydrology  
CVEG 5253, Microbiology for Environmental Engineers  
CVEG 5273, Advanced Pollution Control  
CVEG 5283, Solid Waste Management  
CVEG 5753 or CHEG 5753, Air Pollution  
MEEG 4453, Industrial Waste and Energy Management  
MEEG 4473, Indoor Environmental Control  
MEEG 4483, Thermal Systems Analysis and Design  
MEEG 4603, Basic Nuclear Engineering  
MEEG 4623, Radiation Protection and Shielding  
MEEG 4813, Air Pollution Abatement  
MEEG 4843, Environmentally Conscious Design and Manufacturing

Natural and Water Resources Specialty Area

BENG 4113, Risk Analysis for Biological Systems  
BENG 4903, Water Resource Engineering  
BENG 4913, Bioenvironmental Engineering  
CVEG 4253, Small Community Wastewater Systems  
CVEG 4263 Environmental Regulations and Permits  
CVEG 5234, Water and Wastewater Analysis  
CVEG 5243, Groundwater Hydrology  
CVEG 5253, Microbiology for Environmental Engineers  
CVEG 5263, Stream Pollution Analysis  
CVEG 5283, Solid Waste Management  
CVEG 5293, Water Treatment & Distribution System Design  
CVEG 5734, Advanced Wastewater Process Design and Analysis  
GEOL 4033, Hydrogeology  
AGRN 5224, Soil Physics

Additional Requirement:

Each MSEN candidate must submit a manuscript on their area of research to an appropriate peer-reviewed journal as determined by their Graduate Program of Study Committee. The manuscript should meet the guidelines for authors of the journal.

## Master of Science in Engineering

The Master of Science in Engineering (MSE) degree is awarded only to students who pursue the degree through distance education. It is designed for students who do not wish to specialize in a particular field or for students who do not have an undergraduate degree in Civil Engineering.

### MSE Degree Options:

A total of 30 semester credit hours are required to complete degree requirements for the MSE. A student has two basic options to meet the 30 hour requirement: a *Program* option or a *Coursework* option as detailed in the table which follows.

<b>MSE</b>			
<b>Master of Science in Engineering</b>			
Program Option		Coursework Option	
Course Work 24 Hours*		Course Work: 30 Hours*	
Project	6 Hours maximum GNEG 590V (Special Topics) <i>Requires Proposal and Final Project Report</i>		
Total	30 Hours*	Total	30 Hours*

\*The number of hours listed are minimums

\*Limit of 9 hours of CVEG 400 classes

### Required Coursework (applicable to all options):

- One 3-hour course from each of the following four areas for a total of 12 hours: Mathematics, Computer Applications, Technical Communications, and Engineering Management;
- Three 3-hour engineering courses that form a cohesive topic or area of emphasis with the approval of the advisory committee;
- Nine additional graduate-level hours from any area approved by the advisory committee.
- A minimum of 50% of the course work must be engineering, non-operations management (OMGT), classes.
- A maximum of four 4000-level graduate level courses may be taken; the remainder must be 5000-level or higher.

A thesis is not required; however, towards the end of the program students will be required to complete a comprehensive oral exam. Students must also maintain a 3.0 GPA or higher, with no more than two “C” grades. No credit will be received for courses with “D” or “F” grades; however, such grades will be included in the GPA calculation. A student has a maximum of six years to complete all degree requirements.

### Doctor of Philosophy (Ph.D.)

Doctor of Philosophy programs consist of in-depth study through advanced courses in civil engineering and support disciplines, plus an intensive research investigation leading to the preparation of a dissertation. Preparation of a paper suitable for presentation at technical conferences and for publication in technical journals also is expected.

Candidates for the Ph.D. degree must either satisfy a language requirement by demonstrating a reading knowledge of a foreign language that has been recommended by his or her Doctoral Advisory Committee, or complete 6 semester credit hours of course work in a field consistent with the student's program of study (outside the Department of Civil Engineering) and career goals.

The following chart lists some program details.

<b>Ph.D. Doctor of Philosophy in Engineering</b>
72 hours of credit beyond the B.S. Degree, including dissertation research
48 hours of forma coursework beyond the BS degree
42 hours of credit beyond the M.S. degree
18 hours of dissertation research
<ul style="list-style-type: none"><li>• The number of hours listed are minimum</li><li>• Limit of 9 hours of CVEG 4000 classes</li></ul>

## PLANNING A GRADUATE PROGRAM

Application for admission to a graduate program implies a commitment on the part of the student to acquire further education in a chosen field of practice. The student is responsible to a great extent for initiating actions required for fulfilling the requirements for the degree. This includes taking the initiative to see that all deadlines for activities and submission of forms are met. The student is responsible for keeping his or her major professor informed of the progress on assignments, for initiating and conducting a research project with the assistance and cooperation of the major professor, and for scheduling committee meetings and candidacy exams.

The requirements for completing many, if not most graduate engineering programs, call for students to successfully:

- complete a specified number of class hours;
- conduct research and prepare a research paper.

### Planning a Research Component

Writing a research paper is a significant part of a thesis-based M.S. or a Ph.D. degree. For a thesis-based M.S. program, the paper is a thesis; for a Ph.D., it is a dissertation. A thesis or dissertation is based on research a student performs under the supervision of a professor. The student is responsible, with the assistance of the major professor and Program of Study Committee, for planning and designing a research project serving as a basis for his or her thesis, or dissertation. It is not uncommon for this thesis/dissertation paper to be based on work a student performs while employed as a graduate assistant by the University. Often, the same work that a student does for his/her research is the not only the basis for the thesis/dissertation, but also becomes a report for the agency that sponsored (i.e., paid for) the research, and is submitted to a technical journal for publication. This means that your paper must be written to conform to certain guidelines, so it can be converted into a research report or journal article.

It is not always possible for a student to write a thesis or dissertation based on her/his University employment. If a student is not employed to do the kind of work leading to an acceptable thesis or dissertation, the student may propose their own topic and write a thesis or dissertation.

Preparation of the thesis or dissertation is the responsibility of the student and its completion includes a professional obligation to the major professor and to the department. Completion of the thesis or dissertation within a reasonable time period requires careful planning and timely execution of the underlying research project. Thus, *the student has the obligation to begin research work as soon as possible after beginning the program of study and not delaying research activities until all course work is completed.* Lack of progress toward completion of the research work and preparation of a thesis or dissertation indicates problems with the conduct of the research, the analysis of data, or the writing of the report. Regardless, it is the responsibility of the student to contact his or her major professor or Program of Study Committee for advice on how to proceed. If differences occur between the student and the major professor or Program of Study Committee that seemingly cannot be resolved, the

Department Head should be contacted for resolution of differences or referrals to other persons or offices.

While initiation of actions is the student's responsibility, the major professor and Program of Study Committee are responsible for assessing the quality and completeness of the degree program and may provide suggestions or requirements above the minimum stated in the Graduate Catalog or this Graduate Student Guide.

### Selection of a Major Professor

A member of the graduate faculty within the department will serve as a major professor for directing a student's program of study. This association is based largely on the common interests of the student and the faculty member and typically is arranged at the time of admission to the program. The student's personal preference for a specific major professor will be honored to the maximum extent possible, although some adjustment may be required to accommodate faculty loads and financial resources. The major professor is the student's academic adviser as well as supervisor of a research program that includes preparation of a thesis or dissertation. Generally, the principal investigator of research projects on which the student is supported will be the student's major professor. The major professor will assist the student in nominating a Program of Study Committee, will periodically review the progress of the student's research program, and will assist the student with preparation of the thesis or dissertation before it is submitted to the Program of Study Committee.

### Selection of a Program of Study Committee

A graduate student working toward a degree should select a Program of Study Committee prior to the second semester in residence. The student's major professor will serve as chairperson of this committee. Committee members are selected from department or university faculty whose educational and research interests are best suited to guide the student and evaluate the progress of his or her graduate study. The student should contact prospective committee members prior to appointment by the Department Head and the Dean of the Graduate School. M.S. committee members may be selected from graduate faculty members within the student's major department and the committee must consist of at least three members. Selection of one member from outside the Civil Engineering Department is strongly encouraged. Ph.D. committees must consist of a minimum of three members selected from the graduate faculty, one of which must be from a department other than the student's major department. The Department Head is an ex-officio member of all Program of Study Committees.

The Program of Study Committee should meet periodically to review the student's progress and to provide input and direction to the program. As a minimum, formal meetings should be held to approve the program of study, at the preliminary exam for Ph.D. candidates, and at the final oral exam or thesis or dissertation defense.

The chart which follows shows typical steps involved in executing a graduate program and a timeline for the various tasks required.

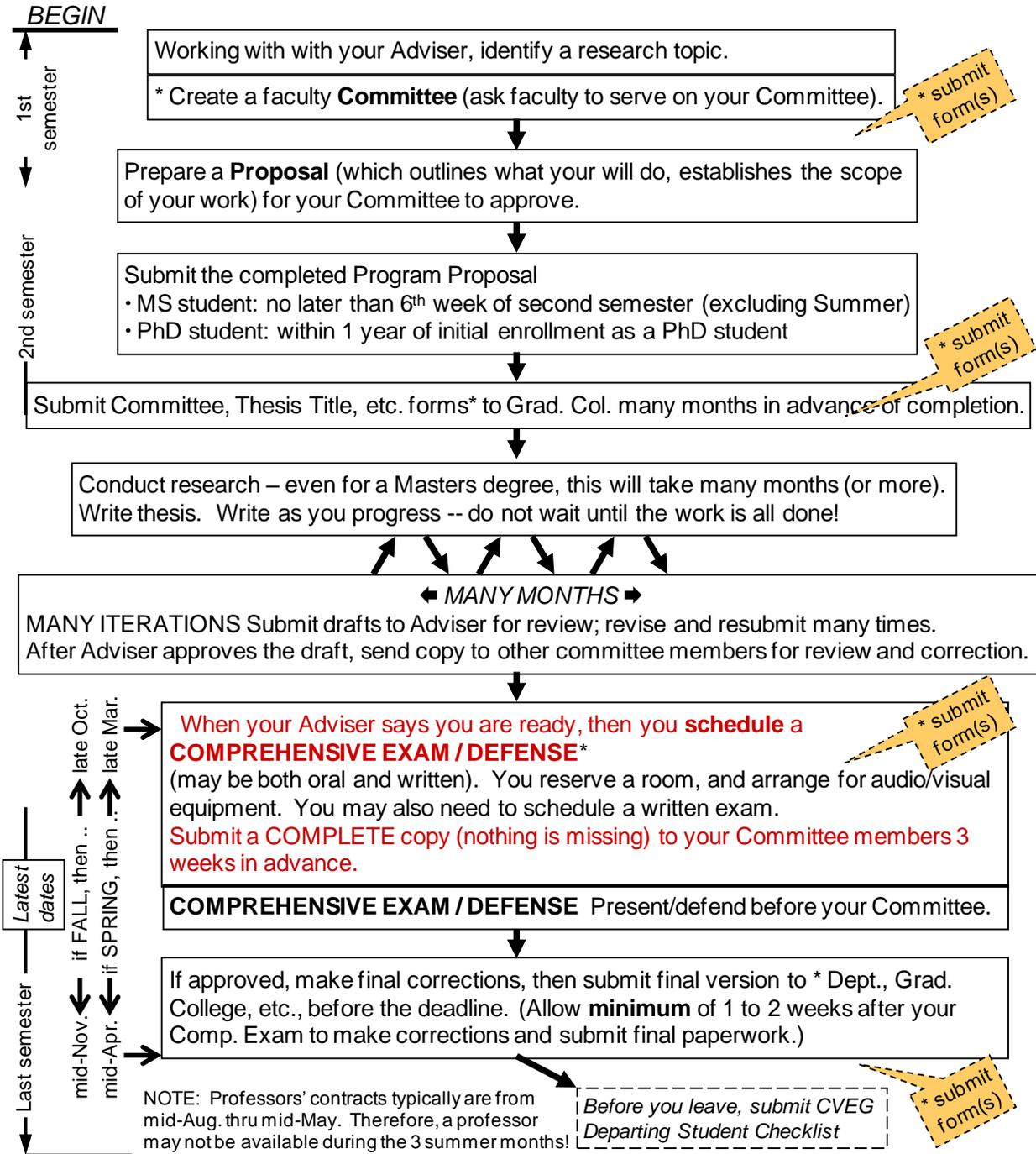
## GRADUATE STUDENTS: FIGURE HOW MUCH TIME IT WILL TAKE TO COMPLETE YOUR PROGRAM.

### OVERVIEW OF STEPS AND TIMELINE FOR YOUR RESEARCH

This diagram outlines some of the steps involved in MS or PhD research. This timeline is more reflective of a Masters degree; some of the steps for a Doctoral degree are different.

This outline does not include all of the details -- refer to documents from the CVEG Department and the Grad College.

*Even a simple MS report will require a **minimum of a semester**; many students take longer. A thesis or dissertation will require **more/much more time!***



## Program Proposal

All graduate students must prepare and submit a program proposal. The lists which follow show the major elements of the proposal process for MS and Ph.D. candidates. Students should work closely with their major advisers to ensure that all elements are completed in a timely manner.

### Master's (M.S.) Students

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- Each student must attend an orientation session, workshop, or personal appointment with the Engineering Research Librarian regarding library services and procedures prior to submitting the Master's Program Proposal. The student must submit written documentation certifying participation in any such activity.
- A Master's Program Proposal must be completed by the sixth week of the second semester of the student's graduate program. The Master's Program Proposal must contain, at a minimum, the following items:
  - A list of the Graduate Program Committee members.
  - A discussion of the research topic for the Master's Thesis; the content and extent/scope of this discussion is determined in consultation with the student's thesis/report adviser.
  - A list of support items necessary for completing the proposed research, i.e. laboratory space, specific equipment requirements, computing requirements, projected expendable supplies, projected travel requirements, etc.
  - A list of the coursework to be completed for the degree sought.
  - A proposed schedule/timeline for completing the research, including a date for delivering a complete draft of the Master's thesis. The proposed schedule should identify specific milestones to be accomplished during the research and thesis preparation effort.
- All required forms related to the Master's Program must be submitted to the graduate school within three working days after successfully completing the Master's Program Proposal. It is the student's responsibility to:
  - correctly complete all forms and submit them to the appropriate person(s); and
  - submit copies of these forms to the Department of Civil Engineering, to be placed in the student's academic file.

### Ph.D Students

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- Each student must attend an orientation session, workshop, or personal appointment with the Engineering Research Librarian regarding library services and procedures prior to submitting the Doctoral Program Proposal. The student must submit written documentation certifying participation in any such activity.
- A Doctoral Program Proposal must be completed within 1 year of the student's initial enrollment as a Ph.D. student. The Doctoral Program Proposal must include the following items, as well as others specified by the Program of Study Committee.
  - A list of the Doctoral Program Committee members.

- A discussion of the research topic for the Doctoral Dissertation; the content and extent/scope of this discussion is determined in consultation with the student's dissertation adviser. It is expected, however that the discussion will demonstrate a high degree of understanding of the scope and objectives of the proposed research, and will contain a significant review of pertinent literature related to the topic.
  - A list of support items necessary for completing the proposed research, i.e. laboratory space, specific equipment requirements, computing requirements not commonly available, projected expendable supplies, projected travel requirements, etc.
  - A list of the coursework to be presented for the degree, including both previously completed and proposed courses.
  - A proposed schedule/timeline for completing the research, including a date for delivering a complete draft of the dissertation. The proposed schedule should identify specific milestones to be accomplished during the research and dissertation preparation effort.
- All required forms related to the Doctoral Program must be submitted to the Graduate School within three working days after successfully completing the Doctoral Program Proposal. It is the student's responsibility to:
    - correctly complete all forms and submit them to the appropriate person(s);
    - submit copies of these forms to the Department of Civil Engineering, to be placed in the student's academic file.

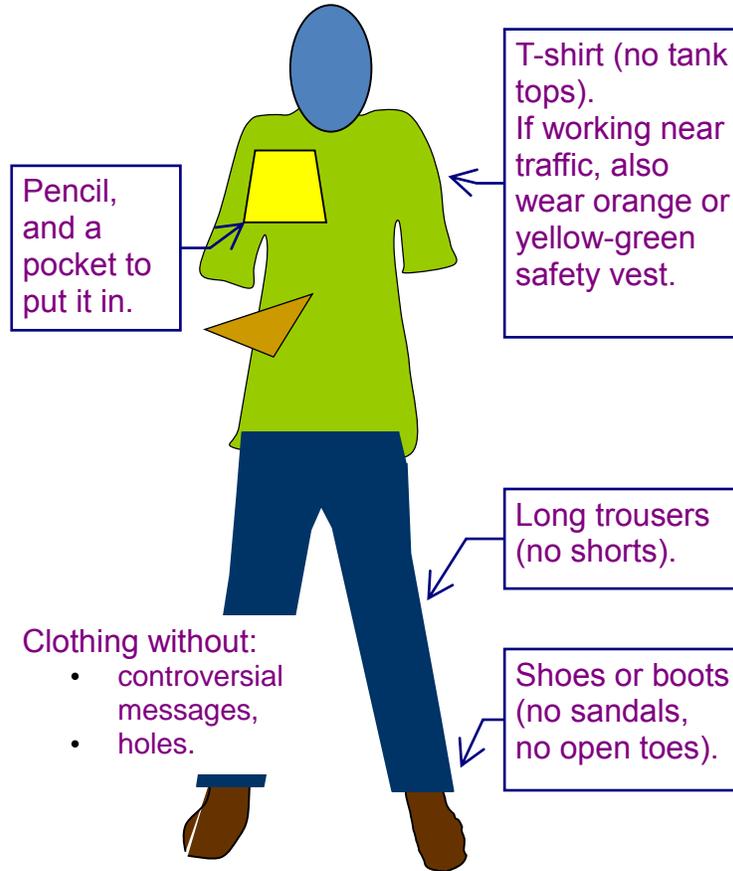
### Conduct of Research

Tasks required for the completion of the research portion of the graduate program should be conducted in a professional manner. This includes timeliness, thoroughness, and with utmost integrity. Work spaces should be kept orderly. All applicable safety rules and policies must be followed stringently; safety equipment and supplies must be kept well-stocked and used as appropriate. Project deliverables – items such as laboratory/field data, reports, photo/video recordings, etc. – should be submitted as required, in a timely fashion. In addition, backup copies of deliverables should be kept up-to-date to reduce the risk of 'losing' valuable project data.

Graduate students may be required to conduct research activities in the laboratory and/or in the field. At all times, graduate students should remember that they represent the University of Arkansas and the Department of Civil Engineering while conducting University-related business. As such, each person should strive to present himself/herself in a professional manner – in speech, actions, and appearance. The suggested dress for working 'in the field' is shown in the diagram which follows. Depending on the type of work being performed, additional clothing items and/or accessories may be required, i.e. a nuclear dosimetry badge when using a nuclear gauge.

## DRESSING FOR FIELD WORK

### Minimum requirements



- You may also wish to bring your own water to drink, insect repellent, sunscreen, raincoat, umbrella, and cap.
- From October through April in Arkansas, you may need a warm coat.
- In some parts of the US, you need a warm coat all year; at higher elevations, it can snow in July.

### Comprehensive Exam, Defense, Candidacy Exam, and Final Examination

In addition to the tests a student takes in each class, graduate programs typically include other examinations. The number and the type of examinations addressing graduate class work and research differ according to the type of program. As mentioned elsewhere, both Master's and Doctoral students will prepare a Proposal before beginning their research.

- Master's Program students will have a combined final Comprehensive Exam and Thesis Defense. The Comprehensive Exam may include written and/or oral questions from any or all of the topics contained in the student's coursework. A Thesis Defense consists of a presentation of the Master's Thesis, followed by a question-and-answer session based on the Thesis. The graduate student will be judged by how well he/she performs on the written and oral tests, the quality of his/her Master's Thesis, the presentation, and how well he/she responds to questions from the Committee.
- Doctoral Program students will have a Candidacy Exam before being formally accepted as a doctoral degree candidate. The Candidacy Exam normally is given after at least two semesters of graduate study in this department. This exam must include a written portion, and may also include an oral portion. When the candidate's research is complete and the dissertation is prepared, the candidate will have a Final Examination. During the Final Examination, the candidate will make a presentation on the dissertation and answer questions from the Committee. The questions will primarily concern the dissertation but may include other aspects of the student's graduate work.

Only when a graduate student has completed an acceptable Thesis or Dissertation is he or she ready to schedule the Comprehensive Examination and Defense or Final Examination. A graduate student will take the following steps:

- Contact committee members at least 3 weeks in advance to find a suitable date and time for the presentation and oral questions.
  - Distribute *revised* copies of the Thesis or Dissertation to the committee members; this implies that the Thesis or Dissertation has been thoroughly reviewed by the major adviser.
  - Masters students also ask committee members if they wish to schedule a written component for the comprehensive exam, to take in addition to and separately from oral questions in the presentation.
- Reserve a room for the exam (usually the CVEG Conference Room). Reserve the room for 1 hour before your exam is to begin, and for 2 hours after the starting time.
- Check to make sure all forms have been filled out. Masters students bring a partially-completed "Record of Progress" form to the presentation of their Thesis.
- Prepare a presentation of your Thesis or Dissertation. Graduate students' presentations of their research are often about 20 minutes long. Familiarize yourself with the audio-visual equipment in the room in which you are holding your defense. Practice your presentation in advance, and check to see how much time you take.

## Publishing the Research

One of the many tasks expected of the faculty is publication of research work that they have supervised. If a faculty member has supervised or directed work that you have performed, then they may wish to submit some or all of that to technical journals, for consideration for publishing (please note the comments which follow). If you wish to take the initiative and be involved in this yourself, notify the faculty member; otherwise, the faculty member may assume the responsibility for this.

The major adviser may require the student to prepare one or more articles to be submitted to peer-reviewed journals and/or conferences in lieu of a traditional Master's Thesis or Dissertation. The Department of Civil Engineering policy follows.

The faculty of the Department of Civil Engineering recognizes the value of publishing research findings in archival journals and through the presentation and publication of findings at technical conferences. In many cases, this streamlines the technology transfer process. Therefore, the faculty has agreed to allow archival journal articles and conference proceedings to stand as a dissertation or thesis – subject to University formatting guidelines and in accordance with the following:

- Ph.D. Dissertation:
  - 3 peer-reviewed, submitted, archival journal articles:
    - The Ph.D. candidate must be shown as the 1<sup>st</sup> Author on all articles;
    - At least one article must have been **accepted** for publication.
  - The UA Dissertation must contain all three articles, with additional text to connect the articles within the context of the overall research effort.
  - A live, on-campus Dissertation Defense is required, in accordance with UA Graduate School policies.
  
- M.S. Thesis:
  - 1 peer-reviewed, archival journal article:
    - The MS candidate must be shown as the 1<sup>st</sup> author on the article;
    - The article must have been submitted for review.
  - A live, on-campus Thesis Defense is required.
  
- Undergraduate Honors Thesis:
  - 1 research article – *either* a peer-reviewed, archival journal article which has been submitted for review, *or* a conference proceedings article which has been submitted for consideration;
  - Presentation of the work at a technical conference may stand for the Thesis Defense with the approval of the candidate's Honors committee; otherwise, an on-campus Thesis defense will be required.