

# **UNIVERSITY OF CINCINNATI COLLEGE OF ENGINEERING AND APPLIED SCIENCE**



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**GRADUATE STUDENT HANDBOOK  
DEPARTMENT OF CIVIL AND ARCHITECTURAL  
ENGINEERING AND CONSTRUCTION  
MANAGEMENT  
2013-2014**

## **PREFACE**

All information in this handbook is intended to supplement the rules and policies described in the most recent edition of the University of Cincinnati Graduate Handbook<sup>1</sup>. In the event that anything in this handbook conflicts with the University of Cincinnati policies, guidelines, rules or regulations, the policies, guidelines, rules or regulations of the University of Cincinnati shall be held as supreme. Graduate students should download and read the handbook.

The School of Advanced Structures reserves the right to correct any errors in this handbook. Correction of errors shall not invalidate those sections corrected, nor relieve students of their duties under those sections.

Should any part of this handbook become invalid, the remainder of the handbook shall remain in force.

In general, full-time students who continue their academic programs without interruptions (not including Summer Semester hiatuses) are held responsible for the graduate program requirements that are in force and published at the time of their first matriculation into the program. Thus, changes in graduate program requirements will affect only those students who matriculate after the adoption and publication of the changes. However, from time to time, minor changes in procedures may be adopted by the graduate program and, since these will have minimum effect on the required effort and time to completion for the graduate degree, the students will be required to conform to the modified requirements regardless of when they began their studies.

Students who interrupt their graduate studies by withdrawing, officially or unofficially, from the program, fail to maintain graduate student status, or change programs, will be held responsible for the graduate program requirements in force at the time they re-enter, are reinstated, or change programs.

## **1. GRADUATE PROGRAMS AND DEGREES**

The Department of Civil and Architectural Engineering and Construction Management (CAECM) offers specialized graduate programs in all areas of civil engineering. These programs stress research and independent study in addition to coursework, and lead to a Master of Engineering (MEng), a Master of Science (MS), or a Doctor of Philosophy (PhD) degree in civil engineering. The focus of the graduate program is on (a) Infrastructure Design and Materials and (b) Infrastructure Systems and Management. The courses and research encompass construction engineering and management, geotechnical engineering, pavement engineering, structural engineering, and transportation engineering. Additional information is available from <http://sas.ceas.uc.edu>.

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<sup>1</sup> [http://grad.uc.edu/academics/graduate\\_studenthandbook.html](http://grad.uc.edu/academics/graduate_studenthandbook.html)

A student admitted to one area of study may change to another area within the School. However, the student must obtain permission of faculty from both areas involved and from the School Graduate Program Director. Thus, for example, a student accepted to the Geotechnical Engineering concentration cannot change to the Transportation Engineering concentration unless a formal request for transfer is submitted and accepted by the faculty in both areas concerned. However, at the time of initial application, students may apply for custom programs that combine elements of two or more areas.

## **2. APPLICATION AND ADMISSION**

### **2.1 Requirements for Applying**

A Bachelor of Science from an ABET accredited or equivalent college with a minimum GPA of 3.0 on a 4.0 scale is required for admission into any of the degree programs. Students with an appropriate Bachelor of Science or Master of Science degree may be admitted into the PhD program. The Graduate Record Exam (GRE) General Test is generally required for all students applying for admission and financial aid. Students with an undergraduate degree from an ABET accredited program holding a 3.2 GPA or higher are not required to take the GRE test. A combined score of verbal reasoning and quantitative reasoning of at least 1250 and an analytical writing score of at least 4 are preferred, with minimum values for admission set at 3.5 analytical, 650 quantitative and 350 verbal (grading scale pre-2011) or 3.5 analytical and 155 for both quantitative and verbal (grading scale post-2011). International students are also required to take the Test of English as a Foreign Language (TOEFL) and they must achieve a minimum score of 96 on the IBT. Under special circumstances (see Section 2.5.2), a student may be admitted provisionally.

The MS and PhD degree programs require a Bachelor of Science (BS) degree in Civil Engineering or in a closely related engineering discipline, such as Mechanical Engineering, Aerospace Engineering, or Architectural Engineering. Applicants with a BS in other engineering or architecture programs, such as Architecture, Electronics & Electrical Engineering, or Computer Engineering, may be admitted but they are required to take a number of required undergraduate courses in Civil Engineering after admission into the graduate program. These courses will be specified at the time of admission.

### **2.2 Application**

Since all qualified applicants for full-time study in the MS and PhD programs are considered for financial aid, no separate form is required. However, in order to be considered, the completed application has to be submitted by January 31 for admission to the academic year starting in late August. MEng applicants can apply for admission at any time. However, admission during the academic year is contingent upon obtaining approval from the School Graduate Director and the College MEng coordinator. Some sequenced courses start in the Fall semester, and scheduling of the required degree courses may prevent admission during the academic year. Online applications are available on the web site listed below.

[http://ceas.uc.edu/Graduate\\_Studies/AppyOnline.html](http://ceas.uc.edu/Graduate_Studies/AppyOnline.html)

All information should be submitted electronically. Below is a specific list of all items that will be needed.

- a. University of Cincinnati online application form, with the required application fee
- b. A minimum of two letters of reference submitted through an online application process
- c. Statement of purpose, describing in the student's own words why he/she wants to pursue an advanced degree
- d. Official transcripts of all coursework and degrees
- e. Graduate Record Examination (GRE), general test scores sent to the University of Cincinnati (Code #1833) (unless exempt – see section 2.1).
- f. The TOEFL (Test of English as a Foreign Language) scores for international students, sent to the University of Cincinnati (Code #1833).
- g. Degree Code CE entered in the application form.

The Fall semester (with classes typically beginning in late August) is the strongly preferred term for admission since this optimizes the sequencing of required courses and the potential for financial aid.

### **2.3 Admission Process**

After the complete application is received, the CAECM Graduate Faculty will review the application. Faculty members first determine if the applicant is acceptable. The faculty must also determine whether an advisor is available and whether other resources needed to support the graduate student are available. On this basis, the faculty members recommend approving or disapproving the application. Occasionally, the faculty may recommend "Provisional Acceptance" which is described in Section 2.5.2. The faculty members then make recommendations on financial assistance for acceptable applicants.

The decisions of the faculty are reviewed and confirmed by the Graduate Program Director and the School Director. A letter from the School Director announcing the decision and detailing the subsequent actions required is sent to the applicant. The accepted applicant is required to sign and return a form letter to indicate acceptance of the offered admission, and to indicate that the conditions of the acceptance are understood. Offers of admission or of admission with financial assistance that are not accepted by the applicant in a timely manner will be withdrawn.

### **2.4 Admission and Financial Aid Decisions**

Admission to the graduate program is competitive; hence, not all applicants who satisfy the minimum requirements for admission can be accepted. Decisions on admission are based on credentials furnished in the application package.

Financial aid decisions are based on those credentials and on the request for assistance indicated on the application forms. Decisions on admission and financial aid must also consider the availability of advisors, other school resources, and funding to support the student.

## **2.5 Types of Admissions**

There are three types of admissions: (a) Full Graduate Standing, (b) Provisional Admission, and (c) Unclassified Graduate Students. A graduate degree may be granted only to a student with full graduate standing.

### **2.5.1 Full Graduate Standing**

For admission to full graduate standing at the University of Cincinnati, a student must have a Bachelor of Science degree from a college or university regarded as standard by a regional or general accrediting agency. The applicant should have at least a B average in relevant undergraduate coursework or otherwise show evidence of promise as judged satisfactory by CAECM Faculty.

MS and PhD students are admitted according to the program standards described in Section 2.1. Upon admission, each student is assigned a faculty advisor who also serves as an academic and thesis/dissertation advisor. The thesis/dissertation advisor must be a graduate faculty. In some instances, an MS student is assigned to a temporary advisor. Within a semester, a permanent advisor is usually identified. For MEng students, the advisor is an academic advisor.

#### **2.5.1.1 Change of Status**

A student admitted as an MEng student can petition to change to the MS Degree Program. Such a change is possible with permission of the program faculty, the student's proposed thesis advisor, and the Graduate Program Director. An MEng student can change to the MS Degree Program only if a faculty member of the School of Advanced Structures agrees to be the academic and thesis/dissertation advisor. The MEng student must have spent a minimum of one year with the MEng program.

A student admitted to the MS Degree Program is not allowed to switch to the MEng Degree Program unless he/she has not received any funding. The student's advisor, the Program Director, and the Graduate Program Director must approve this change of status.

PhD students are permitted to change to the MS Degree Program only with permission of their dissertation advisor, the Graduate Program Director, the Program Director, and the School Director. This change will be permitted only under extraordinary conditions. PhD students are not permitted to change to the MEng Degree Program.

### **2.5.2 Provisional Admission**

Provisional admission may be granted to applicants who lack undergraduate work or skills considered essential for graduate studies in the intended focus area. Coursework, without graduate credit, will be required of provisionally admitted students to make up such deficiencies before admission to full graduate standing can be granted.

Graduates of non-accredited institutions may be granted provisional admission when their academic records warrant admission. Additional coursework will be required of such students when deficiencies in their previous training are apparent.

Graduates of accredited institutions whose scholastic records are below the standards for admission to full graduate standing may be admitted provisionally when extenuating

circumstances can be shown to have affected their undergraduate grade point averages or when progressive improvement in the undergraduate programs warrants provisional admission.

Graduates of accredited institutions whose scholastic records are below the standards for admission to full graduate standing may also be admitted provisionally if 5 years have elapsed since graduation, and the applicant has been employed in responsible engineer work related to the area to which he/she is applying.

Provisional admission may be granted to applicants who lack some document required for the admissions process, such as the official copy of the GRE score.

Provisionally admitted students will be informed in writing of the terms of their acceptance, of the requirements for them to be granted full graduate standing, and of the expected time table for complying with the requirements. At periods not to exceed 12 months or at the end of the specified time to complete the requirements, the progress of the student will be reviewed by the faculty in the area of study and by the Graduate Program Director. Subsequent to the review process, the Graduate Program Director will inform the student in writing whether a change in status to full graduate standing is warranted.

Provisionally admitted students are subject to the same upper limits on total time to complete their degrees as students with full graduate standing.

Provisionally admitted students may earn graduate credits concurrently with taking courses to remove deficiencies, provided that courses are taken in a rational sequence with respect to prerequisites and that the primary effort is to make up deficiencies and attain full graduate standing.

International students on F-1 or J-1 visas cannot be granted provisional admission.

### **2.5.3 Unclassified Graduate Students**

The Unclassified Graduate status allows non-matriculated students to take courses for graduate credit when they have not been admitted into the graduate degree program. Should the student subsequently matriculate into a program, the number of credits counted toward the degree requirements ordinarily may not exceed 10.

### **2.5.4 International Student Admissions**

Admission of international students is based on the requirements stipulated in the University Graduate Handbook.

## **3. MATRICULATION AND REGISTRATION**

A student will normally matriculate (initially enroll) in a degree program only once, but must register for each semester in which courses will be taken. Generally, a new student should plan to arrive at least two weeks prior to the start of classes. There are several activities, such as orientation programs, which are necessarily scheduled before the start of classes. International students are encouraged to arrive even earlier to provide ample time to take the Oral English

Proficiency Test, schedule a physical exam, arrange living accommodations, establish financial accounts, become familiar with the region, and adjust to the cultural environment.

#### **4. Graduate Credit and Grades**

##### **4.1 General**

Graduate credit policies are in accordance with the University Graduate Handbook. Students must maintain graduate student status as stipulated in the University Graduate Handbook.

##### **4.2 Transfer of Credits**

Students who have completed graduate work at other U.S. universities or at the University of Cincinnati may petition the Graduate Program Director for transfer of credits earned elsewhere to be applied towards their graduate degree. Transfer of credits is subject to the following limitations.

- a. A maximum of 10 graduate credits may be transferred towards the M.S. degree.
- b. A maximum of 6 graduate credits may be transferred towards the Ph.D. degree.
- c. The graduate credits must have been taken for graduate credits at the time they were completed.
- d. The graduate credits must be in excess of those needed for any program that resulted in the award of a Bachelor's degree or Master's degree to the students seeking transfer of credits.
- e. Credit can only be transferred for courses in which the student earned a grade of B or better. Credit cannot be transferred for courses in which the student earned a grade of B- or lower, for courses taken as an audit, nor for courses graded on the Pass/Fail Basis.
- f. The credits transferred must be for a course that would ordinarily form an integral part of the student's program.
- g. Normally, credit hours allowed for a transfer course will not exceed the credit hours associated with the University of Cincinnati course(s) that cover equivalent material.
- h. Transfer credits must have been earned not prior to 5 years before application for advanced standing.
- i. Credits from other universities or institutions cannot be used to satisfy research credit hour requirements.

##### **4.2.1 Process for Transfer of Credits**

For transfer of credits earned prior to matriculation in the graduate program in the School, the credit transfer process should be initiated early in the first semester of the student's program. The student must file a petition for Advanced Standing with the Graduate Program Director no later than two semesters after admission. The petition is to be endorsed by the student's advisor. The petition has to list the courses to be transferred, the university, the year, and the grade earned. In addition, course syllabi have to be included. Upon approval, the petition is

sent to the University Registrar where the credits are officially posted on the transcript at Advanced Standing.

The student should provide proof that the courses to be transferred were not part of a program for which a degree was granted. If courses are to be taken at another institution while the student is working on a program at the School of Advanced Structures, prior permission should be obtained in writing from the advisor, with approval noted from the Graduate Program Director.

### **4.3 Audit**

Admission and conditions for participation in a course to be taken for audit are at the discretion of the instructor, who is under no obligation to accept a student for an audit credit. The Audit option should not be elected without consulting the advisor. The Audit option is normally elected for one of two reasons:

- a. to obtain remedial/deficiency instruction in major or minor areas of study, in which case they must be indicated on the plan of study; and/or
- b. to take courses for personal fulfillment outside the plan of study.

The credit hours associated with an audited course do not count towards the 15 credits/semester required of a full-time student. Audited courses do not serve to fulfill requirements for required or elective courses in the plan of study. Audited course credits do not count towards the number of credits required for a degree.

A student who wishes to take a course as an audit must:

- a. meet with the instructor at the beginning of the semester to determine the level of participation which the instructor requires for the audited course;
- b. meet the requirements arranged with the instructor; and
- c. withdraw officially if he/she intends to cease attending the class.

Instructors may require auditing students to complete assignments and/or sit for exams.

Auditing students are identified with a pre-printed "T" on class and grade lists provided to the instructor. This grade may be overridden by a "U" if the student does not meet the instructor's minimum requirements for audit credit, or by a "W" if the student or instructor properly initiates a withdrawal.

## **5. FINANCIAL SUPPORT**

Graduate students typically obtain financial support from:

- a. the University of Cincinnati provides merit-based graduate awards in the form of tuition scholarships (known as University Graduate Scholarship or UGS),
- b. graduate assistantships (including teaching – TA and research assistantships – RA), and
- c. program-specific scholarships and fellowships.



A student accepting financial aid in the form of University Graduate Scholarship, a teaching, or research assistantship (UGS, TA, or RA) must be in the MS or PhD Degree Program. A reduced University Graduate Scholarship may be granted to students in the MEng program. A University Graduate Scholarship will not be provided for more than 3 semesters for MS students and 4 years for PhD students. Students receiving UGS funds must be registered for 15 credit hours per semester in their program. MS students who have accepted a UGS, TA, and/or RA of any type for any length of time cannot change to the MEng program. A MS student who has never accepted a UGS, TA, or RA can change to the MEng degree program only with permission from his or her Thesis Advisor and the Graduate Program Director. This change will be permitted only under extraordinary conditions. An MEng student who changes to the MS Degree Program is bound by the same rules as MS students.

### **5.1 Acceptance of Financial Aid**

Requirements for graduate assistants and UGS recipients are stipulated in the University Graduate Handbook. Specifically, they must:

- a. be a full-time student as defined by the UC Graduate Handbook,
- b. meet all eligibility requirements in the UC Graduate Handbook, and
- c. remain in good standing and make adequate progress toward a degree.

A thesis student not receiving a TA or an RA may still receive a UGS, provided the requirements listed above are met. A student receiving a TA or RA may not be otherwise employed in any manner without the approval of his/her advisor and Graduate Program Director. International students need to check with the International Student Office (ISO) for additional rules regarding employment and financial aid.

## **6. DEGREE REQUIREMENTS**

Graduate students must meet all program and school requirements for graduation. A failing grade in a required class will prevent the student from graduating until a passing grade has been earned in the same class, subject to the minimum GPA requirements as put forth by the University.

### **6.1 General Requirements**

**MEng - Masters of Engineering:** An MEng student must complete not less than 30 credit hours of formal coursework<sup>2</sup>, which may include a capstone project. This project must meet the guidelines within this document and those set forth by the College of Engineering and Applied Science. Students who want to take a course outside of the College of Engineering and Applied Science (CEAS) must obtain permission by completing “Approval for Courses Outside CEAS” form. An MEng student is considered to be a “non-thesis student.” Prior to graduation, MEng students must either submit a formal, written project document and make a satisfactory presentation of this project to a faculty committee, or undergo a final comprehensive oral examination.

**MS - Masters of Science:** An MS student must complete not less than 30 credit hours consisting of at least 20 credit hours of formal coursework<sup>2</sup> plus at least 10 credit hours of thesis research. Students who want to take a course outside of the College of Engineering and Applied Science (CEAS) must obtain permission by completing “Approval for Courses Outside CEAS” form. The student must submit and orally defend a written thesis conforming to the requirements of the University Graduate Handbook. An MS student is considered to be a “thesis student.” The thesis work will be guided and judged by a committee, chaired by the student’s advisor.

**PhD - Doctor of Philosophy:** A PhD student must complete not less than 60 credit hours including a minimum of 12 credit hours of formal coursework<sup>2</sup> beyond the MS degree. Students who want to take a course outside of the College of Engineering and Applied Science (CEAS) must obtain permission by completing “Approval for Courses Outside CEAS” form. After one year of coursework and research at the University of Cincinnati, PhD students are expected to pass the PhD qualifying exam. The examination is structured to assess both the student’s depth of knowledge in the chosen field and his/her ability to apply this knowledge towards formulation of new research paradigms. The format of the qualifying exam is described in Section 9. A PhD student must submit and orally defend a written dissertation conforming to the requirements of the University Graduate Handbook. The dissertation work will be guided and judged by a committee, chaired by student’s advisor.

## 6.2 Restrictions

Research credits (CVE 7092) do not count for MEng students. Independent study and special project (CVE 7093) are limited to six (6) credits total for all MS, PhD, and MEng students unless approved in advance by the student’s academic advisor and the Graduate Program Director.

## 6.3 Curriculum and Course Work

The curriculum and required and elective courses for various programs in the School are described in a companion document.

If a student has taken a course as part of their undergraduate curriculum that is substantially the same as a required graduate course, the student may apply for a waiver of the requirement. The student must petition the Graduate Director, in writing, and provide proof of the claim, such as the syllabus, samples of homework assignments and tests, the textbook, a letter from the instructor, etc. The School of Advanced Structures Faculty will be the sole judge as to whether the proof is sufficient. If granted, the required course is waived, but the student receives no credit hours and still must meet the minimum credit hour requirement. The Faculty may grant blanket waivers for certain courses for former UC undergraduates.

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<sup>2</sup> “Formal coursework” is defined as a graduate level course where a grade of A, A-, B+, B, B-, C+, C, or F is assigned.

**7. REASONABLE PROGRESS TOWARD GRADUATE DEGREE**

Graduate students are expected to proceed toward completing the degree requirements at a “reasonable rate of progress.” Every semester, each graduate student is required to present to his/her advisor with an updated plan of study for his/her signature, which is then submitted to the Graduate Office. This plan of study will be utilized to judge the student’s rate of progress. Once a year, typically toward the end of the Spring semester, each graduate student is required to present to his/her advisor a compiled Progress Evaluation form for his/her signature, which is then submitted the Graduate Director for insertion in the student’s file.

Students are expected to continually progress toward a degree. Thesis students should meet regularly with their advisors. MEng students must initiate bi-yearly review meetings with their academic advisors. Long periods of inactivity are cause for dismissal from the program. Long periods of inactivity are particularly likely if the student has left the University to pursue permanent employment. Therefore, students are highly encouraged to complete all degree requirements before accepting permanent employment. The faculty of the School of Advanced Structures will be hesitant to readmit or reinstate students who have failed to complete their degree due to long periods of inactivity. The burden is on the student to show why he/she should be readmitted/reinstated.

The following suggested timeline would constitute a “reasonable rate of progress.” With this suggested timeline, it is possible for a student to complete his/her MS degree in less than 2 years and PhD in less than 4 years after completing his/her MS. These timelines will be closely followed and adherence to these timelines is required for a successful completion of a graduate degree from CAECM. Students need to pay particular attention to the time between the formation of a committee and thesis defense.

**Full-Time MS Student Monitoring and Procedures**

(To complement the University Graduate School Requirements)

1. Start of MS	Student and advisor are matched and they communicate before the student arrives.	Advisor signs admission letter and guarantees support if offer includes support. At a MINIMUM 20 hours of formal courses (with a maximum of 2 seminar hours) and 10 hours of thesis
2. Within 12 months after starting MS	Thesis committee is formed and Thesis proposal is presented and approved by the committee.	The committee has to be approved by the Graduate Program Director. The proposal is prepared with input from the committee.
3. <b>At least</b> six months after defending proposal	Thesis is defended	Time for MS can be less than two years if the committee is formed ASAP

**Full-Time PhD Student Monitoring and Procedures**

(To complement the University Graduate School Requirements)

<p>1. Start of PhD</p>	<p>Student and advisor are matched following an interview (can be done by telephone) and a careful scrutiny of interests and funding.</p>	<p>The department is responsible for the students' welfare and the quality of the PhD experience. Normally a student should not be admitted without support.</p>
<p>2. Within 15 months of starting the PhD (usually it will be at the beginning of the Fall Semester following the start of the PhD program).</p>	<p>Qualifying exam must be taken. A qualifying exam will be offered during the Fall Semester, administered by a committee that will be appointed by the Graduate Program Director. Students may petition to re-take the exam once.</p>	<p>Qualifying exam will include written and oral components. Program core and specialty core subjects and other basic communication, computation, and creative thinking skills will be covered.</p>
<p>3. The dissertation committee should be formed shortly after passing the qualifying exam.</p>	<p>Committee must have at least 3 Tenure Track faculty and include faculty across disciplines. At least one member must be from outside the School.</p>	<p>The committee has to be approved by the Graduate Program Director. Committee should include one tenured faculty in the specialty area of study. <u>An individualized curriculum plan will be discussed and approved by the committee.</u> At a MINIMUM, 12 hours of formal courses beyond MS are required.</p>
<p>4. A dissertation proposal should be prepared and defended <b>at least 12 months before the Final Defense.</b></p>	<p>The proposal should be prepared in consultation with the committee. The PhD proposal should be of a quality suitable for a competitive funding agency. It is very desirable to actually submit this proposal to a national funding agency.</p>	<p>The student becomes a candidate after successfully defending the dissertation proposal. Candidates become eligible for increased stipend if the available funds permit such as a raise, and a number of special awards and grants.</p>
<p>5. Final defense will take place after completing the committee's requirements.</p>	<p>The candidate should seek regular meetings with the committee, approximately every six months.</p>	<p>The candidate with the advisor should have at least one journal article submitted before the candidate files dissertation.</p>

**8. GRADUATE COMMITTEE COMPOSITION**

The Graduate Program Director approves all committees and may reject those who do not meet University requirements.

**For MEng Degree:**

- Committee must have at least three (3) members.
- Committee must have at least two (2) full-time tenure track CAECM faculty members.
- The Graduate Program Director will select the committee.

**For MS Degree:**

- Committee must have at least three (3) members.
- The committee chair must be a Graduate Faculty from CAECM.
- At least two (2) members must be full-time tenure track CAECM faculty.
- At least half of committee members must be from CAECM.
- At least one (1) member from outside CAECM is strongly encouraged.

**For PhD Degree:**

- Committee must have at least four (4) members.
- The committee chair must be a Graduate Faculty from CAECM.
- At least three (3) members must be full-time tenure track faculty.
- At least half of committee members must be from CAECM.
- At least one (1) member from outside CAECM is required.

**Graduate Committee Member Subsets**

Committee Chair	CAECM Graduate Faculty
Other Faculty	Program Focus Area Full-Time Faculty CAECM Graduate Faculty CEAS Graduate Faculty UC Graduate Faculty Faculty from other universities Adjunct Faculty Visiting Faculty Emeritus Faculty CAECM Research Track Faculty
Other Experts	From: Industry, Consulting, Research Lab, Government

All examination committees must meet all appropriate requirements set forth in the University of Cincinnati Graduate Handbook.

## 9. PHD QUALIFYING EXAM

The Qualifying Examination Committee will usually administer the qualifying exam in December. The Committee will have five members of which four will be in charge of exam **Part I** (five-hour core fundamental exam) and one will prepare exam **Part II** (two-day take home exam). All the members will participate in exam **Part III** (oral exam). All incoming PhD students will take the exam after their first year.

The qualifying exam consists of the following parts.

**Part I: Five-hour core fundamental exam (8 a.m. - 1:30 p.m.):** This part will be open book and will cover (1) mechanics/structural analysis, (2) mathematics, (3) reliability, and (4) one problem in each specialty area (e.g., dynamics for structures majors). A 30-minute break will be given during the test.

**Part II: Two-day take home exam in the student's specialty area:** All those students in the same area will have an identical question. The exam will consist of one "open-ended" problem to evaluate the student's ability to integrate fundamental knowledge from courses, and to efficiently gather and synthesize "new information" in order to solve a "new problem" in a limited available time. The exam will be given to the student at 2:30 p.m. after the core fundamental exam, and will be returned to the Committee chair in two days by 12 p.m.

**Part III: Oral exam:** A comprehensive oral exam will cover the subjects from parts I and II. The student may be asked to justify his/her assumption and/or methodology to solve the open-ended problem. Furthermore, the student may be tested on his/her knowledge of core course materials. If a student scores an aggregate 70 points or more in Parts I and II, he/she is not required to take Part III.

The following grading system will be used to evaluate each student.

- Each problem in **Part I** has 10 points.
- The open-ended problem in **Part II** has 40 points.
- Each faculty will grade the student's oral performance based on a scale of 0 to 20. The oral examination score will be based on taking an average of scores assigned by each committee member.

Total score  $\geq$  70                      Pass

Total score < 70                      Fail

The students who fail will have one more opportunity. Except under very unusual circumstances, a third chance will not be granted.

## 10. FORMS

The PhD advisory committee form, College of Engineering and Applied Science defense form, and the admission to candidacy form are available on

[http://www.ceas.uc.edu/Graduate\\_Studies/CurrentStudents/AdmissionToCandidacy.html](http://www.ceas.uc.edu/Graduate_Studies/CurrentStudents/AdmissionToCandidacy.html).