

# ***THE UNIVERSITY OF NEW MEXICO***

**Department of  
Civil Engineering**



**MANUAL FOR  
GRADUATE STUDIES**

**2009 - 2010**

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### **IMPORTANT NOTE**

**Please check our web site frequently for updates  
to the information contained in this manual:**

<http://www.unm.edu/~civil.>

# Manual for Graduate Studies

## 1. INTRODUCTION

This booklet outlines the requirements and procedures for the degrees of Master of Science in Civil Engineering (MSCE), Master's in Construction Management (MCM), and Doctor of Philosophy (Ph.D.) in Engineering and serves as a reference for graduate students.

The Department, the School of Engineering, and the University specify the requirements for the degrees. Students should carefully study the University of New Mexico Graduate Bulletin applicable at the time of their admission to become familiar with both general and specific requirements. University requirements are described on pages 55 - 84 of the 2009-2010 Catalog, School of Engineering requirements are on pages 391-397, and the Civil Engineering graduate degree requirements start on page 411.

The requirements and regulations in this manual are in effect at the time of printing. The Office of Graduate Studies and the CE Department may change requirements. Such changes will become effective at a time determined by the Department.

The student's degree requirements are fixed when the Program of Studies/Application for Candidacy Forms are completed and approved by the student's major advisor (M.S. or MCM) or Committee on Studies (Ph.D.), the Civil Engineering Director of Graduate Programs, and OGS.

This document summarizes most graduate degree requirements but does not necessarily specify all details of the official requirements that are maintained by the UNM Office of Graduate Studies. *It is the student's responsibility to be informed of and satisfy all requirements by keeping in close communication with the Coordinator of Program Advisement and the Director of CE Graduate Programs and by reviewing the information on the OGS website, in the UNM catalog, and in this manual.*

## 2. ADMISSION

Application for graduate study at UNM is a "self-managed" process in which the applicant compiles the required materials and submits certain items to the Office of Graduate Studies or the Office of International Admissions and certain items to the department. Instructions and deadlines for the application process are available at the following web sites:

Domestic students: [http://www.unm.edu/grad/indices/index\\_prospective.html](http://www.unm.edu/grad/indices/index_prospective.html).

International students: <http://www.unm.edu/admissions/guidelines/international.html/>

The Director of Graduate Programs for the Department of Civil Engineering evaluates applicants to the Department and makes recommendations to the UNM Offices of Graduate Studies and International Admissions regarding admissions. Students with special circumstances such as marginal qualifications or unusual backgrounds can request that their applications be considered by the CE Department Graduate Committee. The CE Department does not offer "provisional", "probationary", or "conditional" admissions.

Admission is based on the student's previous academic performance, professional background and career objectives, Graduate Record Exam (GRE) General Test or Graduate Management Admission Test (GMAT) scores, English language skills, letters of

recommendation, and compatibility between the applicant's interests and the Department's resources. Applicants must include a letter of intent/purpose summarizing their qualifications, professional goals, and intended area of study. The letter may also include additional information relevant to the application.

The deadlines for application for admission to the graduate programs in the UNM Department of Civil Engineering are shown below.

Semester	Application Deadline	
	U.S. Students & Permanent Residents	International Students
Fall	July 15	March 1
Spring	November 10	August 1
Summer	April 29	January 1

The entrance requirements for new students are summarized below. Under some circumstances these requirements may be relaxed for applicants having significant relevant work experience or other exceptional credentials such as licensure as a professional engineer.

***Entrance Requirements – M.S. Program***

Grade Point Average (GPA): A minimum GPA of 3.0 (or equivalent) over the last two undergraduate years in science, math, and engineering courses.

GRE Exam Scores: A minimum combined score of 1000 on the verbal and quantitative sections is required.

Language Skills for International Students: International students must achieve a minimum score of 550 (written test) or 79-80 (internet-based test) on the Test of English as a Foreign Language (TOEFL) exam; a score of 7.0 on the International English Language Testing System (IELTS); or a minimum score of C on the CPE or CAE.

***Entrance Requirements – MCM Program***

Grade Point Average (GPA): An undergraduate baccalaureate degree with a minimum GPA of 3.0 (or equivalent) for courses in the major field of study over the last two undergraduate years.

Entrance Exam Scores:

GMAT: A minimum score of 500 is required.

Language Skills for International Students: International students must achieve a minimum score of 550 (written test) or 79-80 (internet-based test) on the Test of English as a Foreign Language (TOEFL) exam; a score of 7.0 on the International English Language Testing System (IELTS); or a minimum score of C on the CPE or CAE.

***Entrance Requirements – Ph.D. Program***

Generally admission to the Ph.D. program requires that the applicant has earned an appropriate M.S. degree, has all the items listed above for M.S. candidates, and has demonstrated a high potential for research. The minimum entrance requirements for the M.S. program are also applicable, including GRE scores. Exceptional students may

pursue a Ph.D. without first earning an M.S. This is accomplished by enrolling in the M.S. program first, then changing to a Ph.D. program after the student has demonstrated outstanding potential for graduate studies and research.

Admission to the Ph.D. program requires a match between the student's research interests and current departmental research activities.

### ***Preparatory Course Work for MS Students without an Undergraduate Civil Engineering Degree***

Students without an undergraduate degree in Civil Engineering can be admitted to the graduate program MS degree program. However, they may be required to take some undergraduate courses to prepare them for graduate work in the department. Generally, these students fall into one of two categories:

#### Students with a Degree in Another Field of Engineering

These students can be admitted directly to the program, provided they satisfy all other admissions criteria. However, they may need to take some undergraduate courses that are prerequisites for graduate courses in their field of study. This course sequence must be determined on an individual basis and will depend on the student's background and intended program of study. The preparatory course sequence will be selected in consultation with the CE faculty in the student's intended area of study. A member of that group must write a memo identifying the course sequence to the CE Department's Director of Graduate Programs that will be placed in the student's file. The preparatory course sequence will ultimately be listed on the student's Program of Studies which is filed with the Office of Graduate Studies.

#### Students without an Undergraduate Engineering Degree

Students without an undergraduate engineering degree can be eventually admitted to the program but must take a sequence of undergraduate classes with a cumulative GPA of 3.0 and no grade below a "C". This sequence of classes includes the following:

- Math through ordinary differential equations (3 semesters of calculus: Math 162, 163, and 264) and ordinary differential equations (Math 316)
- Statics – CE 202
- Dynamics – ME 306  
Engineering Mechanics – CE 304, may be substituted for CE 202 and ME 306
- Mechanics of Materials – CE 302
- Fluid Mechanics – CE 331
- Soil Mechanics – CE 360

Students intending to study in an area where this sequence of preparatory courses is not appropriate may substitute one preparatory course in engineering for one of the above courses. Permission to do so must be obtained through consultation with the CE faculty in the student's intended area of study. A member of that group will write a memo identifying the sequence to the CE Department Director of Graduate Programs that will be placed in the student's file.

Students without an undergraduate engineering degree **will not** be considered for admission and **should not** apply to the program until the semester in which they are taking their last preparatory class(es). However, in extraordinary circumstances, the student can submit a

*petition* to the CE Department Graduate Committee requesting consideration of his/her application for early admission.

### ***Preparatory Course Work for MCM Students without an Undergraduate Baccalaureate degree in Civil Engineering, Construction Engineering, or Construction Management***

All MCM students will be required to have minimum competencies in Math, Statistics, Engineering Economics, and Construction Fundamentals. Students without a baccalaureate degree in Civil Engineering, Construction Engineering, or Construction Management can be admitted to the program after demonstrating proficiency in the following areas:

- Math through Elements of Calculus - Math 180
- Statistics – Stat 145
- Engineering Economy – CE 350
- Construction Contracting – CE 372

Proficiency can be demonstrated by: (1) taking the undergraduate classes listed above with a cumulative GPA of 3.0 and no grade below a “C”; (2) taking and passing an exam that demonstrates that the student reasonably knows the material; or (3) documenting prior academic experience that substantially covers the preparatory material.

Students who have not demonstrated proficiency will not be considered for admission and should not apply to the program until the last semester in which they meet the proficiency requirements. However, in extraordinary circumstances, the student can submit a *petition* to the CE Department Graduate Committee requesting consideration of his/her application for early admission.

## **3. INFORMATION PERTINENT TO ALL GRADUATE DEGREES**

### **Incomplete Grades**

The grade of "I" may be given if circumstances beyond the student's control prevent the student from completing a course. The "I" automatically becomes "F" if not removed within one year from the published ending date of the semester in which the grade was assigned.

### **Withdrawal from a Course**

A student may withdraw from a course during the first six weeks of the semester or the first three weeks of the summer session without approval or any assessment of progress. If withdrawal is after the sixth week of the semester, a grade of WP will be assigned if work is satisfactory, or a grade of WF if the work is not satisfactory. Withdrawal after the twelfth week requires completing a “yellow card” with the signature of the Associate Dean of the School of Engineering. No withdrawals are accepted after the last day of instruction of the semester, prior to final exam week.

### **Courses taken in Non-Degree Status**

Twelve hours of credit taken in non-degree status at UNM may be applied toward a graduate degree. The 300-or 400 level courses taken in non-degree status to be later applied toward a graduate degree must be identified as being taken for graduate credit at the time of enrollment as outlined by UNM policy.

Courses taken in non-degree status must carry a grade of B or better in order to apply to your graduate degree (p. 69, UNM Catalog, Applied Credit).

If you also have transfer courses (see below), a total of 12 credits of non-degree *and/or* transfer courses may be applied toward your degree.

### **Taking Undergraduate Courses for Graduate Credit**

Students may wish to take certain upper division (300 and 400 level) undergraduate courses outside the Civil Engineering department as a graduate student and use them in their graduate degree program. Those undergraduate courses marked with \*\* in front of the course number, such as \*\*Math 345 - Elements of Mathematical Statistics and Probability Theory, are, according to the UNM catalog, "available for graduate credit except for graduate majors in the department".

That means that that particular course is ELIGIBLE to be used for graduate credit as long as the student is not majoring in that department. This eligibility is not automatically done by registering for the course.

To have a double-starred course count for graduate credit, the student must first have the approval of the Advisor that it is acceptable to use the course in his/her degree program. He/she must then obtain a "green" Graduate Credit Authorization (GCA) card from the Civil Engineering office, complete it with all the required signatures, and submit it to the Registrar's Office. By signing this card, both the student and the instructor acknowledge that the student will be held accountable for graduate-level work and requirements. When approved, the letters GR will appear next to the class on the student's transcript which shows that the course has been approved for graduate credit. GCA cards must be filed with the Registrar's Office by the last day of the fourth week of classes during the regular semester.

Graduate courses taken as an undergraduate must carry a grade of B or better in order to apply to your graduate degree (p. 69, UNM Catalog, Applied Credit).

### **Transfer Credit**

Transfer credit for graduate-level course work taken at an accredited institution either in graduate or non-degree status and not applied to a previous degree is limited to 12 hours.

In accordance with UNM policy, graduate courses used as transfer credit must carry a grade of B or better in order to apply to your graduate degree (p. 69, UNM Catalog, Applied Credit).

If you also have courses taken in non-degree graduate status (see above), a total of 12 credits of non-degree *and/or* transfer courses may be applied toward your degree.

### **Credit/Non-Credit grades**

Other than CE Seminar (CE 691), no courses for degree credit may be taken on a CR/NC basis.

### **Grades of C, C+, and CR**

No more than 6 credit hours of course work in which a C (2.0), C+ (2.33), or CR was earned may be credited toward a graduate degree.

### **Incomplete/NR Grades**

Students may NOT graduate with any I (Incomplete) or NR (no record) grades. These issues should be resolved as soon as they arise, to preserve the student's intended graduation semester.

### **Credit for Experiential Learning**

The Department grants no credit for experiential learning.

### **Grade Point Average**

Students failing to maintain a 3.0 GPA will be placed on academic probation in accordance with OGS policy (p. 71 catalog). Students having a GPA of less than 3.0 are not permitted to take the Master's or Comprehensive Examination.

### **Specialization**

Students must identify an area of concentration authorized in the Graduate Manual. Each area has respective core and elective courses. (see Appendix)

### **Initial Advisement**

The student should select a major advisor in his/her area of concentration as early as possible. The student should meet with a major advisor before the initial registration and identify a program of studies for the first semester. Courses that do not receive prior approval of a major advisor may be disallowed.

### **Project/Thesis/Dissertation Proposal**

The student will prepare, with the advice of the major advisor, a written research proposal and present it for approval by his or her Committee-on-Studies. The Committee may request an oral presentation. The proposal must be submitted sufficiently early for the Committee's suggestions to be fully incorporated into the work. An appendix to this manual discusses proposal content.

### **Program of Studies/Application for Candidacy**

A Program of Studies should be filed with the OGS during the semester after 12-16 hours of graduate work have been completed. The Application for Candidacy should be filed with OGS in the same semester in which you pass the Comprehensive Examination. The application must be filed by July 1 for fall graduation, October 1 for spring graduation, and March 1 for summer graduation. Changes in an approved program may be submitted after approval by the major advisor and the Director of Graduate Programs.

### **Departmental Notification of Intent to Graduate**

The student must inform the Director of Graduate Programs and the Coordinator of Program Advisement of his or her intent to complete all degree requirements by July 20 for fall graduation, December 5 for spring graduation, or May 2 for summer graduation. This notification **will not be accepted** until a Program of Studies or Application for Candidacy has been submitted to and *approved by* the Dean of the Office of Graduate Studies.

## **Defense of Project/Thesis/Dissertation**

Two weeks before the presentation of the project/thesis/dissertation the student must:

- (a) Provide a final or near final copy of the project/thesis/dissertation to the Committee-on-Studies.
- (b) Notify the Department and OGS of the date, time and location of the defense by submitting an "Announcement of Exam" form no later than two weeks before your exam.
- (c) Provide the Department with an announcement suitable for posting.

The presentation shall summarize the project/thesis/dissertation work by the student and include an oral examination by the Committee-on-Studies. The examination may cover coursework as well as the research topic. The presentation is open to the public. The deliberation for final acceptance is open only to the Committee. Results of the examination must be submitted to the OGS by 5:00 pm on November 15 for Fall graduation, April 15 for Spring graduation, or July 15 for Summer graduation.

## **4. MASTER OF SCIENCE**

### **Master's Degree: Time to Completion of Degree Seven-Year Limit**

There is a seven-year limit on completion of all requirements for the Master's Degree, *including transfer credit*. Extensions to this time limit are granted by the Office of Graduate Studies only for the most unusual circumstances that are clearly beyond the student's control.

### **Seminar Requirement**

Students must complete 2 hours of Seminar, CE 691.

### **Program of Studies**

A major advisor, who must be a full-time Civil Engineering faculty member, shall guide the student's coursework. Approval of the program by the major advisor, the CE Director of Graduate Programs, and OGS is required.

### **Single Faculty Member Limit**

No more than half the graduate program's minimum required course work hours, exclusive of Thesis/Project, may be taken with a single faculty member.

### **Committee-on-Studies**

A Committee-on-Studies is formed at the time the student begins thesis or project research. The Committee must be composed of at least three members; at least two members must be full-time tenure or tenure-track Civil Engineering Faculty with graduate faculty approval. The major advisor chairs the Committee and must be a full-time, tenure or tenure-track CE faculty member with graduate faculty approval. The remainder of the Committee is selected in consultation between the major advisor and the student. *Any non-tenured UNM faculty or any individual outside UNM must be approved for graduate committee service in our department to serve on a committee.* Notification of Committee membership must be made in writing to the Director of Graduate Programs and must be approved by the Office of Graduate Studies. The Committee evaluates the project/thesis and judges the Master's Exam.

For any individual designated for committee service who is outside the university environment, part of the approval procedure requires that the individual sign a departmental letter describing the possible conflict of interest associated with academic activities. This letter should be given to the individual by the student and must be returned to the Coordinator of Program Advisement before the approval process can begin.

### **Degree Requirement Deadlines**

Except for courses in which you are currently enrolled, all degree requirements (including final thesis & dissertation manuscripts, graduate exams, defenses, and Incomplete and NR-no record grades) must be completed and related documentation received by OGS by the following deadlines:

- Fall Graduation -- November 15
- Spring Graduation -- April 15
- Summer Graduation -- July 15

### **Plan I - Thesis Option**

It is generally expected that students who are supported by the Department as a Teaching Assistant or Research Assistant will complete a Master of Science degree under the Plan I option.

1. 32 credit hour total.
2. A minimum of 24 hours of coursework.
3. 6 hours of CE 599 (Thesis).
4. A maximum 6 hours of Problems and Independent Study courses.
5. A minimum 9 hours of 500-level courses.
6. A maximum 12 hours taken in non-degree and/or transfer status.
7. 2 hours of CE 691 (Seminar).
8. General UNM limits, including course work from a single professor, and time of completion.
9. No credit is allowed for experiential learning.

### **Thesis Content**

Thesis work is generally of scientific nature rather than design or practice-oriented. The thesis should involve original work suitable for professional publication.

### **Thesis Format**

Information pertinent to preparation of a thesis is described in the UNM publication, "Thesis and Dissertation Manual". For information on thesis format please go to the web page <http://www.unm.edu/grad/manuscripts/manuscripts.html>.

### **Master's Examination**

The thesis presentation to the Committee constitutes the Master's Examination.

A student may defend the thesis after the POS has been approved, has a graduate GPA of at least 3.0 and is NOT on probation.

### **Thesis Submission**

OGS requires that a thesis be submitted electronically (see <http://www.unm.edu/grad/forms/forms.html> under Manuscripts). This must be approved by

the Committee and must be submitted for the approval of OGS by the following deadlines if graduation is to occur:

Fall graduation - November 15  
Spring graduation - April 15  
Summer graduation - July 15

Two additional unbound copies must be submitted to the department. These are paid for by the department and are distributed to the Chair and to the student's faculty advisor.

### **Plan II - Project or Coursework Only Option**

1. 35-credit hour total.
2. A minimum of 33 hours of formal coursework, which may include up to 3 credits of MS Project (CE 588), and 2 credits of seminar (CE 691).
3. 0 or 3 hours of CE 588 (Master's Project).
4. A limit of 6 hours of Problems and Independent Study courses.
5. A minimum 12 hours of 500-level courses.
6. A maximum 12 hours taken in non-degree and/or transfer status.
7. 2 hours of CE 691 (Seminar).
8. General UNM limits, including coursework from a single professor, and time of completion.
9. No credit is allowed for experiential learning.

### **Project Option**

All of the above are required in addition to defending and turning in a project.

### **Coursework Only Option**

All of the above are required in addition to a Comprehensive exam after the completion of your coursework.

### **Project Content**

In general, projects are professionally oriented, emphasizing development in engineering practice and methods. Work done prior to enrolling at UNM is not acceptable. In some cases, professional work done while in graduate studies under both the supervision of an employer and the major advisor can be used for a project topic. Aspects such as literature review, innovative application and critical evaluation will generally be at a higher level than the requirements for the employment product.

### **Project Format**

The project shall be reported in written form in proper English. The report should contain all the elements of a thorough engineering report including: abstract, table of contents, lists of figures, list of tables, list of symbols, introduction, review of pertinent literature and of related recent investigations, description of project, presentation and discussion of results, conclusions, recommendations, and references. The format of a project report is established by the Committee-on-Studies.

### **Master's Examination**

The **Master's Examination** for those doing **projects** is the **project presentation** to the Committee. **Students not doing projects** are required to successfully **complete examinations based on their coursework**. The examinations are to be administered by a

committee of three members; at least two members must be full-time tenure or tenure-track Civil Engineering Faculty. The major advisor chairs the Committee and must be a full-time tenure or tenure-track Civil Engineering Faculty. The rest of the committee is selected in consultation between the major advisor and the student. All Examination Committee members must be approved by the CE Director of Graduate Programs. *Non-tenured UNM faculty, research staff, and persons not affiliated with UNM must be approved by the Office of Graduate Studies to participate in master's examinations.* Notification of Committee membership must be made in writing to the Director of Graduate Programs and must be approved by the Office of Graduate Studies.

For any individual designated for committee service who is outside the university environment, part of the approval procedure requires that the individual sign a departmental letter describing the possible conflict of interest associated with academic activities. This letter should be given to the individual by the student and must be returned to the Coordinator of Program Advisement before the approval process can begin.

**A student desiring the coursework only option** must successfully complete an intermediate written examination prior to submitting the Program of Studies. This exam should be taken as soon as possible, typically after completion of 12 to 16 graduate credits. The student shall decide on the time of the intermediate exam through consultation with his/her advisor. It is only after successful completion of this exam that a student can submit a Program of Studies. Successful completion of a final examination at the conclusion of all coursework, comprised of both written and oral components, is required.

A student may take the master's examination after the POS has been approved, has a graduate GPA of at least 3.0 and is NOT on probation.

### **Project Submission**

Project reports must be distributed in final form to the Committee and to the Department before the end of the semester in which credit is to be received.

### **Required Enrollment**

All master's students must be enrolled for at least 1 graduate credit either in thesis (CE 599) for Plan I, or in project (CE 588), problems (CE 551 - not to exceed 12 credit hours), or another graduate course for Plan II for the semester (including the summer session) in which they are completing degree requirements.

Plan I students must complete a minimum of 6 hours of thesis (CE 599) credit, and only 6 hours may be applied to the Program of Studies. Once initiated, continuous enrollment (fall and spring semesters) is required until the thesis is accepted by the Dean of Graduate Studies.

## **5. MASTER'S IN CONSTRUCTION MANAGEMENT**

### **Master's Degree: Time to Completion of Degree Seven-Year Limit**

There is a seven-year limit on completion of all requirements for the MCM Degree, *including transfer credit.* Extensions to this time limit are granted by the Office of Graduate Studies only for the most unusual circumstances that are clearly beyond the student's control.

### **Seminar Requirement**

Students must complete 2 hours of Seminar, CE 691.

### **Program of Studies**

A major advisor, who must be a full-time Civil Engineering faculty member, shall guide the student's coursework. Approval of the program by the major advisor, the CE Director of Graduate Programs, and OGS is required.

It is expected that all students in the MCM program will complete the Project Option (Plan IIa). Under certain circumstances, students showing exceptional research skills will be allowed to complete the Thesis Option (Plan I). Students wishing to complete a program other than the Project Option should consult with their advisor early in their program.

### **Single Faculty Member Limit**

No more than half the graduate program's minimum required course work hours, exclusive of Thesis/Project, may be taken with a single faculty member.

### **Committee-on-Studies**

A Committee-on-Studies is formed at the time the student begins the project. The Committee must be composed of at least three members; at least two members must be full-time tenure or tenure-track Civil Engineering Faculty with graduate faculty approval. It is recommended that one member of the committee be associated with the student's Project Sponsor (see description of Project Content below). The major advisor chairs the Committee and must be a full-time, tenure or tenure-track CE faculty member with graduate faculty approval. The remainder of the Committee is selected in consultation between the major advisor and the student. *Any non-tenured UNM faculty or any individual outside UNM must be approved for graduate committee service in our department to serve on a committee.* Notification of Committee membership must be made in writing to the Director of Graduate Programs and must be approved by the Office of Graduate Studies. The Committee evaluates the project/thesis and judges the Master's Exam.

For any individual designated for committee service who is outside the university environment, part of the approval procedure requires that the individual sign a departmental letter describing the possible conflict of interest associated with academic activities. This letter should be given to the individual by the student and must be returned to the Coordinator of Program Advisement before the approval process can begin.

### **Degree Requirement Deadlines**

Except for courses in which you are currently enrolled, all degree requirements (including graduate exams, defenses, and incomplete and NR-no record grades) must be completed and related documentation received by OGS by the following deadlines:

Fall Graduation -- November 15

Spring Graduation -- April 15

Summer Graduation -- July 15

### **Plan IIa - Project Option**

1. 35-credit hour total.
2. A minimum of 33 hours of formal coursework, which includes 3 credits of Project

- (CE 588), and 2 credits of seminar (CE 691).
3. Three hours of CE 588 (Master's Project).
  4. A limit of 6 hours of Problems and Independent Study courses.
  5. A minimum 12 hours of 500-level courses.
  6. A maximum 12 hours taken in non-degree and/or transfer status.
  7. 2 hours of CE 691 (Seminar).
  8. General UNM limits, including coursework from a single professor, and time of completion.
  9. No credit is allowed for experiential learning.

### **Project Content**

In general, projects are professionally oriented, emphasizing development in construction management practice and methods. Work done prior to enrolling at UNM is not acceptable. Students should work with an outside company or agency (Project Sponsor) to identify a project topic. Acceptable project sponsors include construction companies, design firms involved in construction, and project owners (including UNM facility management). Acceptable project topics include solving construction management problems within the project sponsor's organization, developing and testing new policies or procedures related to construction management, and developing construction management plans for a new project.

All students must prepare a project proposal for approval by the Committee of Studies no later than the start of the semester in which they plan to graduate. The project proposal should identify the project sponsor and provide a brief summary of the project topic and how the student plans to complete the project analysis.

### **Project Format**

The project shall be reported in written form in proper English. The report should contain all the elements of a thorough technical report including: abstract, table of contents, lists of figures, list of tables, list of symbols, introduction, review of pertinent literature and of related recent investigations, description of project, presentation and discussion of results, conclusions, recommendations, and references. The format of a project report is established by the Committee-on-Studies.

### **Master's Examination**

The project presentation to the Committee constitutes the Master's Examination for those doing projects. Students not doing projects are required to successfully defend a thesis or complete examinations based on their coursework. The examinations are to be administered by the Committee on Studies.

A student may take the master's examination after the POS has been approved, has a graduate GPA of at least 3.0 and is NOT on probation.

### **Project Submission**

Project reports must be distributed in final form to the Committee and to the Department before the end of the semester in which credit is to be received.

### **Thesis or Coursework Only Options**

Students wishing to complete the thesis or coursework only option should consult with their advisor early in their program of studies. The requirements for these options are the same as those presented in Section 4 – Master of Science.

### **Required Enrollment**

All master's students must be enrolled for at least 1 graduate credit either in thesis (CE 599) for Plan I, or in project (CE 588), problems (CE 551 - not to exceed 12 credit hours), or another graduate course for Plan II for the semester (including the summer session) in which they are completing degree requirements. Plan I students must complete a minimum of 6 hours of thesis (CE 599) credit, and only 6 hours may be applied to the Program of Studies. Once initiated, continuous enrollment (fall and spring semesters) is required until the thesis is accepted by the Dean of Graduate Studies.

## **6. DOCTOR OF PHILOSOPHY**

### **Ph.D. Degree: Time to Completion of Degree Five-Year Limit**

Ph.D. candidates have five years to complete all degree requirements from the date that they are formally advanced to candidacy by OGS. Any extensions of this time limit must be requested in writing. The student's Committee on Studies, the Director of Graduate Programs and OGS must support the request.

### **Coursework Requirements**

The Ph.D. degree requires a minimum of 48 credits of course work. Generally, an M.S. degree completed at another university counts for a maximum of 30 credits of course work. At least 24 credits must be taken at UNM and at least 18 credits must be completed after admission to the Ph.D. program in Civil Engineering. In addition, 18 credits must be earned at UNM in courses numbered 500 or above. Ph.D. students must complete the M.S. core course requirements established in their area of specialty.

**Seminar Requirement:** IN ADDITION to the coursework requirements listed in the above paragraph and the general University doctoral degree requirements listed in the UNM catalog, students must take 4 hours of Seminar, CE 691.

### **Qualifying Examination**

The PhD Qualifying Examination will consist of both written and oral components and is intended to examine the student's preparedness for graduate work at the advanced level. There are two options available to students for the Qualifying Exam:

#### **Option 1 – Major area plus two other subjects at advanced undergraduate level**

- Major area is the student's principal area of study within civil engineering.
- The two other subject areas shall be selected from the remaining six core areas of Civil Engineering (structures, geotechnical, construction, transportation, environmental and hydraulics/fluid mechanics).
- The student must demonstrate knowledge of the subject matter in all three selected areas (major area plus two others) at the advanced undergraduate level including the material presented in 300 and 400 level courses.

## **Option 2 – Major area at graduate level plus one other subject at advanced undergraduate level**

- Major area is the student's principal area of study within civil engineering; the student must demonstrate knowledge of subject matter presented in graduate classes for the major area.
- The other subject area shall be selected from the remaining six core areas of Civil Engineering (structures, geotechnical, construction, transportation, environmental and hydraulics/fluid mechanics); the student must demonstrate knowledge of the subject matter in the selected area at the advanced undergraduate level including the material presented in 400 level technical elective courses.

Students wishing to take the Qualifying Exam will notify the Director of Graduate Programs in writing of their intent to take the examination by September 15 or February 15. This memorandum will identify the student's preliminary selection of major advisor and will identify the areas in which the student wishes to be examined. The Director of Graduate Programs will assign the examination committee members. The committee will be comprised of at least 4 members from the Department of Civil Engineering.

### **Committee-on-Studies**

The purpose of the committee on studies is to assist a student in planning a program of studies for the PhD degree, one which is an integrated individual program of study and research meeting general University and specific graduate program requirements. This committee may and usually does serve as the core of the doctoral comprehensive examination committee and/or the dissertation committee.

### **Membership**

The candidate should discuss his/her interests with several Civil Engineering faculty early in attendance at UNM. It is helpful, but not necessary, for an agreement to be reached with a Civil Engineering faculty member to serve as Committee-on-Studies chair before the Qualifying Examination is taken.

The Committee shall consist of at least four faculty members, of whom at least two, including the committee chair, must be full-time, tenure or tenure-track Civil Engineering faculty. The Chair is usually the student's major advisor. At least one of the Committee members must hold a tenure or tenure-track appointment outside the Department. The Committee should be formed the same semester the candidate passes the Qualifying Examination. The Committee-on-Studies must be approved by the CE Director of Graduate Programs/

All members of the Committee-on-Studies MUST be on the Approved List of Faculty for Graduate Committee Service with the CE Department and Office of Graduate Studies, including those who are not tenured or tenure-track faculty at UNM. *Prospective members who are not on this list MUST be approved before he/she can be listed on the committee.* Check with the Coordinator of Program Advisement in the department as to the individual's status and as to the procedure that must be followed.

### **Application for Candidacy**

The Committee-on-Studies meets with the candidate to plan and approve the program of coursework, including make-up work as needed. All Committee members must be present

at this meeting. The candidate will draft an Application for Candidacy Form and submit it to the Committee for approval. The full committee, the Director of CE Graduate Programs, and OGS must approve the Application for Candidacy Form. The signed and approved Application for Candidacy Form formally establishes the requirements that the student must complete in order to receive the Ph.D. degree.

### **Single Faculty Member Limit**

No more than 50% of the required course credits at UNM may be taken with a single faculty member. (Course work that has been completed for the master's degree is included in this limit.)

### **Comprehensive Examination**

When the candidate has substantially completed the coursework indicated on the approved Application for Candidacy, the candidate will take the Comprehensive Exam. This exam, prepared by the Committee, will include both written and oral components and must satisfy the Committee that the candidate is prepared to begin research. All Committee members must be present at the Comprehensive Examination. Students will submit a written dissertation proposal to the Comprehensive Examination Committee one month before the exam. The Committee members will prepare written examination questions related to the proposal to examine the student's preparation for the proposed work. The student will be given the written exam questions and asked to prepare a written response. The Committee members will establish time limits for their questions so that the exam can be completed in a reasonable amount of time. At the end of the oral examination, the student's written examination will be placed in his/her file and maintained as a record of their performance.

For any individual designated for committee service who is outside the university environment, part of the approval procedure requires that the individual sign a departmental letter describing the possible conflict of interest associated with academic activities. This letter should be given to the individual by the student and must be returned to the Coordinator of Program Advisement before the approval process can begin.

### **Dissertation**

#### **Dissertation Committee**

In most cases, the Committee-on-Studies becomes the Dissertation Committee. Membership change requires approval by the Director of Graduate Programs. Selection and appointment of the Dissertation Committee is subject to the same requirements as the Committee-on-Studies.

#### **Dissertation Content**

A dissertation must reflect original and significant scientific study meriting publication in a leading journal.

#### **Dissertation Hours**

The Ph.D. requires a minimum of 18 hours of Dissertation (CE 699) credit. Dissertation enrollment may not begin before the semester in which the Comprehensive Examination is passed. Candidates who fail the Comprehensive Examination cannot register for dissertation again until the Comprehensive Examination is passed.

Enrollment for dissertation may be for 3, 6, 9, or 12 hours per semester, with 9 hours the maximum in summer session. The specific number of hours should reflect the amount of time the candidate is devoting to the dissertation and the demand placed on faculty members, laboratories, libraries, and other University resources. Three hours is appropriate when the candidate is working full-time off campus while continuing to make progress with the dissertation. Six hours represents a half-time commitment. Teaching and graduate assistants should generally enroll for 9 hours.

Continuous enrollment for dissertation is expected in subsequent semesters (exclusive of summer) after initial enrollment until the dissertation is accepted by OGS. This rule applies whether or not the candidate is enrolled for other credit hours. Candidates who fail to register for dissertation in any semester must petition for either reinstatement or readmission, depending upon the circumstances. If reinstatement is the appropriate choice, and the petition is approved, the student must pay a reinstatement fee to the Bursar's Office. If readmission is the appropriate choice, the student must complete the readmission process and pay the application fee. In extraordinary circumstances, OGS may waive the requirement for continuous enrollment upon presentation of a written request from the major advisor and the Director of Graduate Programs. Candidates must be enrolled for the semester in which they complete degree requirements, including the summer session.

### **Dissertation Format**

Information pertinent to preparation of a dissertation is described in the UNM publication, "Thesis and Dissertation Manual". The OGS Manuscript Coordinator arranges workshops on the "preparation of a dissertation." Contact OGS for more information.

### **Dissertation Defense**

The Ph.D. Dissertation must be defended before the student's Dissertation Committee. The Dissertation Committee will consist of at least four members approved by the Dean of Graduate Studies for committee service:

- a. At least two members must hold regular, full-time, tenure or tenure-track faculty appointments in the Department of Civil Engineering.
- b. The dissertation director must hold a regular, full-time faculty appointment in the Department of Civil Engineering or must be employed in the department with the title of: research professor, research associate professor, or research assistant professor. Usually this individual is the student's major advisor.
- c. The Committee must include at least one member who holds a regular, full-time faculty appointment outside the Department of Civil Engineering. This member may be from UNM or from another accredited institution.
- d. One member may be a recognized expert in the field. If other requirements for committee composition are met.

For any individual on the committee who is outside the University, *he/she MUST be on the Approved List for Graduate Committee Service with the CE Department*. If he/she is not on that list, then the person MUST be approved before he/she can be listed on the committee. Check with the Coordinator of Program Advisement in the department as to the individual's status and as to the procedure that must be followed.

The student must notify the Civil Engineering Director of Graduate Programs at least two weeks before the dissertation defense is held and no later than November 1 and April 1 for students expecting to graduate in the fall and spring semesters, respectively. The student

must provide each member of the Dissertation Committee with a complete copy of the dissertation in ample time for review prior to the examination. The student must provide the department with an announcement of the defense which includes an abstract of the dissertation that is suitable for posting on department bulletin boards.

The dissertation defense is open to the public and CE faculty and staff. Students are encouraged to attend. The format for the Dissertation Defense will be developed by the Dissertation Committee. Generally the defense will consist of a formal presentation of the work described in the dissertation followed by questions from the audience. The committee will then convene in closed session to decide whether the work meets the standards appropriate for the Ph.D. degree.

### **Completion of the Dissertation Evaluation Form**

After the Dissertation Defense, the candidate must ensure that each Committee member completes the Report on Dissertation Form and forwards it to the Director of Graduate Programs.

### **Final Dissertation Approval**

The candidate must revise the Dissertation as instructed by the Committee. The Committee chair must confirm that the Dissertation is in final form, and OGS must approve the Dissertation for format.

### **Dissertation Submission**

OGS requires that a dissertation be submitted electronically (see <http://www.unm.edu/grad/forms/forms.html> under Manuscripts). The deadline dates for submission are:

November 15 for fall graduation  
April 15 for spring graduation  
July 15 for summer graduation

Two additional unbound copies must be submitted to the department. These are paid for by the department and are distributed to the Chair and to the student's faculty advisor.

## **APPENDIX**

### **Project/Thesis/Dissertation Proposal Instructions**

The proposal prepared by the student serves three purposes: to establish a formal statement of the problem; to identify the scope of the work and method of approach; and to inform the Committee members of the goal of the research. It is recognized that the scope, and possibly the methods, may change as the research progresses. The Committee should be kept informed of such changes.

The following outline is suggested:

1. Title Page
2. Introduction. This section should include motivation and purpose. Expected engineering value should be discussed.
3. Review

- a. Literature Survey. This should be kept brief but should include the most pertinent references. It should contain only articles that directly contribute to the proposal.
  - b. Related investigations in progress. This should describe any known related investigations that are being conducted at the present.
  - c. Summary: This should summarize the present limitations and needs.
4. Proposed Investigation
- a. Problem Statement. Discuss the problem to be investigated, including scope and range of parameters.
  - b. Theory.
  - c. Plans. Include the proposed approach, mathematical analysis to be undertaken, apparatus required (where applicable), and procedure.
  - d. Expected results.
  - e. Estimated cost of equipment, supplies, and technicians.
  - f. Sources of funding.
  - g. Estimated completion date.
5. References

In addition to this manual, READ THOROUGHLY and refer to:

- the OGS website – [www.unm.edu/grad](http://www.unm.edu/grad)
- the UNM catalog - <http://www.unm.edu/~unmreg/catalog.htm>

### **Forms and Deadlines – Master’s Degree Students**

### **Forms and Deadlines – Doctoral Degree Students**

### **Requirements for Areas of Concentrations (on following pages):**

- (1) Construction Engineering and Management
- (2) Environmental Engineering
- (3) Geotechnical Engineering
- (4) Hydraulics and Water Resources Engineering
- (5) Structural Engineering/Structural Mechanics
- (6) Transportation and Traffic Engineering
- (7) Master’s in Construction Management

### **Faculty in the Department of Civil Engineering**