

University of North Carolina at Charlotte

## **Graduate Course and Curriculum Proposal from the Department of Civil Engineering**

### **Revision of the requirements for the Master's Degree in Civil Engineering**

#### **1. Proposal Summary and Catalog Copy**

##### **1.1 Summary**

The Faculty of the Department of Civil Engineering propose to add a comprehensive exam option for students in the Master's programs in Civil Engineering (MSCE and MSE degrees). The proposed change will be effective January 1, 2005 and will allow students pursuing the Master's degree to take a comprehensive written exam (oral exam may be allowed – but only under special circumstances and will require the approval of the Department Chair and the student's adviser), in lieu of writing a thesis or directed project. Students taking the comprehensive exam option will be required to complete additional Civil Engineering electives at the 6000 level beyond those required of students writing 6-credit hour theses (24 credits of coursework ) or 3-credit hour directed projects (27 credits of coursework), so that the total number of credits earned for the degree equals 30 for all three options. Students may not schedule the exam until they have 24 credit hours of coursework completed or in progress. The exam will measure the student's mastery of theories and applications in his/her area of concentration of graduate study in the discipline. The exam will be administered and evaluated by an examining committee.

##### **1.2 Revised Catalog Copy**

###### **Capstone Experiences**

Students pursuing a Master's degree in Civil Engineering have three options to complete the 30-credit hour program. Students may elect to complete 24 credit hours of coursework plus a 6-credit hour thesis; 27 credit hours of coursework plus a 3-credit hour directed project; or 30 credit hours of coursework plus a comprehensive examination. All 3 options require the formation of a program committee as described earlier in this document. The thesis and project options require students to submit a written thesis or project document, and orally defend it before their program committee.

The comprehensive examination in the third option is written (oral exam may be allowed – but only under special circumstances and will require the approval of the Department Chair and the student's adviser). A student's exam will be scheduled when he/she has at least 24 hours of course credit completed or in progress. The student's graduate adviser and the examining committee will coordinate the examination (to be offered once in the Fall and once in the Spring semesters), preparing the exam with the assistance of the other members of the student's program committee. The exam will measure the student's mastery of theories and applications in the selected area of specialization in the

discipline. Students will have only two opportunities to receive passing marks on the examination.

### Comprehensive Examination

Eliminate this current section in the catalogue.

## **2. Justification.**

A rapidly growing demand for graduate study in the Civil Engineering (CE) profession is increasing the demand for a Master's degree in Civil Engineering at UNC Charlotte. It is expected that this demand will increase in light of a recent policy adopted by the American Society of Civil Engineers (ASCE). ASCE Policy 465 states that engineering professional development and career success depends on graduate study, and the master's degree will be recognized by ASCE as the first professional degree. ASCE's long range plan calls for all 50 states to require a master's degree (or 30 hours of equivalent advanced course work) for professional engineering registration (licensure).

The Charlotte region has a large civil engineering professional community that will likely respond to this ASCE policy change with increased demands on the CE graduate program. Many graduate students enrolled in response to these changing expectations in the work place will benefit more from additional discipline-specific coursework than from completion of a single, intensive research project. A comprehensive exam option would be an appropriate alternative for those students not planning an academic career.

The examination option will allow a certain set of students to conclude their graduate education in a meaningful and rewarding fashion. Firstly, they will have to complete more courses in the discipline than do students completing theses and projects. For students who are not interested in becoming professional researchers, more coursework means greater opportunity for education in their chosen area of concentration, as they will leave with greater immediate expertise. Secondly, they may be able to graduate faster than do those part-time graduate students completing a thesis or a directed project. This is a salient matter, since more than 50% of CE graduate students are part-time, and many are full-time working professionals. These students face different constraints than full-time students. The longer it takes these students to earn their degrees, the greater the likelihood that they will not complete the program. Furthermore, the comprehensive examination option allows students an opportunity to plan and integrate their graduate coursework to support their own professional development as opposed to supporting a research program. Finally, the comprehensive exam will also allow them to have an experience similar to the Professional Engineering (PE) license examination.

## **3. Impact**

It is anticipated that the comprehensive examination will be the option of choice for at least 50% of CE graduate students. Preparing, administering and grading the examination

will be the responsibility of the examining committee drawn from the Department. Each student will select an academic adviser, who will be a member of the examining committee. While some extra work is expected to prepare and administer these new tests, it is not expected that these duties will create an undue burden on faculty. Adding the examination option will increase enrollments across our elective course offerings as students will need to complete additional coursework at the 6000 level. Classes already being offered each semester should easily accommodate the increased levels of enrollment that will accompany the adoption of the comprehensive examination.

Some CE students currently enrolled in the thesis and project options will elect to switch to the comprehensive examination option. Up to 3 credit hours of thesis or project work already completed may be “converted” to equivalent course credit in the form of independent study at the discretion of the student’s adviser and with the approval of the CE Graduate Director.

#### **4. Resources Required to Support the Proposal**

Most graduate courses offered in Civil Engineering are not fully enrolled. Enough seats are available in those courses to accommodate the additional credit hours needed for those students selecting the examination option. Therefore, at current levels of MSCE and MSE admissions, no new course offerings, faculty, or facilities will be needed to accommodate this change.

##### 4.1 Personnel

No new faculty positions are needed.

##### 4.2 Physical Facility

The current facilities are adequate for the proposed change in curricula.

##### 4.5 Equipment and Supplies

Current equipment and supplies are adequate for the curricula change.

##### 4.6 Computer

Current computer resources are adequate for the curricula change.

##### 4.7 Audio-Visual

Current audio-visual resources are adequate for the curricula change.

4.8 Other resources

No other resources are needed.

4.9 Source(s) of funding

No new funding sources are needed.

**5. Consultation with the Library and Other Departments or Units**

5.1. Library Consultation

Not applicable.

5.2. Other Departments

Not applicable.

**6. Initiation and consideration of the proposal**

6.1. Originating Unit: Civil Engineering

In a faculty meeting on December 2, 2004, the Department of Civil Engineering graduate faculty endorsed this proposal.

6.2. Other considering units

None

6.3. Council on General Education

Not applicable.

**7.1 Attachments**

M.S. in Civil Engineering Comprehensive Examination Guidelines

UNC Charlotte Department of Civil Engineering (CE)  
Master of Science in Civil Engineering (MSCE) & Master of Science in Engineering (MSE)  
**Comprehensive Examination Guidelines**

Written by: CE Graduate Committee (Dr. Janos Gergely, Chair)  
Version No.4, 2/11/05

**Administering of Examinations**

Comprehensive examinations provide students with the option of demonstrating their mastery of graduate work in their area of concentration, and advanced knowledge obtained through selected courses specified on the student's plan of study. The examination is the capstone experience of the student's core curriculum of fundamental theories and applications, and of their advanced knowledge obtained through in-depth study in selected classes. Examinations will be written (oral exam may be allowed – but only under special circumstances and will require the approval of the Department Chair and the student's adviser).

Scheduling of comprehensive exams is not optional. Each student will take the comprehensive exam in the semester in which the sum total of his/her coursework completed and in progress reaches 24 hours. The dates for each student's comprehensive exam will be determined by the examining committee and announced at the beginning of the semester. Comprehensive exams will be scheduled twice a year, once in the Fall and Spring semesters. Students will take the exam at the same time when more than one student in an area of concentration is ready for the exam. Comprehensive examinations will be administered in compliance with all Graduate School requirements and deadlines.

Students may elect to switch from a thesis or directed project option to comprehensive examination; such program changes must be approved by the CE Graduate Director and the student's adviser. If students fail the comprehensive examination twice, however, they will not be allowed to then pursue either a thesis or a directed project.

**Taking the Examination**

At the beginning of the written examination, students are assigned identification numbers to be used on all answer sheets. Student names are not to be placed on answer sheets. Students are allowed four hours to complete the examination. Each faculty member on the examining committee will provide questions on the exam. No extensions of time will be permitted, but rest room visits will be permitted during the examination. The materials that may be brought into the examination room are specified by the examining committee. The examination will be scheduled in a room (materials lab, computer lab, etc.) as appropriate for the examination material.

Oral exams (when approved by the Department Chair and the student's adviser) will be scheduled in small classrooms or conference rooms as appropriate and as needed for A/V equipment. Each member of the examining committee will ask several prepared questions to the student, and the student's response evaluated (graded). The grade will be based solely on the accuracy of the answer and not on style or presentation.

### **Grading of Examination**

Grading of each student's examination is done by the examining committee administering the examination. The grade will be based on the accuracy of the answer and not on style or presentation skills.

The only grades given for comprehensive examinations are "pass" and "fail". A "fail" grade means the entire examination must be repeated. Examining committee members are not required to reach a consensus on grades; a simple majority will determine grades. Students will be notified of their performance by letter.

*Criteria for evaluation on the examinations are:*

- Pass – Demonstrates an adequate understanding of all area of concentration core courses (at a minimum), and their integration. Demonstrates sufficient knowledge of theoretical aspect to apply them to "real world" situations.
- Unsatisfactory – Does not demonstrate satisfactory understanding (as noted above) of all area of concentration core courses.

A student who fails the comprehensive exam can not retake the exam in the same semester. A student will only have a total of two attempts to pass the comprehensive exam.

### **Nature of the Examination**

The comprehensive examination will address two explicit areas: core, fundamental theories and applications in a student's area of concentration, and advanced knowledge obtained through selected courses specified on the student's plan of study. Questions will require students to apply and integrate the core concepts and advanced ideas to solve problems or address situations in their respective area of in-depth study.