In general, the requirements for the MCE, MCEZ, and MS degrees are consistent with those imposed by the Graduate School. A brief review of the most important requirements follows. For complete details, consult the online graduate catalog at \( \text{http://www.ncsu.edu/grad/catalog/index.php} \)

**Continuous Registration:** After a student is admitted to the Graduate School and enrolls for the first time, he/she is required to maintain continuous registration, i.e., be enrolled each semester, excluding summer sessions, until he/she has either graduated or his/her graduate program at NC State has been terminated. All students who plan to graduate during a summer session must be registered in that summer session.

**Course Load:** A full-time graduate course load is 9 to 15 credits per semester (including audits) and 3-6 credits per summer session (including audits).

**Graduate Advisor and Graduate Advisory Committee:** All students in master’s programs must have a graduate advisor. In addition, students seeking the MS degree must have a graduate advisory committee composed of at least three faculty members. The graduate advisor serves as chair or co-chair of the graduate advisory committee. Graduate students are encouraged to meet and discuss course work and research topics with a number of SEM faculty members. The student then requests his/her graduate advisor by completing the appropriate form obtained from the Director of Graduate Programs.

**Plan of Graduate Work:** At least six courses must be from the SEM lists given on the next page. If CE 525 is in the Plan of Work, then the number increases to at least seven. The course work to be taken by the MCE/MCEZ student must be approved by his/her graduate advisor; for the MS student, approval of the graduate advisory committee is required. The plan of work should be submitted using MyPack Portal prior to completion of one-half of the credits on the plan.

**Credits:** A minimum of 31 semester credit hours is required for the MS degree, while 30 credit hours are required for the MCE/MCEZ. Included in the 31 hours for MS students is a 1 credit hour symposium, CE 605. Each MS degree student must attend all symposiums during their tenure. MCE/MCEZ students are invited and encouraged to attend. The day long symposiums are held once a semester. MS students register for CE 605 only once, in the semester in which they intend to graduate. Each MS student is required to present at least one paper at one of the symposiums during their enrollment as a student. At least 24 semester hours of the minimum 31 credit hour program must come from 500-700 level courses. MS students should normally include no more than 6 hours of research credit (CE 695). MCE students may include no more than 3 hours of independent study credits (CE 675). Courses at the 400 level counted toward the 31 credit hour minimum may not come from the major field.

**Course work:** The courses comprising the Plan of Graduate Work are selected by the graduate student in consultation with his/her graduate advisor. For MS students, the other members of the graduate advisory committee are also consulted. There are three required fundamental courses; CE 515, CE 526, and CE 527 (and CE 525 if you have not had a similar course). In addition, at least one course must be taken from the SEM Behavior and Design courses. At least two additional courses must be taken from any of the SEM course offerings. The courses on the following page also show graduate level prerequisites needed for each course in parenthesis.

**PhD students:** PhD students are expected to have, at a minimum, 6 courses beyond their MS coursework the specific details of which are decided in consultation with the student’s PhD committee.
SEM Analysis courses:
CE 525 Matrix Analysis of Structures ................................................................. Matzen (Fall)
CE 526 Matrix and Finite Element Analysis I \(^1\) (CE 525) ......................................................... Guddati (Spring)
CE 721 Matrix and Finite Element Analysis II (CE 526) ......................................................... Guddati (Varies)

SEM Mechanics courses:
CE 515 Advanced Strength of Materials \(^1\) ................................................................. Bobko (Fall)
CE 594 Properties of Concrete and Advanced Cement-Based Composites ........ Pour-Ghaz (Spring, odd years)
CE 714 Stress Waves ................................................................................................. Guddati (Varies)
CE 718 Constitutive Modeling of Engineering Materials ................................................... Hassan (Varies)
CE 794 Damage Mechanics .......................................................................................... Bobko (Spring, even years)
CE 794 Continuum Micromechanics of Composites (CE 515) ............................................ Guddati (Varies)
CE 794 Modeling Behavior of Infrastructure Materials .................................................... Pour-Ghaz (Spring, even years)

SEM Dynamics and Earthquake Engineering courses:
CE 527 Structural Dynamics (CE 525) \(^1\) ........................................................................ Gupta (Spring)
CE 723 Advanced Structural Dynamics (CE 527) ................................................................. Gupta (Fall, even years)
CE 724 Probabilistic Methods of Structural Engineering ................................................... Gupta (Fall, odd years)
CE 725 Earthquake Structural Engineering (CE 527) .......................................................... Kowalsky (Fall)

SEM Behavior and Design courses (1 course minimum required):
CE 522 Theory and Design of Prestressed Concrete ........................................................ Rizkalla (Fall)
CE 523 Theory and Behavior of Steel Structures ............................................................... Nau (Fall)
CE 524 Analysis and Design of Masonry Structures ........................................................ Kowalsky (Varies)
CE 528 Structural Design in Wood ................................................................................... Nau (Spring, odd years)
CE 529 FRP Strengthening and Repair of Concrete Structures ........................................... Seracino (Fall)
CE 726 Advanced Theory of Concrete Structures (CE 522) ............................................. Kowalsky/Seracino (Spring)
CE 794 Performance-Based Bridge Engineering (CE 725) .................................................. Kowalsky (Spring)

Computing:
CE 537 Computer Methods and Applications .................................................................. Baugh (Fall)
CE 538 Information Technology and Modeling ................................................................. Rasdorff
CE 737 Computer-Aided Engineering Systems (CE 537) ................................................ Baugh (Spring, even years)

Geotechnical Engineering (Except for CE 548, these courses are generally offered every 3\(^{rd}\) semester):
CE 548 Engineering Properties of Soils I ........................................................................ Montoya
CE 741 Geomechanics of Stress and Deformation .............................................................. Gabr
CE 742 Deformation and Instability of Soils ................................................................... Rahman
CE 744 Foundation Engineering ....................................................................................... Roy Borden
CE 746 Dynamics of Soils and Foundations ..................................................................... Rahman
CE 747 Geosynthetics in Geotechnical Engineering (CE 548) ............................................ Gabr
CE 793 Unsaturated Soil Mechanics (CE 548) ................................................................. Gabr
CE 793 Modeling and Computing in Geotechnical Engineering ........................................ Rahman

Materials:
CE 594 Nondestructive Evaluation of Civil Infrastructure ............................................... Kim
CE 751 Theory of Concrete Mixtures .............................................................................. Leming (every 3\(^{rd}\) semester)
CE 759 Inelastic Behavior of Construction Materials (CE 515) ......................................... Kim

Mathematics:
MA 405 Introduction to Linear Algebra and Matrices .......................................................... Varies
MA 501/2 Advanced Mathematics for Engineers and Scientists I/II .................................. Varies

Courses from other disciplines, e.g. construction engineering and managements, and other departments e.g. Mechanical and Aerospace Engineering, Computer Science, and Material Science and Engineering may also be appropriate for Plans of Graduate Work. Please consult your graduate advisor.

\(^1\) Required Course

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