



Graduate Policies and Procedures Manual

**The Charles E. Via, Jr. Department of Civil and
Environmental Engineering**

Revised July 2015

**THE CHARLES EDWARD VIA, JR.
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1.0 INTRODUCTION

Civil and Environmental Engineering (CEE) graduate programs are governed by the policies stated in the Graduate Policies and Procedures and Course Catalog of Virginia Tech, as well as those stated in this document. The information set forth in this document is intended only to supplement and not to replace general requirements set forth in the documents published by the Graduate School. However, the Graduate School allows departments and program areas within the department to set standards and requirements above and beyond the minimum requirements set by the Graduate School. Students are encouraged to become familiar with the rules and procedures described herein, those of their program area, and those described in the university's Graduate Catalog.

In special cases, the CEE Graduate Committee will approve exceptions to these rules, policies, and procedures. **A request for an exception must be made in writing, with supporting reasons and documentation including a letter of endorsement by the student's Major Advisor.**

The CEE homepage at <http://www.cee.vt.edu/> provides additional information about the department. In particular, the homepage describes the five program areas: Construction Engineering and Management (CEM); Environmental and Water Resources Engineering (EWR), Geotechnical Engineering (GEOT); Structural Engineering and Materials (SEM); Transportation Infrastructure and Systems Engineering (TISE) and two interdisciplinary graduate program options: Civil Infrastructure Engineering (CIE) and Geospatial Engineering. The main campus of Virginia Tech is in Blacksburg, Virginia where the CEE department offers all of its program areas of focus. CEE also participates with Virginia Tech's extended campus programs around the Commonwealth of Virginia. The EWR and TISE have full-time faculty located in the National Capital Region (NCR). More information on off-campus programs is found in section 2.4 and the CEE website.

1.1 GLOSSARY

CEE Faculty: CEE faculty members include both tenure-track and non-tenure-track faculty. The latter category includes professors of practice and research professors. The complete list of CEE faculty is provided on page iii and the departmental webpage (www.cee.vt.edu/faculty-member).

CEE Affiliate Faculty: A limited number of Virginia Tech faculty from outside of the CEE department have been granted affiliate status by the CEE Department Head after consulting with the CEE Promotion and Tenure Committee. An affiliate faculty member typically has related or complementary research to the CEE department's mission. Affiliate faculty members are approved to serve as a primary chair/advisor for a CEE graduate student. Affiliate faculty members are considered as "inside" Virginia Tech and do not need approval by the Graduate School to serve on CEE committees. The complete list of CEE affiliate faculty is maintained by the CEE Graduate Student Coordinator.

CEE Emeriti Faculty: The title of emeritus or emerita is conferred by the university on a limited number of retired full or associate professors. CEE emeriti faculty who remain active in research can serve on CEE graduate student committees as members or co-chairs. Emeriti faculty members are considered as "inside" Virginia Tech, but need approval by the CEE department with final

approval by the Graduate School prior to serving on CEE committees. The list of CEE emeriti faculty is provided on page iii and the departmental webpage.

CEE Adjunct Faculty: CEE adjunct faculty are qualified experts from outside of Virginia Tech given special designation by the CEE department. CEE adjunct faculty may serve as committee members on graduate student advisory committees and may co-chair with a full-time tenured/tenure-track CEE faculty member. These individuals are not full-time employees of Virginia Tech and are considered by the Graduate School as “non-VT committee members”. Examples include professors at other universities and researchers at governmental agencies. Adjunct faculty must be formally approved by the CEE Department Head with final approval by the Graduate School. The CEE Graduate Student Coordinator maintains a listing of CEE adjunct faculty approved for CEE graduate student committees.

2.0 ADMISSION AND ENROLLMENT POLICIES

2.1 Admission Status for Graduate Students

Admission for graduate study in CEE at Virginia Tech is granted by the Graduate School, upon recommendation of the CEE Department through a faculty review committee and/or the Assistant Department Head. Admitted students normally have a bachelor degree in engineering from an ABET-accredited engineering program. Prospective students that do not meet this requirement can be admitted for graduate study, but should check with the Admissions Coordinator of their program area of interest before applying. These students must either complete background courses or show proficiency by prior coursework at the undergraduate level in certain fundamental areas such as mathematics, science, engineering science and CEE.

Specific background course requirements are established by each program area within the Department (see Section 6: Appendix). These courses are prerequisites and must be completed before enrollment in graduate-level courses. It is strongly recommended that every applicant without an ABET-accredited engineering bachelor's degree discuss these requirements with program area faculty prior to enrollment. **All CEE graduate students, regardless of their academic background, are expected to have the proper prerequisite coursework to be successful in their graduate studies at Virginia Tech and should consult with their advisor before enrolling in courses.**

The student may be admitted to one of the following categories:

Regular Graduate Student Status

A student with a Grade Point Average (GPA) of 3.00 or higher (on a 4.0 scale) for the last 60 semester hours may be granted regular admission status. A higher minimum GPA is expected of doctoral candidates.

Provisional Status (Master's Student)

Only under special circumstances, an applicant is admitted on provisional status if the GPA for the last 60 semester hours is between 2.75 and 2.99. Upon completion of no fewer than 9 credit hours of coursework, the program area Coordinator and/or Assistant Department Head may recommend that the student be admitted as a regular student. **International students are not eligible for provisional status.**

Students on provisional status are ineligible for financial aid from the department. Students may contact the Scholarship & Financial Aid office for other financial aid opportunities.

Provisional student status is allowed for no more than 12 semester credit hours. While on provisional status, a student must earn a GPA of at least 3.00. **It is the responsibility of the student to see that the appropriate request for change in student status is submitted to the Graduate School at the proper time.**

Dual Status

Seniors within one semester of graduation who have a GPA of at least 3.0 cumulative, and requiring no more than 1 semester of work for their B.S. degree, may take graduate courses to satisfy an advanced degree program as dual registrants. These classes may be 4000 or 5000 level, but no more than 6 total hours of 4000 level class can be used for a master's degree.

In order to apply for the dual program, the student must apply and be accepted by the Graduate School in time to meet the acceptance deadlines for the semester desiring dual status. Students should apply online for the semester that they will become a regular master's student (usually the semester following their B.S. degree awarding). An accelerated undergraduate/graduate status form (choose DUAL status) must accompany the application package with the planned graduate level classes. **Students admitted under Dual status may not receive both graduate and undergraduate credit for the same course** (except under the UG/G (double count) program).

UG/G Program

Undergraduate CEE students who have an overall/cumulative GPA of 3.5 or better OR students who have a cumulative VT GPA of 3.3 or better *and* have maintained a VT GPA of 3.5 or better in your last 60 hours of coursework are eligible. These students also need to have completed at least 90 credit hours toward their B.S. degree. Students can be in the program for their last two undergraduate academic semesters. Students accepted into this program may "double count" up to 6 credits between their B.S. and M.S. degree programs. These 6 credits may be 4000 or 5000 level. Students **MUST** earn a "B" or better in these courses to use them for the master's degree.

Application information for the UG/G program is available in 200 Patton Hall and online at http://www.cee.vt.edu/current_students/undergraduate_programs/accelerated_undergraduate_graduate_program.html

Students who qualify for the UG/G program are eligible to take Dual status classes as well if pre-approved by the CEE faculty and Graduate School. These dual classes may be 4000 or 5000 level, but no more than 6 total hours of 4000 level class can be used for a master's degree. These Dual classes would be in addition to the "double count" classes, must be taken in their final semester, and will NOT be part of the undergraduate transcript.

Non-Degree Status

Students who qualify for regular status and are not seeking a specific degree at Virginia Tech may request non-degree status in order to take graduate courses. If the student is later admitted to degree status, courses taken while on non-degree status may be used in meeting degree requirements **only** with approval from the student's Advisory Committee.

Non-degree status is applied for and accepted through the Graduate School only. Non-degree students must request permission to be added into CEE classes. Non-degree students should complete the force add request at www.cee.vt.edu/forceadd and email the CEE Graduate Coordinator a copy of their transcripts to be considered for admission into the first class in CEE. CEE staff in the main office will add the approved students to classes.

Commonwealth Campus Program

Students who do not have a degree in Civil Engineering may be asked to take make-up courses as a Commonwealth Campus student before being admitted as a regular graduate student. The CC status is a non-degree status. Overall, the Commonwealth Campus Program is designed to respond to the demand for graduate level course work by prospective students who do not wish to immediately undertake study toward graduate degrees. The Commonwealth Campus program is available at our main campus and all of our extended campus locations. Commonwealth campus status students must request permission to be in CEE classes through the instructors. CEE staff in the main office will add the approved students to classes. Students interested in this non-degree status should see the Graduate School catalog for further details: http://graduateschool.vt.edu/academics/programs/commonwealth_campus_program.html.

Re-enrollment/Re-admission

Students who have not registered for more than two consecutive semesters, excluding summer, need to reapply for admission. Check with the Graduate School for current guidelines.

Certificate Program

The Graduate School offers a number of graduate certificates in the fields of Advanced Transportation Systems, Environmental Engineering, and Civil Infrastructure Systems. The Graduate Certificate Program in CEE is open to both on-campus (Blacksburg) and off-campus students, full-time and part-time, who have been approved by the Virginia Tech Graduate School to take graduate coursework, including Commonwealth Campus students. Check with the Graduate School for current requirements for admission, including coursework requirements and limitations.

2.2 Graduate Record Examination

All applicants **must** take the Graduate Record Examination (GRE) and submit their GRE scores as part of their application. The **recommended** minimum GRE score for the quantitative section is 155 (or 700 under the old system). However, decisions to admit are based on a prospective student's entire application package.

2.3 Test of English as a Foreign Language (TOEFL)

International students who have not **earned** a baccalaureate degree from a higher education institution with English as the language of instruction will be admitted only after satisfactory completion of the TOEFL Examination. It is the responsibility of the international student to provide proof of English instruction to the Graduate School office if their undergraduate institution is outside of the United States. It is unlikely that applicants with TOEFL scores below 88 iBT or 570 paper-based will be considered for admission. International students, like all applicants, must also submit GRE scores. In some cases, the Graduate School will approve other English tests as proof of language proficiency such as IELTS with a minimum of 6.5.

International students may be required to take remedial courses in oral or written English if deemed necessary by their graduate Advisory Committee and/or the International Office of the Graduate School. Such courses cannot be counted towards their graduate degree.

2.4 Off-Campus Admission

Off-campus degree-seeking students are admitted to graduate study in CEE by the same criteria as on-campus students. The Virginia Tech National Capital Region (NCR) campus offers full M.S. and Ph.D. programs (only in the areas of EWR, TISE, and CIE). Off-campus students may pursue an M.S. degree (CE and ESEN) on a part-time basis through the Commonwealth Graduate Engineering Program (CGEP) program (EWR, TISE, and CIE areas only). Several graduate courses in these programs are offered each academic year through CGEP in which faculty deliver lectures using two-way digital videoconferencing technology from either the Blacksburg or NCR campus. Students participate in lectures at a number of sites which are located throughout Virginia. Part-time off-campus students may earn a degree using the course offerings of CGEP but must apply for admission. CGEP students may begin taking courses under the Commonwealth Campus status and later apply for regular admission to the Graduate School. Consult the College of Engineering for more information on CGEP at: <http://www.eng.vt.edu/cgep>.

2.5 Interim/Temporary Advisor

The first contact for a new graduate student arriving on campus to study in the CEE Department should be with the Coordinator of the program area in which he or she was admitted. The Coordinator will assign an Interim or Temporary Faculty Advisor for the first semester of coursework. Questions regarding the student's course schedule, including required background courses, must be discussed with the Interim/Temporary Advisor before the start of classes. The Interim/Temporary Advisor will also assist the student in becoming familiar with research or project opportunities, and help the student in selecting a Major Advisor who will direct the student's research or project work.

2.6 Enrollment and Registration Policies

All graduate students using University resources are required to be continuously enrolled (full or part-time) during the academic year. A person who undertakes any form of academic study within University facilities other than the library, or who consults regularly with a faculty member concerning graduate work, must be registered continuously and pay the normal fees. Individuals not enrolled cease to be students and do not have access to University facilities. Students signing up for research credits (CEE 5994 or CEE 7994) must have the approval of a supervising faculty member.

The Graduate School defines full-time enrollment in an academic semester as 9-18 credit hours. However, during the academic year, students who have a fellowship, scholarship, or graduate assistantship (GA), including teaching and research assistantships, must take a minimum of 12 credits hours per semester. Unfunded students must take a minimum of 9 credit hours per semester to be considered full-time. Audited courses are not counted toward the minimum. **The maximum number of credit hours that a graduate student may take per semester is 18.**

Students not on an assistantship or fellowship may be able to register for a reduced number of hours in their final semester if registration is only for defense of their thesis, project, or dissertation. See information in the Graduate School catalog about special registration.

Graduate students are not required to enroll during summer sessions unless they are taking courses (e.g., students working on research during the summer are not required to sign up for CEE 5994 or 7994). Graduate students on an assistantship who are not registered over the summer may obtain a letter from the Department that will allow them to use many of the campus facilities. Fees for each facility may apply.

2.7 GPA Requirement

Students must obtain a 3.0 GPA overall and on the Plan of Study in order to receive a graduate degree (See sections 4.7 and 5.3 for more information on the Plan of Study). Students whose GPA falls below a 3.0 may be placed on probation. Students on probation are not eligible for financial assistance. In accordance with Graduate School policy, a student placed on probation has one semester while on probation to remedy an unsatisfactory GPA.

2.8 Auditing a Course

An audit requires approval of the instructor. Auditing of laboratory work is not permitted. Registration for audit may not be changed to credit, or vice versa, after the last day to add classes without an exception to policy by the instructor, the student's major advisor, and the Dean of the Graduate School. Students are assessed the same rate of tuition and fees for audited courses as for courses taken for credit. Audited courses do not count toward full-time enrollment.

An audit is a mechanism for a student to reserve a seat in a course, with no performance evaluation of the student. However, the student is expected to attend the course throughout the semester. At the end of the course period, the instructor will determine if an audit is "satisfactory" or "unsatisfactory" based on participation and other expectations set forth at the beginning of the course period. Students should consult the course syllabus about the instructor's policy on auditing at the beginning of the semester. If the student or the instructor expects evaluation of coursework, then the student must enroll either as a P/F option or for a letter grade. If a faculty member wishes to restrict the participation of auditing students in selected activities, then that should be stated in the syllabus.

2.9 Financial Assistance

Graduate students pursuing an M.S. or Ph.D. degree in the CEE Department may have the opportunity to receive financial assistance in one of several forms. The Department has a limited number of graduate teaching assistantship (GTA) positions that are awarded within the various graduate program areas. Students holding a GTA position may be involved in providing support in a formal laboratory setting, holding office hours, and/or grading homework assignments for various courses. In limited situations, those holding a GTA position may provide coursework instruction. Students who work as a GTA must attend the GTA workshop offered by the Graduate School office.

Many students hold graduate research assistantship (GRA) positions. These positions provide financial support that is directly linked to a funded research grant or contract. Students on a GRA position will have assigned duties that contribute to the overall objectives of that research grant or contract. Such appointments are made by the faculty members responsible for the conduct of the research work, and are often linked to the specific funding time period provided by the research sponsor.

A third category of financial assistance may be available through the awarding of either a full or partial fellowship. Fellowships provide direct support to a graduate student's educational experience, and do not carry a specific work assignment in association with the funding. In many cases, a partial fellowship is added to GTA or GRA funding as part of the process for recruiting students for graduate study in the CEE Department. In those instances the work responsibilities assigned to the student only relate to the assistantship and not to any additional fellowship funding they may receive. Students are expected to make satisfactory progress toward their project, thesis or dissertation research while supported by fellowship funding, with such progress monitored at least annually by the major advisor and graduate committee.

The expectation of the CEE Department is that graduate students receiving financial assistance in the form of GTA, GRA, and/or fellowship support will contribute to the research and scholarly work of the Department. Most M.S. students receiving financial assistance will be expected to complete either a thesis or formal project report at the completion of their research activities. Those M.S. students receiving financial assistance who do not complete either a thesis or project report will be expected to generate a research product that will contribute to a scholarly publication (e.g., conference or journal publication). The research dissertation, required of all doctoral students to complete their degree, fulfills the requirements of any financial assistance.

Graduate students on full-time (20 hours per week) assistantships must notify the Graduate School and should notify their advisor and/or funding advisor if they have additional employment, either on-campus or off-campus.

2.10 Student Records

Prior to admission, all CEE faculty members, some approved adjunct faculty members from associated departments, and related departmental support staff will have access to application materials for admission through the departmental electronic admissions system.

After admission, current student records will be maintained in an electronic departmental current (inactive & alumni) student database. This database is secured with a Virginia Tech PID and password log-in. All CEE faculty in the student's program area within CEE, members of the students committee (even if outside of CEE), department heads, and appropriate departmental staff will have access to the student file. Students who wish to review their file should meet with the CEE Graduate Student Coordinator to review the file.

3.0 DEGREES AVAILABLE

3.1 Description of Master's Degree Programs

The Master of Science (M.S.) degree in Civil Engineering (CE) may emphasize any of the major areas of Civil Engineering: civil engineering infrastructure, construction, environmental, geotechnical, geospatial, CEE materials, structures, transportation and water resources or some combination of these. The M.S. degree can be undertaken with a research orientation (through the preparation of a thesis), or it can be accomplished through a non-thesis path which includes more extensive coursework and may include a project and report.

The degree program of Master of Science in Environmental Engineering (ENE) emphasizes intensive training in the various areas of environmental engineering.

The Master of Engineering (M.E.) degree is normally taken with the option of a particular department, such as Master of Engineering (Civil Engineering). Although the degree is adaptable to specialization in a particular area, it is also the natural selection for the student who wishes to broaden his or her general knowledge of Civil Engineering rather than specialize in one area. This degree requires a Project and Report of 3 to 6 credits. The report is normally presented orally as part of the final examination.

The Master of Science in Environmental Sciences and Engineering (ESEN) is a non-engineering degree program intended primarily for students without an undergraduate degree in engineering, who wish to specialize in the environmental field. This program is particularly attractive to those with degrees in the physical or natural sciences but is generally inappropriate for students with an engineering background. Students must meet certain minimum mathematics, physics, chemistry, statistics, or computer requirements at the undergraduate level or take make-up coursework during their program. The curriculum provides much of the same environmental study given to students in the M.S. in Environmental Engineering program but omits the engineering design work that is included in the engineering program.

All students entering the Master's degree program without an ABET-accredited engineering baccalaureate degree must satisfy a number of undergraduate requirements. As discussed in Section 2.1, required background courses for each program area are listed in Section 6.0 (Appendix) of this manual. Most entering students with engineering baccalaureate degrees will have taken these courses or their equivalents. Students without a Civil Engineering baccalaureate degree may find deficiencies in their background. **Courses with either a 1000-level or 2000-level designation may be taken on a pass/fail (P/F) basis; however, courses at the 3000-level and higher must be taken on an A-F basis.** Students who have completed undergraduate courses that they can demonstrate are equivalent to certain requirements listed in Section 6 may request a waiver for specific courses. The student's Advisory Committee will normally make the decision whether or not such waivers are granted.

3.2 Doctor of Philosophy Degree in Civil Engineering

The Doctor of Philosophy (Ph.D.) degree in Civil Engineering is offered in all the program areas of the CEE Department. Typically, qualified candidates for the Ph.D. degree have satisfactorily

completed a Master of Science degree in either Civil Engineering or in Environmental Engineering. Students from other engineering or from non-engineering science curricula are eligible for admission. All students must make up for any deficiencies in their engineering background, including science and mathematics, with additional coursework recommended by their program area (see Section 6 in the Appendix). Students of all backgrounds are subject to remedial coursework as deemed necessary by their Ph.D. Advisory Committee.

Some program areas will accept qualified students directly to the Ph.D. degree program in Civil Engineering without a Master of Science degree (i.e., Bachelor of Science only). Students may enter this program from other engineering curricula or from areas outside of engineering, as outlined for the Master of Science degree in Civil Engineering. Such students must make up baccalaureate work as required (see Section 6 in the Appendix) and other coursework as deemed necessary by their Ph.D. Advisory Committee.

Students in the Master's program who wish to remain in the Civil and Environmental Engineering Department and pursue a Ph.D. degree must submit proper paperwork to the CEE Graduate Student Coordinator to apply for admission to the Ph.D. program. Students are required to discuss admission with faculty in their program area prior to applying to the Ph.D. program. CEE students who wish to continue into the Ph.D. program (usually following the completion of their M.S. program in CEE) should provide a statement of purpose and a letter from a faculty member in their program area who supports their application with the required forms. The student's academic performance will be reviewed by the program area. Once a decision is reached regarding the student's application, the student will be notified in writing whether he or she will be allowed to enter the Ph.D. degree program. In most cases, the student must complete the M.S. degree program before they are fully accepted as a Ph.D.

All applications are reviewed by the program areas and approved by the Assistant Department Head. Major factors taken into consideration in this evaluation are scholarly records, professional experience, recommendations, and scores on standard tests (see Sections 2.2 and 2.3).

4.0 MASTER'S DEGREE PROGRAM

4.1 M.S. Degree Requirements (Thesis Option)

The Graduate School requires a minimum of 30 credit hours, of which 6 to 10 credit hours must be Research and Thesis (CEE 5994). Coursework at the 5000-level and higher must be taken to complete the requirements. A maximum of 6 credits hours of 4000 level classes may be allowed to count toward meeting Graduate School requirements. **Program areas within CEE may have more rigorous requirements. Consult your program area's advising guide for details.** The Graduate School restricts the total amount of Independent Study (CEE 5974) and Special Study (CEE 5984) classes that are allowed for thesis. See the Graduate School catalog for more details.

4.2 M.S. Degree Requirements (Non-Thesis Option with a project and report)

A minimum of 30 credit hours is required which can include up to 6 credit hours of Project and Report (CEE 5904). A maximum of 6 credits hours of 4000 level classes may be allowed to count toward meeting Graduate School requirements. The remaining coursework must be at the 5000-level and higher to complete requirements. **Program areas within CEE may have more rigorous requirements. Consult your program area's advising guide for details.**

The Graduate School restricts the total amount of Independent Study (CEE 5974) and Special Study (CEE 5984) classes that are allowed for non-thesis. See the Graduate School catalog for more details. Each program area within the CEE Department has specific writing and/or scholarly work requirements regarding the M.S. (non-thesis) option. These are listed in Section 6.6 of the Appendix.

4.3 M.S. Degree Requirements (Non-Thesis Option, coursework only)

A minimum of 30 credit hours is required. A maximum of 6 credits hours of 4000 level classes may be allowed to count toward meeting Graduate School requirements. The remaining coursework must be at the 5000-level and higher to complete requirements. **Program areas within CEE may have more rigorous requirements. Consult your program area's advising guide for details.** The Graduate School restricts the total amount of Independent Study (CEE 5974) and Special Study (CEE 5984) classes that are allowed for non-thesis. See the Graduate School catalog for more details.

Each program area within the CEE Department has specific writing and/or scholarly work requirements regarding the M.S. (non-thesis) option. These are listed in Section 6.6 of the Appendix.

4.4 M.E. Degree Requirements

Thirty (30) credit hours are required, including 3 to 6 credit hours of Project and Report (CEE 5904). Your advisor will help you decide if the M.E. is more appropriate for you than the M.S.

4.5 Changing Between Thesis and Non-Thesis Option

A student with an approved Plan of Study will be permitted to switch from the thesis option to the non-thesis option (or vice versa) **only one time**. Such a change requires a form and the approval of the Major Advisor and either the program area Coordinator or the Assistant Department Head.

4.6 Major Advisor and Advisory Committee

All CEE graduate students seeking the M.S. degree will be assigned a Major Advisor upon enrollment. The Major Advisor is typically a CEE faculty member within the student's program area who will provide guidance on course selection in the first semester and general academic advice on the degree program. After beginning the graduate study program, but before completion of 15 semester credit hours of graduate coursework, the student must formalize the selection of a permanent Major Advisor. The Major Advisor will normally be the Chair of the student's Advisory Committee. In the case of a student who is pursuing the M.S. degree with the thesis or project and report option, the Chair directs the student's work toward completion of the M.S. or M.E. degree.

Two models for Advisory Committee composition in CEE are listed below. In model 1, the Major Advisor may be either a full-time tenure/tenure-track CEE faculty member or CEE affiliate faculty member at Virginia Tech (see Section 1.1. for a definition of these standings). CEE faculty, including CEE affiliate faculty, are listed on the departmental webpage (www.cee.vt.edu). The Major Advisor will advise the student on the composition of the student's Advisory Committee. Faculty who agree to serve on a student's Advisory Committee are expected to review and approve the student's coursework requirements (Plan of Study), provide advice, regularly assess the student's progress and accomplishments, and conduct a required Final Examination for the M.S. degree.

In Model 2, two faculty members may jointly co-chair the student's Advisory Committee and direct the student's thesis research or project. In Model 2 at least one Co-Chair must be either a full-time tenure/tenure-track CEE faculty member or a CEE affiliate faculty member. The second Co-Chair may be a CEE faculty, CEE affiliate faculty, CEE emeritus/emerita faculty, or a full-time member of the Virginia Tech faculty from another department. CEE adjunct faculty may also serve as a Co-Chair but only with a full-time tenure/tenure-track CEE faculty member.

1. <u>Single Chair</u>	2. <u>Co-Chair</u>
Chair (1) Committee Members (Minimum of 2)	Co-Chairs (Maximum of 2) Committee Members (Minimum of 1)

The committee must consist of a minimum of three members, one of which must be a full-time tenured or tenure-track CEE faculty member. In the event of a four-person Advisory Committee, a minimum of two full-time tenured or tenure-track CEE faculty members is required. The remaining committee members may be CEE faculty, including professors of practice and research professors, full-time non-CEE Virginia Tech faculty, CEE emeriti faculty or non-Virginia Tech

personnel approved by the Graduate School. In the latter case, qualified experts from outside of Virginia Tech may be recommended for inclusion on a graduate Advisory Committee. Approval for such personnel should be sought by the Major Advisor through petition to the Graduate School. Petition forms must be first approved the CEE Department Head and then filed with the Graduate School by the CEE Graduate Coordinator.

Committee members external to Virginia Tech, including CEE adjunct faculty, have all the voting rights and privileges of an Advisory Committee member and shall make up no more than one-third of the total committee membership. It is the responsibility of the student to verify that a committee member external to Virginia Tech has been approved by the CEE department and the Graduate School.

The approval process for the Advisory Committee begins when the student identifies the committee members on the Plan of Study (Section 4.7) and submits the plan to the department with committee signatures. The Advisory Committee must be approved first by the CEE Department Head and then filed with the Graduate School by the CEE Graduate Student Coordinator. Once a student's Advisory Committee has been constituted and approved by the Graduate School, it may be revised only with the full concurrence of all committee members, both old and new. A form to the Dean of the Graduate School requesting any change in membership must be signed by each member, old and new, and then filed with the Graduate School by the CEE Graduate Student Coordinator.

4.7 Plan of Study

The student, in consultation with his or her Advisory Committee, formulates a Plan of Study (an example showing the format is included in Section 7). The Plan of Study is an official document that outlines the individual student's specific requirements for degree. **Submission of a Plan of Study must be made prior to the completion of 15 credit hours.** The plan is prepared carefully to suit the needs of the student, including his or her research work. The Plan of Study includes graduate courses required for degree, including thesis or project and report, and all remedial background courses required by their program area. Students from the Virginia Tech UG/G program should include their double-count hours toward the 15 credit submission rule. The Plan of Study is submitted to the CEE Graduate Student Coordinator once it has been signed by all members of the Advisory Committee. **A hold will be placed on a student's account if the Plan of Study is not submitted on time.**

The Plan of Study requires the signatures of the student's Advisory Committee. An example showing the format is included in Section 7. **Any subsequent changes to the Plan of Study require that appropriate forms be filed with the Graduate School. All Advisory Committee members must approve such changes.**

All courses on the Plan of Study, including supporting courses, must be taken on a letter grade (A-F) basis except for those courses approved to be graded on a pass/fail (P/F) basis only. Please note that if you take a class P/F and fail the class it is calculated as a 0 in your overall GPA. Supporting courses taken for audit will only appear on the written version of the Plan of Study, not the electronic version. **Supporting courses on the Plan of Study do not count toward minimum degree requirements.**

In the event that a student has completed graduate-level coursework at another institution, the Graduate School limits the transfer of credit hours to a maximum of 50% of the total graded coursework on the Plan of Study. However, any transfer of credit hours must be first approved by the student's Advisory Committee. Only graduate level work from another institution may be transferred. No 4000 level or undergraduate credit can be transferred from other institutions. All transferred course credits must have a minimum grade of "B" or better as noted on an official transcript, have been earned while enrolled as a graduate student in good standing, and be acceptable for graduate degree credit at the "home" institution where the courses were taken.

Any courses on the Plan of Study that are five years or older at the time of submission, will need to go through a "justification of old coursework" process required by the Graduate School.

4.8 Meetings of the Advisory Committee

It is necessary that the Advisory Committee be made aware of and provide input to the research or project work that the student will undertake in completing either an M.S. or M.E. degree. **Thus, degree candidates are required to have a meeting of their Advisory Committee at least three months prior to the final defense of the thesis or project work.** The purpose of this meeting is to inform the Advisory Committee of the scope of the research and the experimental and/or analytical methods being utilized, and present a summary of progress to date. The student should provide the Committee with a one or two page summary of the research work prior to this meeting. It is often appropriate to hold the meeting substantially more than three months prior to the expected defense date. The Major Advisor should place documentation in the student's file indicating that the meeting was held and assessment of research progress. Departmental forms for committee meetings are available at: <http://www.cee.vt.edu/graduate-information-and-forms/>

4.9 Progress Reports

A written annual progress report is required of all graduate students. Each student will submit a 1-page report through Scholar to their Major Advisor which summarizes coursework, research activities (if applicable), achievements, and plans for future progress over the past 12 months or from their date of admission if in their first year. The Department will remind students during the spring semester of the coming deadline (following spring grade reports each year) and will provide the template and specific format for the report. In the academic year in which a student completes all degree requirements before the end of the spring semester, no report is required.

The Graduate School requires that the progress of each graduate student be evaluated by the Advisory Committee at least once a year, and that a report be placed in the student's file (see <http://www.policies.vt.edu/policymemos/ppm229.pdf>). Near the end of the student's studies, the progress report listed above will suffice. If the student's performance is deemed unsatisfactory, the reasons will be documented in a memo that is appended to the report. This memo should describe the specific performance concerns and provide a required course for remedial actions by the student, a timeline for the next review of performance, and a description of repercussions should expectations still not be met at the next performance review. A copy should be given to the student, who should be allowed to respond to the committee.

4.10 Final Examination Requirements

The final examination for the Master's degree varies in format depending upon the particular degree option being pursued. For the thesis option, the final examination requires a defense of the thesis. In the case of the Project & Report option (non-thesis), the final examination requires a defense of the Project & Report. In addition, students will be asked questions on subjects covered in coursework or other questions that are designed to determine the student's depth and breadth of knowledge in the subject area. In the case of the coursework only option (non-thesis), the final examination generally covers coursework and a presentation of any required report or independent study documents. Specific information regarding non-thesis examination requirements is included in the Appendix.

To pass the final examination, the student must have a favorable vote from a majority of the members of the examining committee. If a student fails the final examination, there must be a lapse of one full semester (a minimum of 15 weeks) before rescheduling the examination. The student is allowed no more than two opportunities to pass the final examination.

The electronic form “Request to Admit Candidate to the Final Exam” must be filed at least two weeks prior to the final exam date: <https://gradexam.stl.vt.edu/pages/login.php> The final exam date must be scheduled prior to the Graduate School deadline in a given semester. It is the student’s responsibility to ensure that the request for the final exam is turned in on time and meets final approval with the Graduate School. The electronic form must arrive at the Graduate School offices, electronically signed by the student’s committee within the required deadlines. **The student must be registered during the semester of the final exam.**

4.11 Preparation of Thesis

Thesis documents are submitted electronically to the Graduate School. Information is available on the Internet at <http://etd.vt.edu> where ETD stands for Electronic Thesis and Dissertation. Matters of style are usually handled by reference to the style sheets of a major journal in the particular field of study.

The thesis is a complete document that describes the student's work on a research topic. The exact format of the document is decided by the Advisory Committee. Chapters generally consist of an introduction, literature review, research methods and materials, results, discussion, conclusions, and recommendations. An alternative thesis format is the “journal manuscript” format in which the student prepares a journal article, or possibly several, as the main body of the thesis document. In this case, the student must include specific supporting sections and follow the formatting required by the CEE Department. Students considering this option are referred to Appendix 6.7 for details and should consult their Major Advisor. In either case, matters of style, including citations, are usually handled by reference to the style sheets of a major journal in the particular field of study.

A draft of the thesis document should be submitted to the Advisory Committee at least two weeks prior to the final examination. The draft will be reviewed and approved by the Major Advisor prior to distribution to the Advisory Committee. The student is responsible for obtaining the signatures

of the Advisory Committee on the Electronic Submission Approval Form. Electronic thesis submission should be completed within two weeks following the final defense. A request for an extension may be submitted by the Major Advisor to the Dean of the Graduate School. A delay in the submission of the thesis may cause a delay in awarding of the degree, and the student may incur fees for late submission.

4.12 Steps to the Master's Degree

Note: It is the student's responsibility to ensure timely completion of each one of these steps. Graduate School forms and deadlines can be found at www.graduateschool.vt.edu. It is the student's responsibility to complete and submit all forms and understand the deadlines.

Thesis

- (1) Selection of Major Advisor and Research Topic.
- (2) Selection of Advisory Committee.
- (3) Development of Plan of Study (prior to completion of 15 credit hours).
- (4) Meeting of Advisory Committee to discuss research goals and progress.
- (5) Registration in the semester of final defense: You may use a regular registration OR a special registration (a.k.a. Start of Semester Defense Exception-SSDE).
- (6) At the beginning of the final semester, the form "Application for Degree" must be completed through Hokie SPA.
- (7) Final Defense of Thesis. The electronic form "Request to Admit Candidate to Final Exam" must be submitted to the Graduate School **at least two weeks before the date requested:** <https://gradexam.stl.vt.edu/pages/login.php>. The Graduate School will notify the student, committee, and departmental representatives when the electronic exam card has been released.
- (8) Students have two weeks following the final exam to submit their thesis (ETD) to the Graduate School through the online exam system.

Project & Report (non-thesis)

- (1) Selection of Major Advisor and Project Topic.
- (2) Selection of Advisory Committee.
- (3) Development of Plan of Study (prior to completion of 15 credit hours).
- (4) Meeting of Advisory Committee to discuss research goals and progress.
- (5) Registration in the semester of final defense: You may use a regular registration OR a special registration (a.k.a. Start of Semester Defense Exception-SSDE).
- (6) At the beginning of the final semester, the form "Application for Degree" must be completed for through Hokie SPA.

- (7) Final Defense Project and Report. The electronic form “Request to Admit Candidate to Final Exam” must be submitted to the Graduate School **at least two weeks before the date requested**: <https://gradexam.stl.vt.edu/pages/login.php>. The Graduate School will notify the student, committee, and departmental representatives when the electronic exam card has been released.

Coursework only-Non-Thesis Option

- (1) Selection of Major Advisor and Advisory Committee.
- (2) Development of Plan of Study (prior to completion of 15 credit hours).
- (3) Completion of program area Writing/Independent Study Effort (if required).
- (4) Registration in the semester of final defense: You may use a regular registration OR a special registration (a.k.a.Start of Semester Defense Exception-SSDE).
- (5) At the beginning of the final semester, the form “Application for Degree” must be completed through Hokie SPA.
- (6) Final Examination. The electronic form “Request to Admit Candidate to Final Exam” must be submitted to the Graduate School **at least two weeks before the date requested**: <https://gradexam.stl.vt.edu/pages/login.php>. The Graduate School will notify the student, committee, and departmental representatives when the electronic exam card has been released.

5.0 THE Ph.D. PROGRAM

5.1 Degree Requirements

Each Ph.D. student must complete a minimum of 90 semester credit hours of graduate study (beyond the baccalaureate) including a Ph.D. dissertation. The program must include at least 27 credit hours of 5000-level and higher coursework. Transfer of coursework credit is subject to Graduate School limits (see Section 5.3) and must be approved by the student's Advisory Committee. Transfer credit may count toward the 5000 level hour requirement. Between 30 and 63 hours of Dissertation Research (CEE 7994) must be included in the program. A maximum of 6 credits hours of 4000 level classes may be allowed to count toward meeting Graduate School requirements. **Most program areas within CEE have more rigorous requirements. Consult your program area's advising guide for details.** See the Graduate Catalog for other restrictions.

5.2 Major Advisor and Advisory Committee

The Major Advisor is responsible for overseeing the dissertation work that will be completed as part of the doctoral program. The Major Advisor of each Ph.D. student is typically determined in advance of enrollment. The Major Advisor may be either a full-time tenure/tenure-track CEE faculty member or CEE affiliate faculty member at Virginia Tech (see Section 1.1. for a definition of these standings). CEE faculty, including CEE affiliate faculty, are listed on the departmental webpage (www.cee.vt.edu). The Major Advisor will advise the student on the composition of their Advisory Committee. Faculty who agree to serve on graduate Advisory Committees are expected to review and approve the student's coursework requirements (Plan of Study), provide advice, regularly assess the student's progress and accomplishments, and administer the required Preliminary and Final Examinations for the Ph.D. degree.

Two faculty members may jointly co-advise a student and co-chair their Advisory Committee (Model 2 in the table below). In this case at least one of the Co-Advisors must be either a full-time CEE faculty member or CEE affiliate faculty member. The second Co-Chair may be a CEE faculty, CEE affiliate faculty, CEE emeritus/emera faculty, or a full-time member of the Virginia Tech faculty from another department. CEE adjunct faculty may also serve as a Co-Chair but only with a full-time tenure/tenure-track CEE faculty member.

1. <u>Single Chair</u>	2. <u>Co-Chair</u>
Chair (1) Committee Members (Minimum of 3)	Co-Chairs (Maximum of 2) Committee Members (Minimum of 2)

The committee must consist of a minimum of four members, two of which must be full-time tenured or tenure-track CEE faculty members. Approved affiliate, emeriti, adjunct or other faculty do not count toward this two faculty minimum. However, under extenuating circumstances, CEE emeriti faculty may count toward the two CEE faculty minimum, subject to approval by the CEE Department Head. The remaining committee members may be CEE faculty, including professors of practice and research professors, full-time non-CEE Virginia Tech faculty, CEE emeriti faculty

or qualified experts from outside of Virginia Tech approved by the Graduate School. It is expected, but not required, that the committee include at least one faculty member from outside the CEE Department.

Each member of the committee must hold a Ph.D. or equivalent doctoral degree. Qualified experts from outside of Virginia Tech may be recommended for inclusion on a Ph.D. Advisory Committee (e.g., faculty affiliated with peer universities, government scientists, etc.). Approval for external committee members must be petitioned from the Graduate School. Students should provide the CEE Graduate Coordinator with an updated vita/resume for the person seeking inclusion on the committee from outside of Virginia Tech. Petition forms must be first approved the CEE Department Head and then filed with the Graduate School by the CEE Graduate Student Coordinator. Committee members external to Virginia Tech shall make up no more than one-third of the total committee membership and will have all the voting rights and privileges of an Advisory Committee member.

The approval process for the Advisor Committee begins when the student identifies the committee members on the Plan of Study (Section 5.3) and submits the plan to the department with committee signatures. The Advisory Committee must be approved first by the CEE Department Head and then filed with the Graduate School by the CEE Graduate Student Coordinator. Once a student's Advisory Committee has been constituted and approved by the Graduate School, it may be revised only with the full concurrence of all committee members, both old and new. A form to the Dean of the Graduate School requesting any change in membership must be signed by each committee member, old and new, and then filed with the Graduate School by the CEE Graduate Student Coordinator.

5.3 Plan of Study

After the establishment of the Ph.D. Advisory Committee, and before the completion of 15 credit hours beyond the M.S. degree at Virginia Tech, the Ph.D. student should file a Plan of Study. A hold will be placed on a student's account if the Plan of Study is not submitted on time. The Plan of Study is an official document that outlines the individual student's specific requirements for degree. The plan is prepared carefully to suit the needs of the student, including his or her research work. The Plan of Study includes graduate courses required for degree, including thesis or project and report, and all remedial background course required by their program area. The Plan of Study is submitted to the Graduate Student Coordinator of the Civil and Environmental Engineering Department once it has been signed by all members of the Advisory Committee.

The Plan of Study requires signatures of the student's Advisory Committee. An example showing the format is included in Section 7. **Any subsequent changes to the Plan of Study require that appropriate forms be filed with the Graduate School.** All Advisory Committee members must approve such changes.

All courses on the Plan of Study, including supporting courses, must be taken on a letter grade (A-F) basis, except for those courses approved to be graded on a pass/fail (P/F) basis only. Supporting courses taken for audit will only appear on the written version of the Plan of Study, not the electronic version. **Supporting courses on the Plan of Study do not count toward minimum**

degree requirements.

Up to 50% of the total graded coursework on the plan may be transferred from another institution if approved by the student's Advisory Committee. Only graduate level work from another institution may be transferred. No 4000 level or undergraduate credit can be transferred from other institutions. All transferred course credits must have a minimum grade of "B" or better as noted on an official transcript, have been earned while enrolled as a graduate student in good standing, and be acceptable for graduate degree credit at the "home" institution where the courses were taken.

Any courses on the Plan of Study that are five years or older at the time of submission, will need to go through a "justification of old coursework" process required by the Graduate School.

5.4 Ph.D. Qualifying Examination

Program areas may require some or all Ph.D. students to take a qualifying examination at an early stage of their Ph.D. program, possibly during the first semester. The qualifying examination may be oral, written, or both. The purpose is to evaluate subject mastery, determine deficiencies, and possibly determine whether the student should continue. For international students, it may also be used to determine proficiency in written and oral English. The qualifying examination results are made a part of the student's file. A student will only have two opportunities to pass the qualifying exam. If the qualifying exam is not passed in those two opportunities, the student will not be allowed to continue in the Ph.D. program. The departmental form used to record the completion of the qualifying exam is available at <http://www.cce.vt.edu/graduate-information-and-forms/>.

5.5 Ph.D. Preliminary Examination

The preliminary examination is a requirement for all Ph.D. students. Its purpose is to test the student's mastery of doctoral coursework and to determine the student's ability to develop scholarly research. It is administered by the student's Advisory Committee and may be oral, written, or both. Consult with your program area on specific requirements. It is usually taken when the student is nearing the completion of the required coursework, and must be passed at least six months before graduation. **The student must be registered when the preliminary examination is taken.** If the student's preliminary examination consists of both a written and oral portion, the exam should be scheduled for the oral portion of the exam. **The electronic form "Request to Admit Candidate to Preliminary Exam" must be submitted to the Graduate School at least two weeks before the date requested: gradexam.stl.vt.edu/pages/login.php.**

One negative vote is permitted on a preliminary examination. If the performance is unsatisfactory, one full semester must lapse (a minimum of 15 weeks) before the administration of a second examination. The preliminary examination cannot be attempted more than twice. Upon successful completion of the preliminary examination, the student officially becomes a candidate for the Ph.D. degree.

5.6 Language Requirement

There is no departmental language requirement. However, international students may be required to take remedial courses in oral or written English if deemed necessary by their Major Advisor or Advisory Committee.

5.7 Ph.D. Dissertation Proposal

Each Ph.D. candidate must present a written proposal of the proposed dissertation topic to the student's Advisory Committee for approval at a very early stage of the candidate's work on the dissertation and at least six months prior to the completion of the dissertation. The Committee will then hold a meeting at which the student will give a presentation of the proposal and discuss it with the Committee.

The purpose of this written and oral presentation is to determine the feasibility and originality of the proposed research, to examine the student's familiarity with the literature and background materials involved, and to offer suggestions to the student regarding the proposed research. In some cases, it may be appropriate to conduct this presentation prior to, or in conjunction with, the preliminary examination. **If the proposal and the preliminary exam are taken together, the student must follow the paperwork procedures for an official preliminary exam scheduled with the Graduate School.** In addition, the departmental form used to record the completion of the proposal exam is available at: <http://www.cee.vt.edu/graduate-information-and-forms/>.

After the presentation, the Major Advisor should place a proposal approval form or letter in the student's file indicating the date of the presentation and including the signatures of the Committee members. A proposal form is available on the CEE website under the current graduate student section. One copy of the completed approval form should be given to the program area Coordinator.

Significant variations to the Dissertation Proposal must be reviewed and approved by the members of the Advisory Committee.

5.8 Ph.D. Dissertation

The dissertation should be an original contribution to the literature in an area of Civil Engineering. It should describe the execution and results of the research effort in detail. The style, organization, and standards of the dissertation should be equivalent to those for papers in scientific or engineering journals (e.g., journals published by the American Society of Civil Engineers). The specific content and format must be included as part of the research proposal. In an effort to facilitate preparation of written scientific work and timely submittal of research findings for publication, Ph.D. students should consider the "journal manuscript" format. With this approach, the student prepares journal articles which serve as the main body of the dissertation document. The student must include specific supporting sections and follow the formatting required by the CEE Department. Students considering this option are referred to Appendix 6.8 for details and should consult their Major Advisor.

Dissertations are submitted electronically to the Graduate School. Information is available on the Internet at <http://etd.vt.edu> where ETD stands for Electronic Thesis and Dissertation. Electronic dissertation submission should be completed within two weeks following the final defense. A delay in the submission of the dissertation may cause a delay in awarding of the degree, and the student may incur fees for late submission.

5.9 Ph.D. Progress Reports

During the dissertation work, the Advisory Committee must be kept informed of the student's progress. This could be accomplished by Committee meetings, by meetings of the student individually with members of the Committee, or by written progress reports by the student to the Committee. This notification of progress should be carried out at least every six months after the dissertation proposal has been presented.

A written annual progress report is required of all graduate students. Each student will submit a one-page report using Scholar to their Major Advisor that summarizes coursework and research activities, achievements and plans for future progress over the past 12 months or from their date of admission if in their first year. The Department will remind each student during the spring semester of the coming deadline (immediately following the spring grade reports) and will provide the template and specific format for the report. In the academic year in which a student completes all degree requirements before the end of the spring semester, no report is required.

After each of these reviews of progress, the Major Advisor should place a report in the student's file indicating the date of the review, whether or not progress was judged to be satisfactory, and including the signatures of the members of the Advisory Committee (see link to form in appendix section). If the student's performance is deemed unsatisfactory, the reasons should be described in a memo that is appended to the report. This memo should describe the specific performance concerns and provide a required course for remedial actions by the student, a timeline for the next review of performance, and a description of repercussions should expectations still not be met at the next performance review. A copy should be given to the student, who should be allowed to respond to the committee.

The Graduate School requires that the progress of each graduate student be evaluated by the Advisory Committee at least once a year, and that a report be placed in the student's file (see <http://www.policies.vt.edu/policymemos/ppm229.pdf>). During the dissertation work, the progress report listed above will suffice. Prior to that, if the student's performance is deemed unsatisfactory, the actions described above should be carried out.

5.10 Ph.D. Final Examination

All Ph.D. students must take a final oral examination, given by the Advisory Committee. It cannot be scheduled until the dissertation has been completed and approved by the Major Advisor. The Committee members will read the dissertation before the final examination. At the examination, the student will present a review of the work and be prepared to defend it in response to questions from the Committee.

Requirements for successful completion of the final examination are the same as for the preliminary examination. The student must be registered when the examination is taken. **The electronic form “Request to Admit Candidate to Final Exam” must be submitted to the Graduate School at least two weeks before the date requested: <https://gradexam.stl.vt.edu/pages/login.php>.** The Graduate School will notify the student, committee, and departmental representatives when the exam card has been electronically released. (Note: Application for Degree should already have been submitted). Students who successfully defend their dissertation have two weeks to submit their electronic dissertation (ETD) to the Graduate School through the online exam system. The student will only have two opportunities to take the final exam. See the Graduate Catalog for details.

5.11 Residency Requirements

A residency requirement applies to all Ph.D. students. Residency allows students to concentrate focused time on their degree and scholarship. Residency goals can be achieved by multiple means. Refer to the Graduate School catalog for exact requirements.

6.0 APPENDIX

This section contains the following information about required background courses for the MS and PhD:

6.1. Required Background Courses for Construction Engineering and Management

6.2. Required Background Courses for Environmental and Water Resources Engineering

6.3 Required Background Courses for Geotechnical Engineering

6.4 Required Background Courses for Structural Engineering and Materials

6.5 Required Background Courses for Transportation Infrastructure and Systems Engineering

6.6 Master of Science (Non-Thesis) - Final Examination Requirements

6.7 Requirements for Preparing a Master of Science Thesis in the Journal Manuscript Format

6.8 Requirements for Preparing a Ph.D. Dissertation in the Journal Manuscript Format

**6.1 Required Background Courses for Construction Engineering and Management
Worksheet for Verifying Core Knowledge Base**

STUDENT NAME:

Students must have a well-developed "core" knowledge base for successful graduate study in construction engineering and management. Departmental policy requires that each student document having met this requirement. This worksheet provides such documentation.

Instructions: Please complete this worksheet in consultation with your advisor (or temporary advisor) who will then work with you to plan the first semester's courses. This process may involve reviewing transcripts from your former institution(s). Your advisor (or temporary advisor) will make a preliminary assessment of your core knowledge base, initial the worksheet on the second page, and make an electronic copy (pdf) as a record. Your advisory committee will then review this worksheet, typically during the second semester. The advisory committee will either approve the worksheet (usual case) or ask you to take additional courses (unusual case).

Required VT Course	√	Equivalent Course	Grade
MATH 1205 or MATH 1225 (Calculus I/Single Variable)			
MATH 1206 or MATH 1226 (Calculus II/Single Variable)			
CHEM 1035/1045			
MATH 2224 (Calculus-Multi Variable)			
MATH 2214 (Differential Equations)			
PHYS 2305 (Physics)			
PHYS 2306 (Physics)			
GEOS 2104 (Elements of Geology)			
ISE 2014 (Engr. Econ.)			
ESM 2104 (Statics)			
ESM 2204 (Deform. Bodies)			
CEE 3014 (Construction Mgmt.)			
CEE 3104 (Environmental Engr.) <u>OR</u> CEE 4554 (Natural Disaster Mitigation)			
CEE 3404 (Theory of Struc.)			
CEE 3424 (Reinforced Concr.)			
CEE 3514 (Soil Mechanics)			
CEE 3684 (CEE Materials)			
CEE 3804 (Computer Applications.)			
CEE 4804 (Prof. & Legal Issues)			

Approvals

Advisor/Temp. Advisor Initials Date

Advisory Committee:

_____ Chair	_____ Date	_____ Member	_____ Date
_____ Member	_____ Date	_____ Member	_____ Date
_____ Member	_____ Date	_____ Member	_____ Date

**6.2 Required Background Courses for Environmental and Water Resources Engineering
Worksheet for Verifying Core Knowledge Base**

STUDENT NAME:

Students must have a well-developed "core" knowledge base for successful graduate study in EWR. Departmental policy requires that each student document having met this requirement. This worksheet provides such documentation - by one of two ways, depending on your academic background.

Instructions: Please complete this worksheet in consultation with your advisor (or temporary advisor) who will then work with you to plan the first semester's courses. This process may involve reviewing transcripts from your former institution(s). Your advisor (or temporary advisor) will make a preliminary assessment of your core knowledge base, initial the worksheet on the second page and make an electronic copy (pdf) as a record. Your advisory committee will then review this worksheet, typically during the second semester. The advisory committee will either approve the worksheet or ask you to take additional courses.

Student Name (Last, first)	
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1. Students with an ABET-accredited Engineering degree

Graduates of ABET-accredited engineering programs are assumed to have the required core knowledge base*. If you are in this group, place a check in the box on the following line and write in the institution and year of your civil engineering degree.

Graduate of ABET accredited engineering program	✓	Institution	Year
	<input type="checkbox"/>		

2. Students without an ABET-accredited engineering degree enrolled in graduate engineering degree (MSCE, MSEN, Ph.D. CE)

Students must complete the courses below or demonstrate having taken an equivalent course at another institution. Students should enter the course number, name and grade earned in each course or equivalent course. Missing courses/equivalent courses can be taken either before or after entering the graduate program. Courses at the 1000/2000 level can be taken pass-fail (P/F). Courses at the 3000/4000 level must be taken for a letter grade (A/F). These undergraduate background courses do not count toward graduate degree requirements.

Required VT Course	✓	Course/Equivalent Course	Grade (or P/F)
CHEM 1035/1045 - <i>General Chemistry</i>	<input type="checkbox"/>		
MATH 1205 or MATH 1225 - <i>Calculus/Single Variable</i>	<input type="checkbox"/>		

MATH 1206 or MATH 1226 – <i>Calculus/Single Variable</i>			
ESM 2104 Statics			
MATH 2214 - <i>Differential Eqns.</i>			
MATH 2224 - <i>Multivariable Calculus</i>			
PHYS 2305 - <i>Physics I</i>			
CEE 3104 - <i>Intro to Environmental Eng.</i>			
CEE 3304 - <i>Fluid Mechanics</i>			
CEE 3314 – <i>Water Resources Engineering or 2nd level introductory EWR engineering course</i>			

3. Students in the MS ESEN program

Students must complete the courses below or demonstrate having taken an equivalent course at another institution. Students should enter the course number, name and grade earned in each course or equivalent course. Missing courses/equivalent courses can be taken either before or after entering the graduate program. Courses at the 1000/2000 level can be taken pass-fail (P/F). Courses at the 3000/4000 level must be taken for a letter grade (A/F). These undergraduate background courses do not count toward graduate degree requirements.

Required VT Course	✓	Course/Equivalent Course	Grade (or P/F)
CHEM 1035/1045 - <i>General Chemistry</i>			
MATH 1205 or MATH 1225 – <i>Calculus/Single Variable</i>			
MATH 1206 or MATH 1226– <i>Calculus/ Single Variable</i>			
MATH 2214 - <i>Differential Eqns.</i>			
PHYS 2305 - <i>Physics I</i>			

Approvals

Temp. Advisor/Advisor Initials Date

Advisory Committee:

Chair Date

Member Date

Member Date

Member Date

Member Date

Member Date

6.3 Required Background Courses for Geotechnical Engineering
Worksheet for Verifying Core Knowledge Base

STUDENT NAME:

Students must have a well-developed "core" knowledge base for successful graduate study in geotechnical engineering. Departmental policy requires that each student document having met this requirement. This worksheet provides such documentation - by one of two ways, depending on your academic background.

Instructions: Please complete this worksheet in consultation with your advisor (or temporary advisor) who will then work with you to plan the first semester's courses. This process may involve reviewing transcripts from your former institution(s). Your advisor (or temporary advisor) will make a preliminary assessment of your core knowledge base, initial the worksheet on the second page and make an electronic copy (pdf) as a record. Your advisory committee will then review this worksheet, typically during the second semester. The advisory committee will either approve the worksheet (usual case) or ask you to take additional courses (unusual case).

Student Name (Last, first)	
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1. Students with an ABET-accredited Civil Engineering degree

Graduates of ABET-accredited Civil Engineering programs are assumed to have the required core knowledge base*. If you are in this group, place a check in the box on the following line and write in the institution and year of your civil engineering degree.

Graduate of ABET accredited engineering program	✓	Institution	Year

2. Others

All other students must complete the courses below or demonstrate having taken an equivalent course at another institution. Students should enter the course number, name and grade earned in each course or equivalent course. Missing courses/equivalent courses can be taken either before or after entering the graduate program. Courses at the 1000/2000 level can be taken pass-fail (P/F). Courses at the 3000/4000 level must be taken for a letter grade (A/F). Undergraduate background courses do not count toward graduate degree requirements.

Required VT Course	✓	Course/Equivalent Course	Grade (or P/F)
CHEM 1035- <i>General Chemistry</i>			
CHEM 1045- <i>Gen. Chem. Lab</i>			

MATH 1205 or MATH 1225- <i>Calculus/Single Variable</i>			
MATH 1206 or MATH 1226- <i>Calculus/Single Variable</i>			
MATH 2224- <i>Multivariable Calculus</i>			
MATH 2214- <i>Differential Eqns.</i>			
PHYS 2305- <i>Physics I</i>			
PHYS 2306 - <i>Physics II</i>			
GEOS 2104- <i>Elements of Geology*</i>			
ESM 2104- <i>Statics</i>			
ESM 2204- <i>Mech. Deform. Bodies</i>			
CEE 3304- <i>Fluid Mechanics</i>			
CEE 3404- <i>Theory of Structures</i>			
CEE 3514- <i>Intro. Geotechnical Eng.</i>			
Note: Students whose career objectives include becoming a registered Professional Engineer should consider completing the following courses: ISE 2014 – <i>Engineering Economy</i> , CEE 2814 – <i>CEE Measurements</i> , CEE 3424 – <i>Reinforced Concrete</i> , ESM 2304 – <i>Dynamics</i> .			

3. All Students

*Given the importance of geology to Geotechnical Engineering, all students are required to have a course in physical geology. Students lacking such a course must take either CEE 5xxx *Geological Engineering* or CEE 5xxx *Advanced Engineering Geology*. These courses must be taken A/F and can be counted toward graduate degree requirements. Depending on your situation, fill in (a) or (b), below.

a) <i>No geology deficiency</i>	
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b) <i>Geology deficiency satisfied by:</i>	
<i>Course Equivalent</i>	<i>Grade</i>

Approvals

Temp. Advisor/Advisor Initials Date

Advisory Committee:

Chair Date

Member Date

Member Date

Member Date

6.4 Required Background Courses for Structural Engineering and Materials
Worksheet for Verifying Core Knowledge Base

STUDENT NAME:

Students must have a well-developed "core" knowledge base for successful graduate study in structural engineering and materials. Departmental policy requires that each student document having met this requirement. This worksheet provides such documentation.

Instructions: Please complete this worksheet in consultation with your advisor (or temporary advisor) who will then work with you to plan the first semester's courses. This process may involve reviewing transcripts from your former institution(s). Your advisor (or temporary advisor) will make a preliminary assessment of your core knowledge base, initial the worksheet below, and make an electronic copy (pdf) as a record. Your advisory committee will then review this worksheet, typically during the second semester. The advisory committee will either approve the worksheet (usual case) or ask you to take additional courses (unusual case).

Required VT Course	√	Equivalent Course	Grade
CHEM 1035-General Chemistry			
CHEM 1045-Gen. Chem. Lab			
MATH 1205 or MATH 1225- Calculus/Single Variable			
MATH 1206 or MATH 1226- Calculus/Single Variable			
MATH 2224- Multivariable Calculus			
MATH 2214- Diff Eqs.			
GEOS 2104-Elements of Geology			
ESM 2104-Statics			
ESM 2204-Mech. Deforms. Bodies			
CEE 3404 – Theory of Structures			
CEE 3424 – Reinforced Concrete			
CEE 3434 – Steel Structures I			
CEE 3514 – Introduction to Geotechnical Engineering			
CEE 3684 – CEE Materials			

Note: Students whose career objectives include becoming a registered Professional Engineer should consider completing CEE 2814 – CEE Measurements.

Approvals

 Advisor/Temp. Advisor Initials Date

Advisory Committee:

_____ Chair	_____ Date	_____ Member	_____ Date
_____ Member	_____ Date	_____ Member	_____ Date
_____ Member	_____ Date	_____ Member	_____ Date

**6.5 Required Background Courses for Transportation Infrastructure and Systems Engineering
Worksheet for Verifying Core Knowledge Base**

STUDENT NAME:

Students must have a well-developed "core" knowledge base for successful graduate study in transportation infrastructure and systems engineering. Departmental policy requires that each student document having met this requirement. This worksheet provides such documentation.

Instructions: Please complete this worksheet in consultation with your advisor (or temporary advisor) who will then work with you to plan the first semester's courses. This process may involve reviewing transcripts from your former institution(s). Your advisor (or temporary advisor) will make a preliminary assessment of your core knowledge base, initial the worksheet on the second page, and make an electronic copy (pdf) as a record. Your advisory committee will then review this worksheet, typically during the second semester. The advisory committee will either approve the worksheet (usual case) or ask you to take additional courses (unusual case).

Required VT Course	√	Equivalent Course	Grade
CHEM 1035-Gen. Chem CHEM 1045-Gen Chem Lab MATH 1205 or MATH 1225 (Calculus-Single Variable) MATH 1206 or MATH 1226 (Calculus-Single Variable) MATH 2224 (Calculus-Multi Variable) MATH 2214 (Differential Equations) ISE 2014 (Engineering Economics) CEE 3604 (Transportation) CEE 3804 (Computer Applications) STAT 4604 (Stat Methods for Engr)			
ESM 2104 (Statics)* ESM 2204-Mech. Deform. Bodies CEE 3404 (Theory of Structures)* CEE 3424 (Reinforced Concrete)* CEE 3514 (Intro to Geotech)* CEE 3684 (CEE Materials)*			

* Only required for infrastructure area.

Note: Students whose career objectives include becoming a registered Professional Engineer should consider completing the following courses: CEE 2814 – CEE Measurements, CEE 4604 – Transportation Engineering.

Approvals

Advisor/Temp. Advisor Initials Date

Advisory Committee:

Chair Date

Member Date

Member Date

Member Date

Member Date

Member Date

6.6 Master of Science (Course-work ONLY, Non-Thesis) - Final Examination Requirements

Construction Engineering and Management

Students seeking to graduate after completing either the Project and Report or coursework-only option take a final examination which is presented (30-minute presentation) to the student's committee and defended.

Environmental and Water Resources Engineering

The final examination is an oral exam and covers course material. Students seeking to graduate after completing the Project and Report option take a final examination which is presented (30-minute presentation) to the student's committee and defended.

Geotechnical Engineering

The final exam is oral and covers course material.

Structural Engineering and Materials

The final examination consists of a written exam due within the first four weeks of the final semester.

Transportation Infrastructure and Systems Engineering

Students are required to take either (i) a 3-credit Independent Study with a Report, plus a 3-hour oral exam, or (ii) a 6-hour written exam spread over three days, plus a 3-hour oral exam.

6.7 Requirements for Preparing an M.S. Thesis in the Journal Manuscript Format

Using the Journal Manuscript Format in Preparing the MS Thesis Department of Civil and Environmental Engineering

Objectives

1. To provide students with an opportunity to prepare written scientific work with the target audience being their professional peers.
2. To encourage students to conduct their research in a manner that will be defensible to the academic/professional community.
3. To encourage timely submission of research results for publication.

General Policy

1. Preparation of a thesis in a journal manuscript format is optional; any decision to proceed must be by mutual agreement between the student and his/her advisor with the consent of the advisory committee.
2. Students should aim for high quality manuscripts for submission to peer-reviewed journals or proceedings of a national/international professional conference(s). The publications targeted for manuscript submittal shall be mutually agreed to by the student and his/her advisor
3. The number of manuscripts that will constitute the main body of the thesis and the targeted journals/conference proceedings will be determined in advance following discussions between the student and his/her advisor(s) and must be formally documented with his/her advisory committee. It is typical for a single manuscript to constitute the main body of the MS thesis, but there is precedent for multiple manuscripts.
4. Any manuscript should be prepared in accordance with the rules of the publication source, including word count, page limits, and format of tables and figures.
5. A manuscript does not have to be submitted for review prior to thesis defense, but should be submitted shortly after the defense. Use of published manuscripts is acceptable, but students must follow procedures for obtaining permission to publish materials that are subject to copyright laws.
6. For a manuscript that have not been submitted prior to the thesis defense, students and faculty must reach agreement on who will be listed as authors and the order of authorship prior to the final exam.
7. It is not expected that the student will be the first author of the manuscript(s); however, it is absolutely necessary to delineate the contributions of the student as a primary author.
8. Clearly identify each manuscript chapter in the thesis including a title page with all authors and the target publication. In addition, the Graduate School requires a Foreword documenting all contributions from each author listed on each manuscript.
9. The details of the student's plan regarding the number of manuscripts and content should be clearly communicated to his/her advisory committee, typically at the research proposal defense or earlier. Any proposed change to the deliverables will be the result of mutual

agreement between the student and his/her advisor with the consent of the advisory committee.

Guidelines

1. The content of the manuscript-based thesis will consist of:
 - a) Abstract (per graduate school requirements)
 - b) Acknowledgements
 - c) Table of Contents
 - d) List of Tables
 - e) List of Figures
 - f) Introduction
 - g) Literature Review
 - h) Manuscript(s)
 - i) Engineering Significance or Conclusion
 - j) Appendices
2. References can be listed at the end of each section, or as a separate section at the end (after Engineering Significance but before Appendices).
3. *It is essential for the student to appropriately document his/her research in the form of Appendices.* The nature and content of these sections should be determined early in the development of the thesis with the advice and approval of the student's advisor(s). Examples of the expected content in Appendices include:
 - a) Documentation of procedures and methodologies in greater detail than what is presented in the manuscripts (because of page limits) or procedures and methodologies not described at all in other chapters.
 - b) Archiving of primary data shown in figures, etc. and also data that form the basis of calculations presented in the manuscripts that is not listed in other chapters.
 - c) Documentation of data management plan.
 - d) Any additional data analysis not included in manuscripts (e.g., Supplemental Info).
4. Any waiver of the requirement of the Literature Review (see 1g) must receive the advice and consent of the advisory committee. The Literature Review is typically a continuation of the student's critique of previous research presented with the research proposal. However, it may be prepared in manuscript format for submittal to a journal.

6.8 Requirements for Preparing a Ph.D. Dissertation in the Journal Manuscript Format

Using the Journal Manuscript Format in Preparing the PhD Dissertation Department of Civil and Environmental Engineering

Objectives

1. To provide students with an opportunity to prepare written scientific work with the target audience being their professional peers.
2. To encourage students to conduct their research in a manner that will be defensible to the academic/professional community.
3. To encourage timely submission of research results for publication.

General Policy

1. Preparation of a dissertation in a journal manuscript format is optional; any decision to proceed must be by mutual agreement between the student and his/her advisor with the consent of the advisory committee.
2. Students should aim for high quality manuscripts for submission to peer-reviewed journals or proceedings of a national/international professional conference(s). The publications targeted for manuscript submittal shall be mutually agreed to by the student and his/her advisor
3. The number of manuscripts that will constitute the main body of the dissertation and the targeted journals/conference proceedings will be determined in advance following discussions between the student and his/her advisor(s) and must be formally documented with his/her advisory committee. Typically, 3-4 manuscripts constitute a dissertation.
4. Manuscripts should be prepared in accordance with the rules of the publication source, including word count, page limits, and format of tables and figures.
5. Manuscripts do not have to be submitted for review prior to dissertation defense, but should be submitted shortly after the defense. Use of published manuscripts is acceptable, but students must follow procedures for obtaining permission to publish materials that are subject to copyright laws.
6. For manuscripts that have not been submitted prior to the dissertation defense, students and faculty must reach agreement on who will be listed as authors and the order of authorship prior to the final exam.
7. It is not expected that the student will be the first author of all manuscripts; however, it is absolutely necessary to delineate the contributions of the student as a primary author.
8. Clearly identify each manuscript chapter in the dissertation, including a title page with all authors and the target publication. In addition, the Graduate School requires a Foreword documenting all contributions from each author listed on each manuscript.
9. The details of the student's plan regarding the number of manuscripts and content should be clearly communicated to his/her advisory committee, typically at the research proposal defense or earlier. Any proposed change to the deliverables will be the result of mutual agreement between the student and his/her advisor with the consent of the advisory committee.

Guidelines

1. The content of the manuscript-based dissertation will consist of:
 - a) Abstract (per graduate school requirements)
 - b) Acknowledgements
 - c) Table of Contents
 - d) List of Tables
 - e) List of Figures
 - f) Introduction
 - g) Literature Review
 - h) Manuscripts
 - i) Engineering Significance or Conclusion
 - j) Appendices
2. References can be listed at the end of each section, or as a separate section at the end (after Engineering Significance but before Appendices).
3. *It is essential for the student to appropriately document his/her research in the form of Appendices.* The nature and content of these sections should be determined early in the development of the dissertation with the advice and approval of the student's advisor(s). Examples of the expected content in Appendices include:
 - a) Documentation of procedures and methodologies in greater detail than what is presented in the manuscripts (because of page limits) or procedures and methodologies not described at all in other chapters.
 - b) Archiving of primary data shown in figures, etc. and also data that form the basis of calculations presented in the manuscripts that is not listed in other chapters.
 - c) Documentation of data management plan.
 - d) Any additional data analysis not included in manuscripts (e.g., Supplemental Info).
4. Any waiver of the requirement of the Literature Review (see 1g) must receive the advice and consent of the advisory committee. The Literature Review is typically a continuation of the student's critique of previous research presented with the research proposal. However, it may be prepared in manuscript format for submittal to a journal.

7.0 Sample Plan of Study Forms

Workable Plan of Study forms and departmental progress forms are available at:
<http://www.cee.vt.edu/graduate-information-and-forms/>

7.1 EXAMPLE of Ph.D. Plan of Study:

PROPOSED GRADUATE PLAN
FOR
Joe Engineer
Leading to the Degree of
Ph.D.
In
Civil Engineering

Research hours:

CEE 7994- Research and Dissertation	Fall 2009	3 hours
CEE 7994- Research and Dissertation	Spring 2010	6 hours
CEE 7994 - Research and Dissertation	Fall 2010	12 hours
CEE 7994 - Research and Dissertation	Spring 2011	15 hours
CEE 7994 - Research and Dissertation	Fall 2011	9 hours
CEE 7994 – Research and Dissertation	Spring 2012	12 hours
		Total Research = 57

5000 and Higher Level Courses from VT:

CEE 5000 – Dynamic things in Engineering	Fall 2008	3 hours
CEE 5100 – Design of things in Engineering	Fall 2008	3 hours
CEE 5200 – Design of steel engineering materials	Fall 2008	3 hours
CEE 5300 – Design of Soil in Engineering	Spring 2009	3 hours
CEE 5400 – Design of GIS for Engineers	Spring 2009	3 hours
STAT 5000 – Stats for Engineers	Spring 2009	3 hours
GEOG 5001- Geology for Engineers	Fall 2009	3 hours
ESM 5002- Materials for Engineers	Fall 2009	3 hours
CEE 5500 – Analysis of Engineers	Fall 2009	3 hours
		Total VT 5000 = 27

5000 level Transfer classes:

(All classes transferred from George Washington University)

CE- Intermediate Engineering things	Spring 2008	3 hours
EVN – Environmental things	Fall 2007	3 hours
		Total transfer = 6

4000 Level Courses-

CEE 4000- Design of transportation things	Fall 2010	3 hours
		Total 4000 Level= 3

Supporting Courses:

CEE 5944- seminar
CEE 5944 – seminar

Fall 2008 1 hour
Spring 2009 1 hour
Total Supporting Courses= 2

**Total Graduate Hours
(Supporting not included) = 93**

Signatures (and printed names) of Student's Advisory Committee

Chair- Dr. Jefe (print name)

Student Number: 900-00-007

Committee Member- Dr. Two(print name)

Student Signature:

Committee Member- Dr. Three (print name)

Committee Member- Dr. Four (print name)

The student completed the required departmental ethics requirement by attending departmental orientation on _____(date) and by attending the departmental seminar(s) in _____semester(s).

7.2 EXAMPLE of an M.S. Plan of Study

PROPOSED GRADUATE PLAN
FOR
Joan Engineer
Leading to the Degree of M.S.
In
Civil Engineering

Research hours:

CEE 5994 – Research and Thesis	Fall 2009	3 hours
CEE 5994 – Research and Thesis	Spring 2010	6 hours
Total Research = 9		

5000 and Higher Level Courses from VT:

CEE 5000 – Dynamic things in Engineering	Fall 2009	3 hours
CEE 5100 – Design of things in Engineering	Fall 2009	3 hours
CEE 5200 – Design of steel engineering materials	Fall 2009	3 hours
CEE 5300 – Design of Soil in Engineering	Spring 2010	3 hours
STAT 5000 – Stats for Engineers	Spring 2010	3 hours
GEOG 5001- Geology for Engineers	Fall 2009	3 hours
Total VT 5000 = 21		

4000 Level Courses-

CEE 4000- Design of transportation things	Fall 2010	3 hours
Total 4000 Level= 3		

Supporting Courses:

CEE 5944- seminar	Fall 2008	1 hour
CEE 5944 – seminar	Spring 2009	1 hour
Total Supporting Courses= 2		

Total Graduate Hours

(Supporting not included) = 33

Signatures (and printed names) of Student's Advisory Committee

Chair- Dr. Jefe (print name)

Student Number: 900-00-007

Committee Member- Dr. Two (print name)

Student Signature:

Committee Member- Dr. Three (print name)

The student completed the required departmental ethics requirement by attending departmental orientation on _____ (date) and by attending the departmental seminar(s) in _____ semester(s).