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**DEPARTMENT OF HORTICULTURAL SCIENCE
NORTH CAROLINA STATE UNIVERSITY**

GRADUATE STUDENT HANDBOOK

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INTRODUCTION TO THE HORTICULTURAL SCIENCE GRADUATE PROGRAMS

The departmental graduate programs and graduate students are an important and integral part of the Horticultural Science Department. This handbook has been prepared to assist you in becoming oriented to the Department, its faculty, and its operational procedures. **It is not intended to be the sole source of information.** It is designed to be complementary to the NCSU Graduate School (<https://grad.ncsu.edu/>) policies, rules, regulations, and procedures that are described in the [NCSU Graduate Handbook](#). **The Department of Horticultural Science Handbook is intended for informational purposes only and is subject to change.** All students should consult with the NCSU Graduate School Handbook for additional information.

The Department offers graduate programs leading to the **Master of Horticultural Science (MHS and MHS-DE), Master of Science (MS), and Doctor of Philosophy (PhD) degrees.** A thesis or dissertation, based on original research, is required for the MS and PhD, respectively. Completion of the requirements normally takes 2 to 2 1/2 years for the MHS and MS degrees and 3 to 3 1/2 years for the PhD. For students who do not plan to further their graduate studies or who wish to substitute additional course work for the research requirement in their graduate programs, the MHS degree is offered. Generally, this is considered to be a terminal degree. The MHS degree is also offered through Distance Education (DE).

Horticultural Science is a diverse field and a variety of areas for study and research are available:

- Horticultural crop production and management
- Breeding, genetics, genomics, and bioengineering
- Landscapes, gardens, and urban horticulture
- Plant and postharvest physiology
- Community food systems and agroecology

Within these research areas are specialized fields of study such as greenhouse production, fruits and vegetables, organics, weed science, nursery substrates, controlled environmental production, and others.

The Department often works with allied departments for a portion of the instructional program. In addition, many of our research programs are in collaboration with researchers in those departments.

Opportunities for employment after graduate study include teaching and research faculty positions in state and private universities; teaching in community colleges; research and regulatory consultant positions, both foreign and domestic; Extension specialist and county agent careers; research, production, and sales work with horticultural businesses or services to horticultural industries; public garden administrative and technical positions, and others.

NORTH CAROLINA REQUIREMENTS FOR RESIDENCY (IN-STATE TUITION)

North Carolina law requires that "To qualify for in-state tuition a legal resident must have maintained his/her domicile in North Carolina for at least the 12 months immediately prior to his/her classification as a resident for tuition purposes". Non-resident domestic students with out-of-state tuition waivers are expected to **TAKE IMMEDIATE ACTION** upon their arrival to North Carolina to obtain in-state residency. This includes voter registration in Wake County, vehicle registration, NC Driver's License, and paying Wake County personal property taxes. These items and others are used by the university when reviewing your request for NC residency for in-state tuition purposes which may be made about 12 months after you move into the state. For information concerning the establishment of NC resident status and the residency application, go to "[Residency for Tuition Purposes](#)."

An out-of-state tuition waiver (tuition remission) is granted the first year of study to domestic students on graduate assistantships. The Department cannot guarantee waivers for summer school classes. Tuition remission is typically available for up to 2 years for MS students and up to 3 1/2 years for PhD students on assistantships. However guidelines may change; therefore, all out-of-state students must pursue residency with vigor. International students on F-1 or J-1 visas are unable to apply for NC residency. International students on departmental assistantships are provided out-of-state tuition remission (a reduced percentage of out-of-state tuition) for four semesters for MS degrees and eight semesters for PhD degrees. Out-of-state tuition for any semesters beyond this allocation is handled on a case-by-case basis.

CONTINUOUS REGISTRATION

After a student is admitted to the Graduate School and enrolls for the first time, she/he is required to maintain continuous registration, i.e., be enrolled each semester, excluding summer sessions, until she/he has graduated. Students who are on assistantships and the GSSP must take at least 9 credits hours per semester until they accumulate the required minimum number of hours required by their degree program. They should then register for that number of credit hours, but not less than 3 credit hours. From that point on, they will continued to be considered full-time until they complete their thesis or dissertation, as long as they enroll for at least 3 credit hours. Students who violate this policy without a request for a formal leave of absence will be required to apply for readmission if they wish to resume their graduate studies here at NCSU. Students not on assistantship and the GSSP must take at least 1 credit hour each semester to be continuously enrolled.

DEPARTMENTAL ASSISTANTSHIPS

The Department has a limited number of departmental assistantships available for qualified students. In addition, many faculty provide grant-sponsored assistantships. Assistantship recipients must enroll as a full time student. International students on an F-1 or J-1 visa must be registered as full time students. Registration is not required during either summer sessions.

Graduate assistantships are half-time (50%) appointments that assist the Department's research and teaching programs. Graduate assistantships are on a twelve-month contract. One

nine-month teaching assistantship contract is available to the Landscape Design faculty on a rotating basis. Students on graduate assistantships should budget their funds accordingly.

Departmental assistantships for MS degree program are awarded on a competitive basis for a maximum of 2 years (24 months) as defined by the NCSU Graduate Student Support Plan (GSSP) (<https://grad.ncsu.edu/students/gssp/>).

PhD students receive departmental assistantship support for 3 years. A PhD student can continue on the GSSP for a total of 4 years total (after the MS degree), but support for the additional year is provided through other assistantship funding arrangements (see GSSP funding timelines in the table that follows).

All assistantship appointments are made on an annual basis and reappointment is subject to satisfactory performance and degree progress.

Graduate Student Support Plan (1)

Eligibility Requirements At-A-Glance

Current Graduate Classification	Number of Semesters from Initial Graduate Enrollment to Current Semester (2)										
	1	2	3	4	5	6	7	8	9	10	> = 11
Master's	Hours of Registration Required (F = Full-time, at all times) (4)										
	F	F	F	F	F	F	F	F	F	F	F
Doctoral	Hours of Registration Required (F = Full-time, at all times) (4)										
DR students with a previous related master's degree upon enrollment to the Graduate School	F	F	F	F	F	F	F	F	F	F	F
DR student without a previous related master's degree upon enrollment to the Graduate School	F	F	F	F	F	F	F	F	F	F	F

Eligible Benefits: NCSU RA-TA Health Insurance Plan, In-State Tuition, & Out-of-State Tuition (2, 3)

- ★ (1) For degree seeking graduate students that meet the below requirements at all times.
 - ★ Have an active, qualifying graduate appointment (RA, TA, RA-TA, EA, or primary fellowship) with a minimum stipend of, at least, \$8,000 annualized. The qualifying appointment must begin on or before Census Day and extend, at least, 30 days beyond the first day of classes. Tuition will be prorated for graduate appointments that do not extend through the fall or spring semesters.
 - ★ Active in an on-campus master's or doctoral program. Distance education and graduate certification programs do not qualify for the Graduate Student Support Plan
 - ★ Student must be enrolled full-time at all times. (4)
 - ★ Student must be within allowed semesters in order to be eligible for GSSP tuition benefits.

Eligible Benefits: NCSU RA-TA Health Insurance Plan ON

- ★ (2) Fall and Spring standard tuition only. Semesters of Graduate Student Support Plan eligibility begin at initial enrollment in graduate studies at NCSU regardless of whether the student is active in a degree seeking program. Each semester that a student is enrolled in graduate studies counts as an eligible semester and against the total number of allowed semesters for GSSP tuition eligibility regardless of whether the student actually participated/benefitted from the Graduate Student Support Plan.
- ★ (3) Out-of-State students are only eligible for tuition remission support through the Graduate Student Support Plan for the first two semesters of graduate studies (first academic year). After this time, the student must establish in-state residency. This tuition remission stipulation does not apply to international students with visa types ineligible for establishing in-state residency.
- ★ (4) F = Full-time, at all times -- See "Full-Time/Part-Time Determination for All Graduate Students" for more information about enrollment requirements.

DEGREE PROGRAM REQUIREMENTS

OVERVIEW

General Graduate School requirements for the MHS (Master's Degree in a Designated Field), MS and PhD programs are outlined in the [NCSU Graduate Catalog](#). Students are advised to study carefully the portion pertaining to the degree sought.

A GPA of at least 3.000 for the degree requirements, as well as on overall graduate course work at NC State, is required for graduation.

Guidelines for each of the degree programs within the Department, plus the non-thesis MHS degree program, are discussed below. This discussion includes some repetition and summary of general requirements as well as those specifically applicable to our Department. It is expected that the research conducted in the MS and PhD programs will lead to publication in a refereed journal, which is the end-product of research. MHS projects generally are published in a variety of formats, including refereed journals, trade journals, popular press and websites.

ADVISORY COMMITTEE

The **advisory committee** is made up of a minimum of three members of the Graduate Faculty for the MHS and MS degrees and four members of the Graduate Faculty for the PhD degree. The advisory committee must be chosen during the student's first semester in residence. During the first semester of the student's residency, the student and major professor must determine if a minor field of study will be chosen.

A **minor** is not required by the Graduate School or the Department, but each student has the option of choosing one if she/he wishes. If a minor is chosen, at least one committee member must represent the minor area. For the PhD program, if a minor is not chosen, one committee member must still be chosen from outside the Department. The student may elect to have a committee composed of more than the minimum number of members.

The major professor is always **chair (or co-chair)** of the advisory committee. Students and their major professors share joint responsibility to set up and hold meetings of the student's advisory committee at least once each year and to report the current status of the candidate to the Director of Graduate Programs' (DGP) and Graduate Services Coordinator's (GSC) offices on the annual Student Progress Report. While studying at NCSU, the student should consider her/his major professor as the first source for policy information, advisory guidance, and access to resources of the Department and University needed to complete all research, teaching and outreach experiences required for graduation.

A faculty member from another university or a professional from industry or government (with credentials comparable to those required for membership on the Graduate Faculty) may serve as an **external member**, with full voting rights, along with the required committee composed of members of the NCSU Graduate Faculty. It will be necessary to provide credentials to the Graduate School.

In addition, a person from industry, a governmental agency, or a university may, upon recommendation of the committee and the Department/program, serve as a **technical consultant**, without voting rights, along with the required committee composed of members of the NCSU Graduate Faculty. A statement describing the consultant's potential contribution to the student's research or project should be provided to the Graduate School.

GRADUATE PLAN OF WORK

The student's program of study must be reported on the **Graduate Plan of Work** ([MHS](#), [MS](#) or [PhD](#)). This plan must be developed with input from the advisory committee and be submitted to the GSC/DGP's office for approval and proper transmittal. This must be done before the end of the second semester in residence. The Graduate Plan of Work, once approved, becomes the student's official requirements for graduation. Any alteration in this program must be documented in writing and receive approval of the DGP. Changes, upon official approval, become a part of the Graduate Plan of Work. There is no foreign language requirement in our Department.

MASTER OF HORTICULTURAL SCIENCE (MHS)

The **Master of Horticultural Science (MHS)** is classified as a Master's Degree in a Designated Field. **It is a non-thesis, professional degree that is considered to be terminal.** The general requirements for the MHS degree have been established by the Graduate School and the Horticultural Science Department has additional requirements. **The MHS degree is offered on-campus (MHS) and through Distance Education (MHS-DE).** Information concerning the advisory committee is the same as that for the MS degree program. The major difference in the two degrees is that the MHS degree program substitutes additional course work in lieu of the research and thesis required by the MS degree program. Thesis Research credit is not permitted in non-thesis programs, except upon approval by an Associate Dean of the Graduate School in cases where the student was initially enrolled in a thesis program, but later transferred to a non-thesis program. No graduate assistantships are provided to MHS students, with one exception: a 9-month teaching assistantship is available on a rotating basis to the Landscape Design teaching faculty. All requirements for the Master's degree must be completed within 6 calendar years from the date the student begins courses for graduate credit, including any approved leave of absence.

MHS Degree Requirements:

1. A minimum of 36 semester hours of course work.
2. **18 hours must be at the 500 level and 700 level** (there is no minimum requirement for 700 level courses).
3. At least 4, and no more than 6, hours of HS 693 Master's Supervised Research (see below).
4. HS 601 Professional Presentation Skills.
5. One graduate level statistics course (3 credit hours) – with the statistics class to be determined by student, advisor and committee. Examples of acceptable classes include ST 511, ST 512, ST 531 and CS 755.

6. Up to 12 hours of 400-level courses can be taken as a part of the MHS program; however, only 6 hours of Horticultural Science 400-level courses are allowed.
7. Students pursuing the MHS degree may choose a minor, but this is not required.
8. Students are encouraged, but not required to take the Horticultural Science core courses.
9. Master's Examination (HS 690) and Summer Thesis Research (HS 696) may not be used to satisfy credit hour requirements.
10. No more than 18 hours may be used to satisfy degree requirements for another Master's degree program at NC State, unless the student did not complete the other program.
11. The remaining 12 credit hours, or more depending on the requirements of the specific program, may be transferred from any of the sources listed in the [NCSU Graduate Handbook](#).
12. A seminar presented by the student on their research project, followed by an oral examination with their graduate committee.
13. Both the MHS and MS degree students are allowed, even encouraged, to take courses from departments other than Horticultural Science. Horticulture is one area of a broad range of interconnected fields and departments, including crop and soil sciences, plant biology, entomology and plant pathology, statistics, agricultural economics, agricultural engineering, food science and agricultural education.

MHS Supervised Research (HS 693): The MHS special topic is a comprehensive project focusing on an area of interest to both the student and the faculty advisor. The project is not intended to provide basic horticultural training, but to provide in-depth experience in a specific area of horticulture. The nature of the project is cooperatively agreed upon by the student and their advisor. Projects vary greatly in the scope and depth, but overall, are highly rigorous:

- A typical research project might include three components of variable depth and at least one should result in a research publication, trade journal publication or popular press article. An on-line web resource could also be one of the publications. Projects must be original work.
- A landscape horticulture project might include either a research project or library search summary combined with landscape plans showing the information being incorporated into one or more designs.

In addition to courses and the final project, MHS students are required to complete two [Outreach/Extension Experiences](#) and one or more [Teaching Experiences](#). These experiences, in combination with informal activities listed below, are intended to broaden the knowledge and range of learning opportunities for each student:

- Attend 10 departmental seminars per year (required).
- Interact with fellow graduate students through office sharing, Pi Alpha Xi (PAX) activities, attending departmental activities, taking the same courses.

- Interact with Horticultural Science faculty (other than the advisor) and committee members through departmental activities, working on project, serving as a teaching assistant, participating in outreach/extension experiences and taking courses.
- Interact with non-Horticultural Science faculty (other than the advisor) and committee members through departmental activities, project work and taking courses.
- Interact with undergraduate students as a teaching assistant (required).
- Interact with the general public and the horticulture industry through project work and outreach/extension experiences (required).

COMPLETION OF THE MHS DEGREE PROGRAM:

1. When all requirements (see above) are satisfied, including the teaching and outreach/extension experiences, with the exception of completion of course work in the final semester, the GSC/DGP submits to the Graduate School the Request for a Permit to Schedule the **Master's Oral Examination**. The Master's Oral Examination consists of a seminar presentation of the student's project results and outputs, followed by oral questions posed to the student by their graduate committee.
2. If Graduate School requirements are met, a Request for a Permit to Schedule the Master's Oral Examination is approved by the Graduate School within 10 working days of receipt of the request and the permit, Admission to the Final Master's Oral Examination, is issued, and the Final examination is scheduled and conducted.
3. Final examination report, including date and result of the examination, submitted to the Graduate School by the Horticultural Science Graduate Services Coordinator (GSC). The Graduate School should receive the report within five working days of the examination.
4. The deadline date for unconditionally passing the final examination in order for the student to graduate in a given semester or summer session appears in the [Graduate School Calendar](#).

MASTER OF SCIENCE (MS)

The general requirements for the MS degree have been established by the Graduate School. The Horticultural Science Department has additional requirements. All MS degree students are required to have an advisory committee with a minimum of three committee members. All requirements for the Master's degree must be completed within 6 calendar years from the date the student begins courses for graduate credit, including any approved leave of absence.

MS degree requirements:

1. A minimum of 30 credits.
2. Up to 6 of the 30 credits may be research credits (HS 695), but there is no requirement to enroll for research credit.
3. At least 20 semester hours must be 500-, 600- or 700-level courses. In addition, **at least 18 credits hours must be from letter-graded courses.**
4. HS 601 Professional Presentation Skills.

5. Two graduate level statistics courses (total of 6 credit hours) – with the statistics classes to be determined by student, advisor and committee. Examples of acceptable classes include ST 511, ST 512, ST 531 and CS 755.
6. Students pursuing the MS degree may choose a minor, but this is not required.
7. No more than 6 credit hours of 400-level courses may be counted toward the minimal 30-hour requirement, and they may **NOT** come from Horticultural Science.
8. Master's Thesis Preparation (HS 699) may be used to satisfy credit hour requirements.
9. A final seminar of the thesis research presented to the department, followed by an oral examination with the advisory committee.
10. All requirements for the Master's degree must be completed within 6 calendar years from the date the student begins courses for graduate credit, including any approved leave of absence.
11. Both the MHS and MS degree students are allowed, even encouraged, to take courses from departments other than Horticultural Science. Horticulture is one area of a broad range of interconnected fields and departments, including crop and soil sciences, plant biology, entomology and plant pathology, statistics, agricultural economics, agricultural engineering, food science and agricultural education.

COMPLETION OF THE MS DEGREE PROGRAM:

1. There is no comprehensive written examination for the MS degree. The only comprehensive examination is the **final oral examination** conducted by the advisory committee, which is held after the student's seminar. Authorization to schedule the final examination is requested through the GSC/DGP's office. Prior to the time the request is submitted, the GSC/DGP and Advisory Chair (or co-chairs) will determine if all requirements (see above), including the teaching and outreach experience, have been met.
2. If Graduate School requirements are met, a Request for a **Permit to Schedule the Master's Oral Examination** is approved by the Graduate School within 10 working days of receipt of the request and the permit, Admission to the Final Master's Oral Examination, is issued, and the final examination is scheduled and conducted.
3. At least two weeks prior to the final oral examination, the student submits the thesis to the members of the advisory committee for review.
4. The Graduate School should receive the final examination report within five working days of the examination.
5. Student follows guidelines for submitting thesis to the Graduate School as described on the [Electronic Theses and Dissertations](#) (ETD) website.
6. The deadline for submitting the thesis to the Graduate School in order for the student to graduate in a given semester or summer session appears in the [Graduate School Calendar](#).
7. The thesis is reviewed by the Graduate School Thesis Editor to ensure that the format conforms to the specifications described in the [Steps in the ETD Submission Process](#).

8. The thesis must then be approved by the advisory committee members prior to publication by the library.

DOCTOR OF PHILOSOPHY (PhD)

Once obtained, the PhD degree represents the ability of the recipient to conduct original research and scholarly work at the highest level without supervision. As stated in the NCSU Graduate Catalog, "The degree is not granted simply upon completion of a stated amount of course work but rather upon demonstration by the student of a comprehensive knowledge and high attainment in scholarship in a specialized field of study. The student must demonstrate this ability by writing a dissertation reporting the results of an original investigation and by passing a series of comprehensive examinations in the field of specialization and related areas of knowledge."

PhD advisory committee: Early in the program of the student, the major professor and student must consult and agree on the composition of the advisory committee membership they wish to recommend to the GSC/DGP. The committee must include at least one representative outside of the Department of Horticultural Science (external member). If a minor is chosen, the external committee member must come from the minor Department.

At least four graduate faculty members are required for the committee. The members of the committee will be approved by the Dean of the Graduate School upon the recommendation of the major professor and the DGP. A member (or members) of the Graduate Faculty serves as chair (or co-chairs) of the committee. See the NCSU Graduate Handbook for information about [Committee Members from Other Institutions, External Members and Technical Consultants](#).

As soon as possible after the appointment (or after completion of 18 credit hours of course work), the committee must meet with the student and prepare a [Graduate Plan of Work](#), which must be approved by the DGP and the Graduate School. In addition to the proposed course work, the subject of the student's dissertation must appear on the plan. This should be submitted to the GSC/DGP's office. When approved, this plan becomes the student's requirements for graduation. Any subsequent changes in subject of the dissertation, course work or committee membership must be submitted in writing for approval to the GSC/DGP. It is not necessary to file a new plan. The advisory committee should meet at least semi-annually and review the progress of the candidate.

Preliminary comprehensive examinations: Preliminary comprehensive examinations are required for admission to candidacy for the PhD student. All doctoral students must attain candidacy for the degree within four years of starting their program or after they have completed 48 hours of coursework, whichever is later. The examinations consist of two parts: written examinations and an oral examination. If the student has declared a minor, requirements for written examinations in the minor field are set by the department in which the student is minoring.

The **written examination** is conducted by having each member of the advisory committee prepare a set of questions for the student to answer. Answers to each set are returned to the

appropriate member for evaluation. The questions may cover any portion of the course work taken by the student during graduate study or any subject logically related to the subject matter in the major and minor areas of study. Failure to pass the written preliminary examinations terminates the student's relationship with the Department. However, each case of failure can be reviewed individually for the possibility of re-examination.

Upon satisfactory completion of the written portion of the preliminary examination, authorization for the **preliminary oral examination** is requested through the GSC/DGP's office. This Request for a Permit to Schedule the Prelim Oral Examination must be submitted at least two weeks before the scheduled date of the examination. The preliminary oral examination is conducted by the student's advisory committee and a representative from the Graduate School (referred to as the Graduate School Representative. It is the student's responsibility to schedule an examination time that is satisfactory for all committee members, including the Graduate School Representative. A unanimous vote of approval by the members of the advisory committee is required for the student to pass the preliminary oral examination. Approval may be conditional, depending upon completing specified additional work. Failure to pass the preliminary oral examination terminates the student's relationship with this Department, unless the committee recommends a re-examination. Only one re-examination is permitted.

A doctoral student is **admitted to candidacy** either after passing the preliminary examinations without conditions or after fulfilling any conditions specified by the advisory committee.

The completed dissertation should be given to the committee for review at least two weeks prior to the **final oral examination**. It is the student's responsibility to schedule an examination time that is satisfactory for all committee members, including the Graduate School Representative. Requests for a change in the Graduate School Representative will not be honored except under extenuating circumstances. The student submits the request to schedule final oral exam to the Graduate Services Coordinator (GSC) by email at least two and one-half weeks before the anticipated date for the examination. At that time the GSC/DGP will examine the student's Plan of Graduate Work to determine if all requirements have been met, including the teaching and outreach experiences. The Request for a **Permit to Schedule the Final Oral Examination** will then be forwarded to the Graduate School.

The Department has **no foreign language requirement**. Participation in the Department's teaching and outreach/extension programs is required. For details, see the [Teaching Experience](#) and [Outreach/Extension Experience](#) sections.

Graduate School Representative: The representative of the Graduate School on the PhD committee has a unique role on the examination committee in that s/he serves to protect the interests of the student, the advisory committee, and the Graduate School. S/he is also a 'disinterested person' to whom the Dean may turn for judgment and counsel. While this representative need not be chosen from a related discipline, the attempt is made to appoint the same representative for both examinations. The Graduate School Representative will be appointed by the Graduate School at the time the [Graduate Plan of Work](#) is submitted for approval. In scheduling the final oral examination, the student and committee chair (or co-chairs) must coordinate the time with the same Graduate School Representative who was appointed for the preliminary examination.

The Graduate School Representative (GSR) is provided a separate signature line with a space for comments on the examination report. The GSR signature with no comments indicates that they believe that the examination was properly conducted and that the GSR does not take exception to the findings of the student's advisory committee. The GSR signature does not imply that they have approved the substance of the examination or dissertation, and they may comment to that effect. If the GSR has any reservation about the conduct of the examination, the student's performance or any aspect of the dissertation [a copy of which the advisory committee chair (or co-chairs) or the student shall offer the GSR no later than one week in advance of the final oral examination], the GSR should sign the form and note any concerns in the space provided or note that a full letter of explanation follows. In the event the GSR indicates any reservation, the Dean of the Graduate School will decide what course of action is to be taken. The GSR, being a mature scholar who has not worked closely with the candidate, will contribute to the scholarly atmosphere of the examination. Moreover, the experiences of faculty members who serve as Graduate School Representatives should improve the overall quality of graduate examinations.

PhD degree requirements:

1. At least two residence credits are necessary in continuous residence as a graduate student at the University.
2. Advisory committee of at least four graduate faculty members and at least one member of the advisory committee must be from a different department. That member could represent the minor field, if declared. A Graduate School Representative will also be appointed by the Graduate School to serve on the committee.
3. HS 601 Professional Presentation Skills.
4. Students are encouraged, but not required to take the Horticultural Science core courses.
5. As soon as possible after the appointment (or after completion of 18 credit hours of course work), the committee must meet with the student and prepare a [Graduate Plan of Work](#) (which must be approved by the DGP and the Graduate School). In addition to the proposed course work, the subject of the student's dissertation must appear on the Graduate Plan of Work.
6. Doctoral degrees at North Carolina State University require a minimum of 72 graduate credit hours beyond the Bachelor's degree.

7. For a student who has a Master's degree from a university other than NC State, a maximum of 18 hours of relevant graduate credit from the Master's degree may be applied toward this minimum, upon the recommendation of the student's Graduate Advisory Committee, resulting in a the minimum credit-hour requirement of 54 credit hours.
8. If a student completes a Master's degree at NC State and continues for a doctoral degree without a break in time, up to 36 credit hours taken while in Master's status may be used to meet minimum requirements for the doctoral degree. Students cannot take 400-level courses or lower as part of the credit-hour requirement.
9. Doctoral Dissertation Preparation (HS 899) may be used to satisfy credit hour requirements.
10. A graduate course that was completed while enrolled in PBS status at NC State University may be considered for transfer to a doctoral program provided that it is a 500- or 700-level course and that the grade is B or better.
11. All course work scheduled in the graduate degree classification must be completed prior to graduation.
12. Qualifying **written examinations** in the major and minor fields are scheduled no earlier than the end of the second year of graduate study and no later than one semester before the final oral examination.
13. When all written examinations have been completed satisfactorily, the **preliminary oral examination** is scheduled for admission to candidacy.
14. Successful completion of preliminary written and oral examinations for admission to candidacy (See above).
15. All **PhD students** are expected to give two formal departmental seminars. The first will be early in their graduate program (usually the beginning of the third semester) and will focus on a review of the literature, proposed research and research progress made to date. The second will be scheduled in conjunction with their **Final Oral Examination**.
16. A copy of the preliminary draft of the dissertation is submitted to the chair (or co-chairs) of the student's advisory committee for review.
17. At least two weeks prior to the Final Oral Examination, the student submits the dissertation to advisory committee members for review.
18. For submitting the dissertation to the Graduate School, the student follows the guidelines as described on the [Electronic Theses and Dissertations](#) (ETD) website. The deadline for submitting the dissertation to the Graduate School in order for the student to graduate in a given semester or summer session appears in the [Graduate School Calendar](#).

For all degree programs, if the final exam is scheduled during either summer session, and the student formally completes all degree requirements during either summer session, the student must be registered for one of the two summer sessions.

FORMS

- [MHS and MS Plan of Graduate Work Template](#) (MS Word)
- [PhD Plan of Graduate Work Template](#) (MS Word)

- [Student Progress Report](#) (PDF)
- [Residence and Tuition Status Application](#)

DEPARTMENTAL SEMINARS

Seminars are part of graduate training and continued professional development. All students are required to attend a minimum of 10 seminars a year, which is documented on their annual Student Progress Report. Graduate students, like faculty, are expected to attend departmental seminars if their schedule permits. Seminars offered in other departments and universities are also permitted.

Graduate students are required to give one or more formal seminars depending on their degree program:

1. All **MHS and MS students** are expected to give a formal departmental seminar immediately prior to their scheduled final oral examination. A notice of the seminar and abstract of the thesis must be sent out to everyone in the Department of Horticultural Science at least 2 weeks prior to the presentation.
2. All **PhD students** are expected to give two formal departmental seminars. The first will be early in their graduate program (usually the beginning of the third semester) and will focus on a review of the literature, proposed research, and research progress made to date. The second will be scheduled in conjunction with their final oral examination. A notice of the final seminar and an abstract of the dissertation must be sent out to everyone in the Department Horticultural Science at least 2 weeks prior to the final seminar.

TEACHING EXPERIENCE REQUIREMENT

The Department requires all graduate students to fulfill a teaching requirement independent of their funding source. This involves working as a teaching assistant (TA) for one or more courses.

MHS students are expected to serve as a teaching assistant at least one time during their degree program. MS students are expected to serve two times and PhD students serve TA three times. Any students on external funding (self-funded or solely on grant or scholarship funds) only have to TA once during their graduate program. Students in the MHS-DE program can fulfill their TA requirements by serving as a TA for one of the on-line courses offered by the department. Requests to waive the teaching assistant requirement must be approved by the DGP at the start of the student's first committee meeting.

On occasion, the DGP may request that students serve as a TA for an additional semester depending on the teaching needs of the department. Some students request additional TA opportunities to further develop their teaching skills and to participate in teaching certificate programs offered on campus.

Occasionally, a graduate student may be asked to take on the full responsibility of teaching a class, including the awarding of final grades (as instructor of record). Under these circumstances, the

student must have taken the course and accumulated a minimum of 18 credit hours of relevant course work. Additional compensation may be provided by the department for this service.

Time/credit requirements: A student may enroll in HS 685 (Masters Supervised Teaching) or HS 885 (PhD Supervised Teaching) for 1-3 credits depending on the amount of time the student devotes to teaching. The general guideline is that 1 credit = 10 hours/week of teaching activity; 2 credits = 15 h/w; 3 credits = 20 h/w.

The student's major advisor must approve the number of credits, and at the end of the semester, the DGP will request a grade of S/U from the course instructor for the TA.

OUTREACH / EXTENSION EXPERIENCE REQUIREMENT

An Outreach/Extension experience has the same educational value to a graduate student as teaching and research experiences. It gives the student exposure to another area of potential employment and an opportunity to assess this type of work. It also adds to the student's expertise in Horticulture. Equally important is the empathy gained for the industry and public we serve. Guidelines for the outreach experience are given below.

Each student must participate in the Outreach/Extension experience during their graduate degree program. The MHS, MS and PhD student will participate in two of the three general categories listed below. The student may undertake an outreach activity not described herein subject to approval by his or her major advisor and GSC/DGP. Waiver of this experience must be requested at the time the Plan of Graduate Work is submitted and will be approved only for students with extensive backgrounds in extension or other similar outreach programs. Waiver requests submitted near the completion of a student's degree will not be considered.

DEVELOPING AND COMMUNICATING INFORMATION

1. Present research-generated information in a form and in a medium designed to reach either the general public or industry.
2. Prepare and present a talk on a horticultural topic to an audience of non-scientists. Examples are garden clubs, commodity groups, and extension meetings.
3. Use an alternative or creative medium to deliver information. Examples are web sites, mass media (e.g. television or radio), on-farm or other demonstrations or materials that can be delivered electronically.

INTERACTING WITH THE PUBLIC

1. Assist in developing and conducting a commodity or other meeting designed to attract a large and diverse audience. Assisting only with clerical duties, lights or audiovisuals during a session will not fulfill this requirement.
2. Participate in the planning and execution of a tour. This could involve a facility tour (JC Raulston Arboretum or Fox Greenhouses) or it could involve scheduling visits for a group of horticulturists. Tours for international groups are especially encouraged.
3. Travel with an extension specialist on assignment for at least 3 days. The 3 days need not be consecutive.

4. Assist in responding to requests for horticultural information from extension agents.

PUBLIC SERVICE

1. Presenting horticultural programs or developing materials for public or private schools -- including preschools. This could be through established programs or through contacts made personally by the graduate student, mentor or other faculty.
2. Presenting horticultural programs or developing materials for other educational institutions or groups. Examples are: museums, state historical sites, the NC State Fair, and 4-H.
3. Conducting horticultural programs at institutions where the objective of the activity is therapeutic as well as educational. Examples are: prisons, hospitals, retirement communities, and public housing.
4. Assist in planning or judging in the 4-H program. Contact [Liz Driscoll](#) to get involved in this activity.
5. After completion of the extension experience, the activities conducted by the student must be briefly described and documented by the student in an email addressed to the GSC/DGP.

THESIS AND DISSERTATION PREPARATION

The Graduate School and the Department strongly urges students to prepare their theses and dissertations so that only minor changes in the manuscript are required to meet the standards of publication of a particular scientific journal (journal article format thesis).

Detailed information on form, organization and number of copies required of the thesis or dissertation for both the MS and PhD is located at the [Electronic Theses and Dissertations ETD](#) website. Graduate students are also encouraged to attend the [Thesis and Dissertation/ETD Workshops](#) regularly given by the Graduate School.

The thesis or dissertation prepared by the MS or PhD candidate must represent an original investigation into a subject that has been reviewed and approved by the student's advisory committee. Go to the [Electronic Theses and Dissertations ETD](#) website for the [Complete Steps in the ETD Submission Process](#). Before final approval, the thesis or dissertation will be reviewed by the [Graduate School Thesis Editor](#) to insure that it conforms to the specifications prescribed in the [Thesis and Dissertation Guide](#). It is expected that the research conducted will lead to a refereed journal publication, which is the end-product of research.

MINOR IN HORTICULTURAL SCIENCE

Students with a minor in Horticultural Science must have a Horticultural Science departmental representative from the Graduate Faculty on their Graduate Committee. The GSC/DGP must be notified in writing when a student chooses Horticultural Science as a minor.

Master of Science - A minimum of 9 credit hours in Horticultural Science (6 at the 500 level or above and 3 at the 400 level or above) is required of students minoring in this Department at the MS level.

Doctor of Philosophy - A minimum of 12 credit hours in Horticultural Science at the 500 level or above will be required for students minoring at the PhD level.

Should a student minor in Horticultural Science at both the MS and PhD level, the courses at the 500-800 level taken in their Master's program would not fulfill this requirement for the doctoral minor; additional courses must be taken.

DEPARTMENTAL POLICIES AND PROCEDURES

WORKING HOURS AND VACATIONS

All graduate students who are on departmental assistantships are considered employees of the Department. Each must carry out the duties assigned by the major professor and/or teaching and graduate coordinators. Those students on Graduate Assistantships are expected to work 10-20 hours per week in areas related to the teaching program and/or for their major professor on research areas outside their thesis or dissertation area.

Lastly, all students on assistantships are expected to be available at all times, even when school is not in session. This is particularly true for Spring and Fall breaks, etc. Most faculty expect students to follow the faculty/staff work and holiday schedule. Please be aware, however, that research or teaching duties may be required on weekends and holidays. Vacation time must be pre-arranged with your major professor. Students must keep in mind that this is a period of professional training which requires dedication, time and effort.

Graduate Students on the GSSP are able to take up to 10 days of vacation each year, but the vacation days must be discussed and approved by the student's Graduate Advisor.

MAIL

Mail for graduate students is placed in a special box in the mail room (107A Kilgore Hall) and is distributed by the GSC. Each graduate student is assigned a mail slot in 235 Kilgore Hall.

PHOTOCOPYING

The WolfCopy machine located in 227 Kilgore Hall is available for students.

COMPUTING

Students are expected to have their own personal computers or an NCSU computer by agreement with their advisor. Personal computers are not the responsibility of CALS IT.

Functions of the CALS IT:

- Serve as departmental consultant for hardware and software acquisitions based on specific needs. Purchase and install hardware and software for users.
- Trouble-shoot all computer hardware, software, and communications problems. Maintain computer communications inside Department and connections to the Campus Computing Center.

Basic requirements for CALS IT support:

- Provide support for NCSU purchased computers, iPads, etc. only.

- Support for Windows and Mac computers that are imaged or joined to WolfTech, the campus Active Directory domain for Windows computers, or JAMF for Mac computers.
- Computers should meet the [minimum hardware specifications](#) based on best practices.
- Computer purchases need to adhere to the campus required IT [CPI purchasing agreement](#).
- Support provided for the campus-provided email system and campus recommended client: GMAIL and Chrome browser.

All requests for support should first be initiated through the CALS IT Help Desk via email calsit-help@ncsu.edu. This contact initiates a support ticket in the CALS IT call manager system.

Schedule to have your NCSU PC or Mac imaged and upgraded to join managed services: We support computers that are managed centrally through Active Directory or JAMF. When you are joined to Active Directory for PCs or JAMF for Macs, your computer will be more secure with automated patching, antivirus, and installed with the latest OSes and Microsoft Office suite of products. In addition, your computer will be added to our inventory portal for use by your department for evaluating refresh of aging computers and for asset information. Exceptions can be made for computers attached to instrumentation. To schedule your computer to be upgraded: calsit-help@ncsu.edu

NCSU Policy on Use of Computers:

The use of computers is governed by the University's administrative regulation on computer use. Limited personal use is allowed provided all conditions are met under Section 3 of the regulation. See [Computer Use Regulation](#) for complete policy.

Student Unity Account and E-Mail: You will be assigned a personal UNITY computer account prior to your arrival on campus. This will give you access to e-mail and [MyPack Portal](#). The DGP and Graduate Services Coordinator routinely communicate with graduate students via e-mail, so it is important that you check your e-mail regularly.

SUPPLIES

The Department cannot provide supplies for personal use. All supplies for research purposes must be obtained through your major professor.

REQUISITIONS AND PURCHASE ORDERS

All requisitions for supplies and equipment must be made by your major professor.

USE OF DEPARTMENTAL VEHICLES

Only students on assistantships or biweekly payroll with a valid NC driver's license may drive a state vehicle! A state vehicle is an expensive and important piece of equipment that has been purchased with departmental funds. At all times, we must drive in a courteous manner, adhere to state and local laws (particularly the speed limit), and use vehicles only for state business.

The **public is quick to criticize employees who appear to misuse state vehicles**. In many instances, they report violations to the highway patrol who in turn inform the Governor's office.

It is suggested that all faculty, project personnel and graduate students pay attention to the following items:

- Treat state vehicles as you would your own
- Park properly and only in assigned areas
- When you borrow a vehicle, leave it parked where it belongs and locked
- Do not leave credit cards in a parked vehicle anytime!
- Be certain it is clean and in good working order
- Ensure that the gas tank is at least half full when returned
- Fill out Trip Log properly
- Turn in gasoline tickets to the major professor at the end of each trip
- NCSU Policies, Regulations and Rules states: Hitchhikers are not permitted to ride in state-owned vehicles. Non-state employees may accompany state employees in state cars when they have a business interest in the travel. Spouses and children of state employees may accompany them in state-owned vehicles, if ample space is available and all travel is strictly for official state business.
- The research component of the Department has basically two types of vehicles for use. Most of the research vehicles are assigned to project leaders. In most instances, you will be using your major professor's vehicle. If you need a vehicle, make your request through your major professor. Also, the main office has one vehicle (which is not intended for field work). Use of this vehicle must have prior approval of the Main Office (contact the Graduate Services Coordinator).

TRAVEL

- General - All travel on state business whether in-state or out-of-state must be coordinated through your major professor. All travel expenses are charged to the respective project.
- In-State Travel - You must have approval of your major professor before traveling in-state.
- Out-of-State Travel - Support for graduate student travel to scientific meetings is generally provided by the student's advisor and should result in at least three important benefits to our School:
 - a. Promote and encourage excellence in our graduate program
 - b. Provide visibility on the nature and quality of our graduate education programs
 - c. Enhance our ability to recruit outstanding faculty and students
 - d. Every effort should be made to obtain travel support from extramural sources (University Graduate Student Association, Graduate School, Foundations, ASHS, etc.).
 - e. Support for commercial transportation may be for partial or full costs. If travel is by state car, no transportation costs will be allowed. Subsistence and registration fees may be provided as indicated below.
 - f. Travel by state car is encouraged if two or more students are attending the same meeting and the distance to the meeting is one driving day or less.

- g. Subsistence may be allowed up to the in-state rate.
- h. Registration fees, in whole or in part, may be allowed for professional meetings.
- Out-of-state travel authorizations are to be processed for graduate students who are on a University Assistantship, traveling to professional meetings or on other authorized out-of-state trips in state-owned vehicles. These travel authorizations are essential, even when the student is receiving no travel support, in order to provide for Workmen's Compensation coverage.
- The NCSU Graduate Student Association (GSA) Travel Fund - The GSA Travel Fund is set up to assist eligible graduate students attending professional meetings. It will not pay for the entire trip. The following instructions are furnished by the UGSA:
 - a. Read the [GSA Travel Fund Guidelines](#).
 - b. Investigate other funding sources, e.g., major adviser's grant or departmental funds.
 - c. Fill out [application](#) and submit to travel fund committee chairman before trip.
 - d. Submit all receipts (or photocopies thereof) no later than ten (10) days after trip. If photocopies are submitted, original copy must be available for inspection.

HORTICULTURAL SCIENCE FACILITIES

KILGORE HALL

The Department is fortunate to have excellent offices, laboratories, and classroom facilities in Kilgore Hall. Horticultural Science research laboratories are available for use by graduate students in their research programs regardless of whether their major professor is in charge of such a facility. However, a particular faculty member or members are responsible for each laboratory. Thus, permission may be obtained from the faculty member(s) in charge of the facility prior to use of space, equipment or supplies in a laboratory. All students should review and be familiar with all safety procedures and concerns pertinent to each laboratory. Any student involved in laboratory research is required to read the lab safety handbook for that particular laboratory. All students are also required to participate in the [NCSU Environmental Health and Safety trainings](#).

CALS ON-CAMPUS GREENHOUSES

All greenhouse usage by graduate students must be coordinated through their major professors, who make requests for space to the departmental greenhouse committee. For day-to-day needs, students should contact the greenhouse superintendent.

UNIVERSITY RESEARCH UNITS (RALEIGH AREA)

The NC Agricultural Research Service maintains several research units in the Raleigh area. Horticultural Science utilizes two of them. [Horticulture Field Laboratory](#) (HFL) and the [JC Raulston Arboretum](#) located on Beryl Road, is primarily used by Horticultural Science, but other departments also conduct research on horticultural crops on those facilities. The HFL has a superintendent who should be contacted for day-to-day needs. All land and space needs must be coordinated by the major professor, who makes requests to the departmental committee.

OUTLYING RESEARCH STATIONS

- Border Belt Tobacco Research Station (Whiteville)
- Caswell Research Farm (Kinston)
- [Center for Environmental Farming Systems](#) (Goldsboro)
- Central Crops Research Station (Clayton)
- Cherry Research Farm (Goldsboro)
- Horticultural Crops Research Station (Castle Hayne)
- Horticultural Crops Research Station (Clinton)
- Lower Coastal Plain Tobacco Research Station (Kinston)
- Mountain Horticultural Crops Research Station (Mills River)
- Mountain Research Station (Waynesville)
- Oxford Tobacco Research Station (Oxford)
- Peanut Belt Research Station (Lewiston)
- Piedmont Research Station (Salisbury)
- Sandhills Research Station (Jackson Springs)
- Tidewater Research Station (Plymouth)
- Umstead Research Farm (Butner)
- Upper Coastal Plain Research Station (Rocky Mount)
- Upper Mountain Research Station (Laurel Springs)
- Upper Piedmont Research Station (Reidsville)

PHYTOTRON

The Phytotron is located in Gardner Hall and is readily accessible to the faculty and students. A [Phytotron Procedural Manual](#) describing the facility is available. Graduate students are encouraged to utilize this excellent facility but they must coordinate all needs with their major professors. All requests must be reviewed by a special Phytotron Committee in order to obtain space to conduct research.

OFFICE OF INFORMATION TECHNOLOGY (OIT) SERVICES FOR STUDENTS

If you are a student at NC State, you have access to one of the most advanced technology infrastructures in higher education. OIT provides IT services for all NC State students.

STATISTICAL CONSULTING, DEPARTMENT OF STATISTICS, NC STATE

The NCSU Department of Statistics has SAS consultants to provide assistance with statistical computing to researchers and graduate students affiliated with North Carolina State University. Assistance is provided for analyzing research data. Assistance is not provided with class work.

PLANT DISEASE AND INSECT CLINIC

The Departments of Entomology and Plant Pathology operate the plant disease and insect diagnostic service in 1227 Gardner Hall. This service supports the research and extension programs and is an excellent asset.

NC STATE LIBRARIES

There is no departmental reference library. The [D. H. Hill Jr. Library](#) is located a short distance from Kilgore Hall. It has an excellent selection of horticultural journals and reference books. Located on Centennial Campus is the [James B. Hunt Jr. Library](#).

[ANALYTICAL INSTRUMENTATION FACILITY](#)

The analytical tool, Scanning Electron Microscopy, is located in Room 308 of the Monteith Research Center on Centennial Campus . The scanning microscope lab manager is Charles 'Chuck' Mooney.

[N.C. PLANT SCIENCES BUILDING | INITIATIVE](#)

The Plant Sciences Building is located on Centennial Campus. This state-of-the-art building houses faculty from multiple disciplines.

[MICROPROPAGATION AND REPOSITORY UNIT](#)

The NCSU Micropropagation and Repository Unit provides certified pathogen-tested material of both table-stock and ornamental sweetpotatoes, strawberries, raspberries, blackberries, blueberries and muscadine grapes. The MPRU keeps a repository of true-to-type mother plants that are put through tissue culture.