

Handbook for the Master of Science in Nutrition

2021 ~ 2022

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INTRODUCTION

The MS degree in Nutrition is offered to those students who wish to increase their knowledge of nutrition science and to acquire skills in laboratory and population-based research. This degree is useful for students interested in nutrition research or in career in industry, as well as for students considering pursuit of a doctoral degree in medicine or in other areas of public health and biomedical sciences. MS students will perform advanced research in nutrition and take graduate nutrition courses that will provide the information and experience needed to help them choose their career path. Additionally, for those students who are uncertain about whether they wish to enter the Department's Doctoral program, the MS program offers an excellent opportunity to determine whether a more advanced degree would be appropriate. In summary, the MS program in Nutrition provides students the opportunity to explore nutrition at an advanced level.

The MS is also offered as a dual degree program with the BSPH in Nutrition. The program can be completed in one calendar year (summer, fall, spring) following completion of the BSPH in Nutrition program (See 1C-Time Required).

DEGREE-SPECIFIC COMPETENCIES

Competencies define what students should know and be able to do upon completion of their degree program. Competencies guide our curriculum planning process and serve as a measure against which student achievement is assessed. Listed below are the degree-specific competencies for MS in Nutrition. Additional competencies are completed through the BSPH program for students participating in the dual degree BSPH/MS.

1. Demonstrate knowledge of nutritional biochemistry and biological mechanisms underlying the relationships between nutrients and health.
2. Demonstrate competence in fundamentals of public health, including biostatistics and epidemiology, and how it is used in research.
3. Demonstrate mastery of concepts in nutritional biochemistry and/or in other areas of nutrition science.
4. Demonstrate specialized knowledge in selected research competency areas.
5. Present research results effectively.
6. Demonstrate mastery of research methodology, contribute new knowledge and successfully accomplish the goals and objectives of the master's research.

TIME REQUIRED

The time needed to complete all requirements for the MS will ordinarily be two years, but may be shorter. A minimum of 30-credit hours must be earned in order to graduate.

For students in the dual degree BSPH/MS, up to 30% of the MS 30-credit hours or 9-credit hours taken while an undergraduate, but not part of the BSPH 120- credit hour requirement can count towards the MS degree. These courses must be at the 600 or 700 level, and require approval from the BSPH/MS dual degree committee. The total time needed to complete all requirements for the

BSPH/MS dual degree program will ordinarily be five years, including one summer session (typically the summer after BSPH graduation). Students admitted to the dual degree program are not required to complete degree requirements within 1 year. Admission into the dual degree program is not a guarantee that the student will complete degree requirements. This program requires an agreement of goodwill between the faculty mentor and the student that based on the student's academic record and demonstrated research ability, a continuing level of dedication will result in completion of degree requirements within a year. Degree requirements for dual degree students are the same as those for students admitted to the regular MS program. None of the credits are double-counted towards requirements for both the BSPH and MS. However, students can (and are highly encouraged) to have completed up to 30% of the graduate degree (MS) credit hour requirements at the time of BSPH graduation. Research completed while an undergraduate for credit cannot be counted towards the MS degree.

FINANCIAL SUPPORT

Financial assistance is rarely available through faculty members in the Nutrition Department for MS students. Ordinarily, funds for training at the Masters level are not available from the University.

The Nutrition Department

The department does not offer support in the form of traineeships, or research or teaching assistantships for Master students. However, nutrition faculty members are involved in many research activities, and opportunities for employment on faculty research grants are sometimes available. Each student holding an appointment carrying either service or non-service financial support must be registered in order to hold that position.

Private and Public Funding Opportunities

Information is available from the department's Academic Coordinator regarding sources of agency funding. The Academic Coordinator will also help applicants to access a list of external funding sources for which students may apply.

The University

Application for financial assistance may also be made to the University Scholarships and Student Aid Office. <http://studentaid.unc.edu/>

The Resource Library at the Research Services Office offers a free computerized search service to UNC graduate students. The database includes private and public sources of research funding that can be searched by the student's area of research interest or by discipline of investigator, e.g., funding for nurses. Some agencies provide training support only, some dissertation support only and some both training and dissertation support. Some funding agencies provide dissertation support by means of competitive grant applications. Students should be aware that the deadline for applying for many of these grants might precede the funding date by as long as a year.

<http://research.unc.edu/grantsource/>

THE FACULTY MENTOR

Assignment of Faculty Mentor

At the time of *acceptance* to the MS program, students will have already identified a faculty member with whom they plan to do their Masters research and the faculty member will have agreed to supervise the student's research. That faculty member will be the student's research mentor.

The selection of a research mentor should be based primarily on the interests of the student and the expertise that a member of the graduate faculty can provide in the respective research areas. Students should inform the MS Program Director of their choice in writing, and provide a signed statement from the research mentor indicating willingness to serve in that capacity. The research mentor will serve as Chair of the Master's thesis committee, and must be a member of the Nutrition Department faculty and of the Graduate School faculty. The research mentor is responsible for conveying information about departmental expectations and procedures for the Master's thesis.

For students in the dual degree BSPH/MS, the undergraduate Honors research mentor will be the MS thesis mentor as well. The student must obtain the endorsement of their BSPH research mentor for admission to the BSPH/MS program. This endorsement signifies that the mentor is willing to supervise the student's MS research and provide guidance for completion and defense of the MS thesis. If the primary mentor is not a Nutrition faculty member, the endorsement of a Nutrition faculty member who served as the student's Honors BSPH co-mentor is also required. The undergraduate research project will form the basis of the MS thesis, and therefore, a close relationship with the research mentor is expected. The selection of the research project as an undergraduate requires close consultation with the mentor to ensure that the Honors thesis project selected is appropriate for forming the MS thesis work. BSPH students interested in the BSPH/MS program should discuss their interest in the program with their research mentor during the fall semester of their Junior Year (first semester in the BSPH program).

Student/Faculty Mentor Relationship

Student/faculty communication is viewed as a mutual responsibility. The research mentor will serve as the major source of guidance. The members of the MS Committee will review the progress of all MS students biannually and provide feedback to the student and the mentor if necessary.

Changing the Faculty Mentor

A student may wish to change faculty mentors. To change mentors, the student should confer with the current and the intended mentors. A change in research mentor must be very carefully considered, as it is likely to significantly delay the student's progress through the MS program. Students should consult with the Program Director or the department Chair for assistance in making such a change. A change in mentor form can be obtained from the Academic Coordinator and will require the approval of the MS Committee.

COURSES

The student will improve his/her knowledge of nutrition, learn research techniques in nutritional science, develop critical thinking skills, and perform original research. Ordinarily students will take the courses listed below; however, for those students with prior course work or experience, some courses may be exempted based on criteria established by the instructor of the course. Students are welcomed and encouraged to take other courses offered in the School of Public Health as well as the wider-University.

Graduates should understand methods used in the design and implementation of nutrition research, including the basics of epidemiology and biostatistics. Basic elements of research design will be tested in the doctoral comprehensive exam.

School of Public Health Core Course

SPHG 600 Introduction to Public Health (3 credits)

Department of Nutrition Core Courses

NUTR 600 Human Metabolism: Macronutrients (3 credits)

NUTR 620 Human Metabolism: Micronutrients (3 credits)

NUTR 813* Nutritional Epidemiology (3 credits)

NUTR 696 Nutrition Research Seminar (1 credit)

Choose one of the following 3 Biostatistics Courses:

BIOS 600 Principles of Statistical Inference (3 credits)

BIOS 610 Biostatistics for Laboratory Scientists (3 credits)

BBSP 610 Biostatistics for Laboratory Sciences (3 credits)

*NUTR 813 may be substituted by:

EPID 600 Principles of Epidemiology (3 credits) – or –

EPID 710 Fundamentals of Epidemiology (4 credits)

Students in the dual degree BSPH/MS do not need to complete BIOS 600, EPID 600, SPHG 600, NUTR 600 or NUTR 620 during the MS as they will have completed the related competencies during the BSPH program but must still meet the minimum credit requirements to graduate.

MS students are required to participate in the weekly Research Seminar in their first fall semester that serves as a forum to discuss current, controversial topics appearing in the nutrition literature and to present students' research in progress (students in the dual degree BSPH/MS will only take this if they did not complete it in their senior year). It is also a forum for regular interaction among students and faculty. The topics covered, and the development of *critical thinking skills* through discussions will help students to prepare for the masters comprehensive exam, and for the continued reading of the scientific literature required of scholars.

Critical Thinking

In addition to core research methods learned in basic biostatistics and epidemiology courses (as well as other core nutrition courses), MS students will perform independent research that expands the boundaries of knowledge in basic nutrition science. Independent research includes:

- Formulating an original research question.
- Understanding alternate research designs, and methods, including sample selection methods. These methods are unique to the analysis of nutritional factors as either exposures or outcomes, be they in laboratory, clinical or population-based small or large group settings.
- Carrying out a research project, including appropriate skills for collecting data and/or using secondary data.
- Using statistical and analytic skills to test hypotheses and interpret results.
- Reporting the research findings in an original thesis and in papers for scholarly journals.

Students will develop competency in research methods through advanced courses, individual mentoring, and hands-on experience as they conduct their own research.

Research Courses

NUTR 910	Nutrition Research (3 credits per semester)
NUTR 993	Master Thesis (3 credits – to be taken in the final semester)

MS students are required to take additional courses from those offered by other departments such as Biology, Cell and Developmental Biology, Biochemistry and Biophysics, Genetics, Epidemiology, Biostatistics, Health Behavior etc., as well as other courses offered by the Department of Nutrition. See below for a list of examples. The Academic Coordinator should be notified by email that a course has been approved by the faculty mentor as an elective.

Electives

NUTR 745	International Nutrition
NUTR 805	Nutrition Policy
NUTR 670	Nutrition and Health Behavior
NUTR 811	Development and Evaluation of Health Promotion and Disease Prevention
NUTR 812	Introduction to Obesity: Cell to Society
NUTR 814	Obesity Epidemiology
NUTR 818	Analytical Methods in Nutritional Epidemiology
NUTR 845	Nutritional Metabolism
NUTR 865	Advanced Nutritional Biochemistry: Nutrigenetics and Nutrigenomics
HPM 715	Health Economics for Policy and Management
HPM 880	Principles of Health Policy Research Methods
BIOS 511	Introduction to Statistical Computing and Data Management
BIOS 545	Principles of Experimental Analysis
EPID 700	SAS and Data Management

Typical Program

The MS curriculum will focus on courses that enhance understanding of nutrition, biochemistry, and physiology, as well as build on prior coursework (prerequisite NUTR 400 or equivalent). An illustrative set of courses follows:

Example of a Typical Course Load for the MS degree:

Year 1

Fall

NUTR 600 Human Metabolism: Macro (3)
NUTR 696 Nutrition Research Seminar (1)
NUTR 910 Research (3)
SPHG 600 Introduction to Public Health (3)

Spring

BIOS 600/BIOS 610 Biostatistics (3)
NUTR 620 Human Metabolism: Micro (3)
NUTR 910 Research (3)

Summer

NUTR 910 Research (3)
(Research can be started in the summer before year 1, depending on arrangements with preceptor)

Year 2

Fall

Elective (3)
EPID 600 Epidemiology (3)
NUTR 910 Research (3)

Spring

Elective (3)
Elective (3)
NUTR 993² Master Thesis (3)

²The Capstone course for the degree

For students completing the dual degree BSPH/MS, the recommended structure is as follows:

Summer

NUTR 910 Research (3 per summer term, 6 total)

Fall

Elective (3)
Elective (3)
NUTR 696 Nutrition Research Seminar (1)
NUTR 910 Research (5)

Spring

Elective (3)
NUTR 910 Research (6)
NUTR 993² Master Thesis (3)

Requirement for 30-credits can be reduced by 9-credits depending on what courses were taken as an undergraduate. Credit hours cannot count for both the BSPH and MS degrees.

²The Capstone course for the degree

MS students should plan to spend 20 hours/week working on their research projects during the first semester. They will attend the weekly Nutrition Research Seminar with nutrition students and participate in end-of-semester lab presentations and departmental seminars.

Timing of Activities to Meet Requirements

Students should plan to meet all of their course and research requirements in two years of graduate study (preferably one year for dual degree BSPH/MS students). The comprehensive exam should be taken by March of the second year (or December of the first year for dual degree BSPH/MS students) and the Masters thesis completed by the date set by the Graduate School so that the student will be eligible to graduate in May of the second year (or May of the first year for dual degree BSPH/MS students).

OTHER DEPARTMENT REQUIREMENTS

Seminar Presentation

Each MS student must present one scheduled seminar to the MS Committee before graduation. This seminar, typically presented during the semester before graduation, reports the results of the student's MS research. Each MS student should schedule the seminar in consultation with his/her mentor.

Comprehensive Examination

MS students will take an oral comprehensive exam that consists of defending the thesis proposal (in the fall of their first year if dual degree, no later than fall of second year otherwise). Following a 30-minute presentation concerning the thesis work, members of the MS thesis committee will ask questions concerning both the research proposal, as well as, information that have been gained from coursework and the students' own reading. The oral comprehensive exam may take up to 2-hours.

The MS thesis committee judges whether the student has passed the exam based on evaluation of the student's performance and the quality of the thesis proposal. Students who fail are entitled to retake the exam. If a student does not pass the exam on the second try, he or she must petition the Graduate School to take the exam for a third time. A supporting letter from the BSPH/MS dual degree committee must accompany the petition.

SELECTION OF THE MASTER THESIS COMMITTEE

Composition

By the beginning of the second year (first semester of first year for dual degree BSPH/MS students), the student and his/her research advisor will choose a Master Thesis committee. This committee must have three members, one of whom (the faculty advisor) serves as the chair. The chair and at least one other member must hold a primary or joint appointment in the Department of Nutrition. At least two committee members must be full members of the Graduate Faculty. Committee members who are not full members of the Graduate Faculty (for example, individuals from other institutions or firms who may hold adjunct appointments at UNC-CH) may be appointed with approval of the Graduate School. Members are selected because their fields of expertise are particularly relevant to the student's research.

Functions

MS students are responsible for consulting with members of their thesis committee at intervals throughout their research. At a minimum, students should submit a progress report and meet with each committee member at least once during each semester.

The first formal meeting of the student and his/her committee should be held at the beginning of the second academic year (first year for dual degree BSPH/MS students). The agenda usually includes a review of the student's previous educational and working experiences, courses taken while in the MS program, and presentation and defense of the research proposal. The second formal meeting would be the oral defense of the Masters thesis. The mentor, student or the committee members may request that additional meetings prior to defense be held if necessary.

MASTER THESIS RESEARCH

Research Proposal

The research proposal typically includes a survey of the research literature, a statement of the testable hypotheses and research objective(s), detailed description of the research methodology and significance of the proposed research, and preliminary data, if available. However, before any data are collected, research involving animal or human subjects must have the approval of the student's faculty mentor and the IACUC or the Institutional Review Board for the Protection of Human Subjects, as appropriate.

Each MS student together with the research mentor should develop a research project that enhances both independent thinking and technical achievement. The student cannot assume that the research mentor is expert in a wide range of topics or that the research mentor will become expert in whatever topic the student chooses. Generally, the closer a student's topic to the research

advisor's area of expertise, the more the student will learn. For dual degree BSPH/MS students, research will be a continuation of the Honors Thesis Research they began during the BSPH program.

Research Methodology

The MS research should indicate that the candidate has mastered the research methodology, has a grasp of the historical aspect of the research topic, and has contributed new knowledge. Through the conceptualization, planning and execution of research and the experience of writing the Master's thesis, the MS student will learn skills that scientists need in order to succeed in almost all research settings.

The level of independence that a student has in research execution usually depends on the level of the experience of the student. Students should become more independent as they progress through the MS program. The student and research mentor should discuss and agree upon the level of independence that is appropriate. Policies for defining authorship on papers that may result from their work together should also be discussed. It is impossible, and probably not very profitable, to attempt to define the Master thesis too closely. Latitude remains to fit a variety of circumstances. Ultimately, the student's MS thesis committee is best able to make decisions on the acceptability of an individual student's work.

Final Oral Defense

When the student has completed a final draft of the Master thesis, and the MS thesis committee has certified that all other degree requirements have been met, the final oral defense may be scheduled. The oral defense is held only after all members of the MS Thesis committee have had an adequate opportunity to review the Master Thesis. Committee members should be given a completed draft at least two weeks before the scheduled oral defense date.

At the final oral defense, the student will present a 40-45 minute seminar, in which they discuss the background, methods, results and significance of the research. After this presentation, which is open to all members of the community, the general audience may ask the student questions. The MS thesis committee will then meet in closed session with the student to ask further questions. This meeting will constitute the final oral examination. The committee may, at the time of the final oral, but not later, require revisions to the Master thesis.

Format of the MS Thesis

Two formats are acceptable for the Master thesis. The first is the traditional "book-style" document with separate chapters, which typically include (1) a literature review or background, (2) methods, (3) results, which may be in multiple chapters depending on the subject matter, (4) discussion, (5) conclusions, and (6) references.

The second approach is to write the Master thesis as an extended manuscript suitable for publication. The MS Committee recommends this format. Thus, the body of the Master thesis would consist of a manuscript that has been supplemented by additional sections of introduction/background, synthesis, discussion of significance, and direction for future research.

This style has the advantages of teaching students how to write for publication and of producing manuscripts ready for submission.

Other pertinent points regarding the manuscript:

1. The manuscript should be of the quality and length usually expected for publication in a peer reviewed scientific journal.
2. The thesis should present major, substantive, and original research results.
3. The expanded methods section should not reiterate methods described in the thesis. Instead, it should present those issues that are deemed appropriate for evaluating the research, but that one might not present in as great detail when writing for a journal. To avoid repetition, it is recommended that additional details of methods be placed as more lengthy footnotes to articles or as appendices.
4. Additional detailed results (for example, results from full regression models, replicates of experiments, etc.) may be presented in appendices.
5. The synthesis chapter should provide:
 - (a) an overview of the major research findings;
 - (b) a discussion of significance: how the research contributes to the field, how it confirms previous work or breaks new ground, the context in which the research should be placed and/or where appropriate, a discussion of the health/nutrition/public health/policy significance of the work;
 - (c) a discussion of the major strengths and weaknesses of the work,
 - (d) directions for future research.
6. Each reference should include all authors, the title, volume, page numbers (first-last), year.

Application for Graduation

When a student nears the end of their research and can anticipate final approval of the Master thesis, they must complete an online application for graduation. The student must file a new application for the degree if he/she does not graduate as planned. Such applications must be filed by the deadline provided by the Registrar. Students will notify the Graduate School of their plan to graduate by applying online through the ConnectCarolina student portal.

Students should monitor applicable deadlines for completion and submission of the thesis according to the Graduate School, consulting the Academic Coordinator as questions arise.

Time Limitation

All requirements for the degree must be completed within five-years from the date of first registration in the Graduate School. An extension of the degree time limit may be granted upon petition to the Dean of the Graduate School.

COURSE PLAN FOR THE MS NUTRITION DEGREE

Course #	Course Name	Credits Taken	Planned Term	Pertinent notes: substitutions, exemptions.*
Required SPH Course				
SPHG 600	Introduction to Public Health			
Degree Specific Required Courses				
BIOS 600 or BIOS 610	Principles of Statistical Inference or Introductory Statistics for Laboratory Scientists			
NUTR 813 or EPID 600 or EPID 710	Nutritional Epidemiology or Principles of Epidemiology for Public Health or Fundamentals of Epidemiology			
NUTR 600	Human Metabolism: Macronutrients			
NUTR 620	Human Metabolism: Micronutrients			
NUTR 885				
Additional Coursework (400 level or higher)				
Thesis Capstone				
NUTR 993	Masters Thesis			
	Total credits required for graduation ≥ 30 <i>Credit hours cannot count for both the BSPH and MS degrees.</i>			

Milestones

Term Complete	Milestone	MS	BSPH/MS	Notes
	Formation of Master Thesis Committee	Fall 2	Fall 1	
	Comprehensive Exam	Fall 2	Fall 1	
	Final Defense	Spring 2	Spring 1	
	Submission of Thesis	Spring 2	Spring 1	