BSPH in Environmental Health Sciences (ENHS) HANDBOOK

Department of Environmental Sciences and Engineering

90 Years
1921-2011

August 1, 2018

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Overview

The Bachelor of Science in Public Health (BSPH) in Environmental Health Sciences (ENHS) is a professional undergraduate degree offered by the [Department of Environmental Sciences and Engineering (ESE)](#) in the [Gillings School of Global Public Health](#) (SPH), a professional school within the [University of North Carolina at Chapel Hill](#) (UNC-CH). This degree requires 120 credit-hours, obtained during a maximum of 8 academic semesters (4 calendar years). The BSPH in ENHS is overseen by the Director of Undergraduate Studies (DUS), supported by the staff of the ESE Student Services Office.

Students spend their first two years in the General College and apply (in the Spring semester of their Sophomore year) to transfer to the Gillings School of Global Public Health for the Fall of their Junior year. The application deadline usually falls in mid-February. We admit 25-30 rising Juniors per year. Our curriculum emphasizes rigorous preparation in the basic sciences, graduate-level course-work in Environmental Sciences (with the option of specializing in Environmental Biology, Environmental Chemistry or Environmental Physics tracks), and involvement in research. Close to half our students participate in the Honors program and/or write a Senior Honors Thesis. This program offers the possibility of completing a Masters degree in Environmental Sciences and Engineering (MS or MSPH) in one year beyond the undergraduate degree (bachelor's -to–master's degree option).

The Department of Environmental Sciences and Engineering focuses on the interface between people and the environment. [Research](#) and [teaching](#) in ESE encompass the chemical, biological, toxicological, and physical aspects of environmental and engineered processes, as well as the social, political, and legal considerations involved in managing the quality of our water, soil, and air resources. Specific areas of expertise include air quality, water quality, and biomarkers and mechanisms of human exposure and disease.

Although a research rotation is not required, some of our undergraduates participate in research alongside graduate students and postdoctoral fellows. Recent BSPH research projects have focused on water purification (chemical and microbiological), genetic tracking of malarial infections, aerosol formation in the atmosphere, dermal exposure to chemicals in work environments, food insecurity in migrant communities, to name but a few areas.

Our graduates typically continue to professional schools (medicine, law, dentistry) or graduate studies. Others work for non-profit organizations, federal, state and local agencies, or environmental consulting firms.

Degree requirements

The curriculum is composed of six elements:

1. **General education requirements**: including BIOL 101+101L, CHEM 101+101L, MATH 231 and 232; these courses also fulfill UNC-CH General Education requirements as follows: Foundations- Quantitative Reasoning (MATH 231), Approaches – Physical and Life Sciences (BIOL 101+101L, CHEM 101+101L), Connections – Communications Intensive (BIOL 101L) and Quantitative Intensive (MATH 232). The remaining General Education requirements are: Foundations - English Composition and Rhetoric, Foreign Language, Lifetime Fitness; Approaches – Social and Behavioral Sciences, Fine Arts; Connections – Global Issues, U.S. Diversity

2. **Basic science requirements** in Biology, Chemistry, Physics and Mathematics: BIOL 201, 202; CHEM 102+102L, 261; MATH 233 if placed out of MATH 231 and 232; PHYS 118 and 119 [formerly PHYS 116 and 117] *or* PHYS 114 and 115 [formerly PHYS 104 and 105]. These courses provide grounding in the basic sciences equivalent to most fundamental science BA degrees. *Additional requirements for Environmental Chemistry Track*: MATH233, MATH 383, CHEM481, and Physics 118 and 119 are required. *Additional requirements for Environmental Physics Track*: MATH383.

3. **Skills**: COMP 116 (or approved alternatives BIOL 201H, BIOL/MATH 452, GEOG 595) provides a marketable skill in computer programming for data analysis and model building

4. **Public Health Core**: Coursework in the central Public Health disciplines, Biostatistics, Epidemiology, Health Policy and Health Behavior, BIOS 600, EPID 600, HBEH 600, HPM 600. These courses provide coverage of the Public Health Core Competencies.

5. **Environmental Health Core**: ENVR 230, ENVR 430, and ENVR 698 or 593 provide a broad perspective on environmental health problems and specific understanding of the scientific mechanisms underlying environment—related health effects. These courses provide coverage of the Environmental Health Science Competencies. ENVR 698 and ENVR 593 also fulfil the UNC-CH General Education requirement for Connections – Experiential Education.

6. **Advanced Electives**:

General track: Four advanced undergraduate or graduate level courses (400 or higher) relevant to Environmental Health allow in-depth study of specific aspects of Environmental Health.

Environmental Biology Track: Select 4 from: ENVR 411, ENVR 412, ENVR 421, ENVR 423, ENVR 425, ENVR 433, ENVR 442, ENVR 468, ENVR 610, ENVR 630, ENVR 640

Environmental Chemistry Track: Select 4 from: ENVR 403, ENVR 416, ENVR 419, ENVR 451, ENVR 575, ENVR 650, ENVR 675

Environmental Physics Track: Select 4 from: ENVR 403, ENVR 416, ENVR 451, ENVR 452, ENVR 453, ENVR 666, ENVR 671, ENVR 672, ENVR675

Program 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 the BSPH in Environmental Health Sciences (ENHS).

BSPH in Environmental Health Sciences
- Demonstrate basic knowledge in the fundamental sciences and mathematics.
- Describe the relationship between public health and environmental sciences and engineering.
- Identify major issues in environmental sciences and engineering.
- Demonstrate broad knowledge in the core fields of public health.
- Demonstrate written and oral communication skills related to environmental sciences and engineering issues within a public health context.

Our curriculum also addresses the core Environmental Health Sciences competencies:
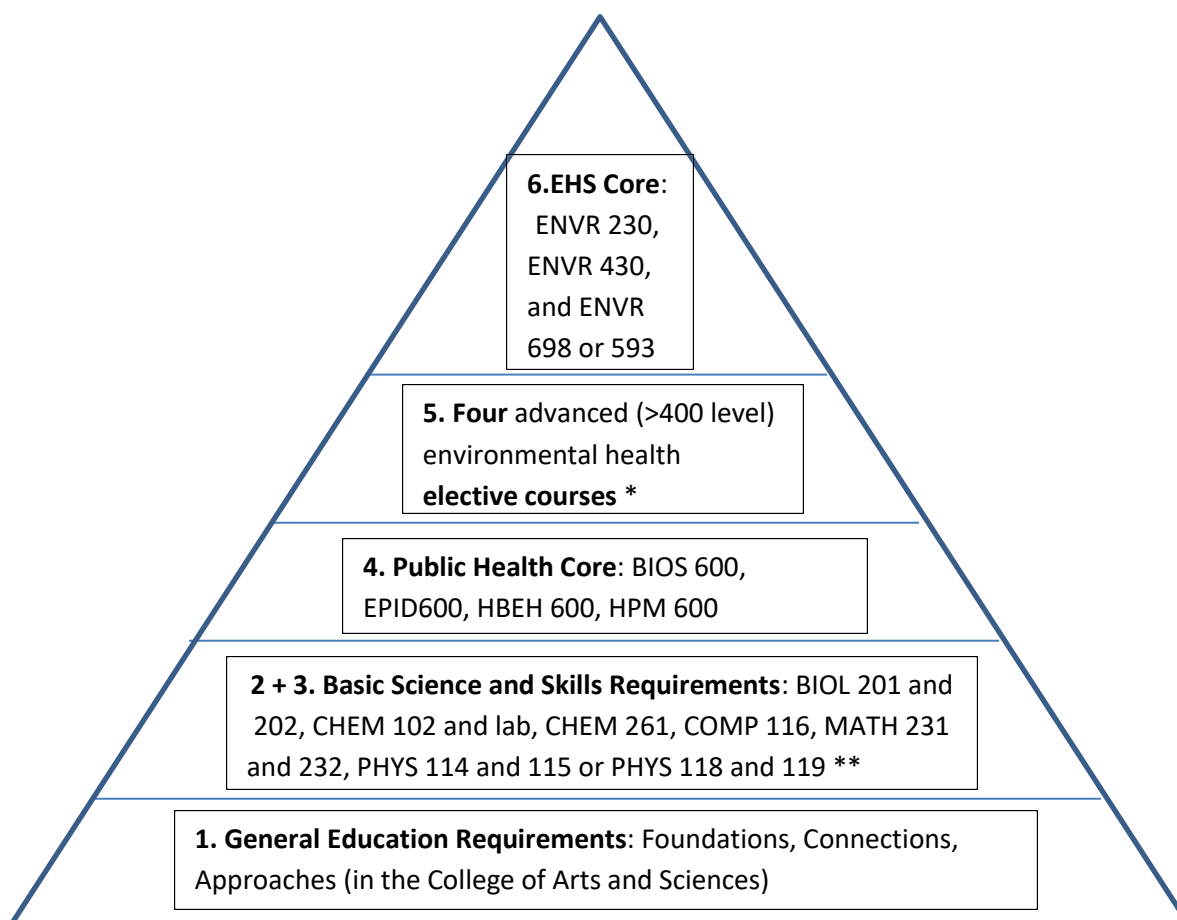
Environmental Health Sciences Core Competencies

- Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety
- Describe the direct and indirect human, ecological and safety effects of major environmental and occupational agents
- Specify current environmental risk assessment methods
- Describe genetic, physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards
- Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity
- Explain the general mechanisms of toxicity in eliciting a toxic response to various environmental exposures
- Develop a testable model of environmental insult
- Describe federal and state regulatory programs, guidelines and authorities that control environmental health issues

Students in this degree program also develop core public health competencies as described in the Gillings Schoolwide Handbook.

Please refer to the competency matrices at the end of this document to review the learning experiences through which students in the BSPH in Environmental Health Sciences develop and attain these competencies.

Culminating experience

A culminating experience is required. This can take the form of an internship or practicum (ENVR 593, see p 16) or completion of ENVR/ENEC 698, Analysis and Solution of Environmental Problems, in which students work in small groups to address environmental issues identified by an external client. The culminating experiences provide students an opportunity to synthesize, integrate and apply knowledge and skills learned in coursework and other learning experiences and require students to demonstrate attainment of program competencies. Completion of an Honors Thesis (see p 11) also represents a culminating experience, though it is not required, nor is it a substitute for ENVR 593 or ENVR/ENEC 698.

6.EHS Core:
ENVR 230,
ENVR 430,
and ENVR
698 or 593

5. Four advanced (>400 level)
environmental health
elective courses *

4. Public Health Core: BIOS 600,
EPID600, HBEH 600, HPM 600

2 + 3. Basic Science and Skills Requirements: BIOL 201 and
202, CHEM 102 and lab, CHEM 261, COMP 116, MATH 231
and 232, PHYS 114 and 115 or PHYS 118 and 119 **

1. General Education Requirements: Foundations, Connections,
Approaches (in the College of Arts and Sciences)

* Or four electives as specified for the Environmental Health Biology, Environmental Chemistry or Environmental Physics Concentrations.

** Additional basic science requirements: For the Environmental Chemistry Concentration, MATH 233 and 383, CHEM 481, PHYS 118 and 119; For the Environmental Physics Concentration, MATH 383.

Applying to the ENHS program

The ENHS faculty and staff participate in open houses and information sessions held throughout the year both in the School of Public Health and on the Main Campus, and in Fall Majors Exploration workshops. Prospective applicants are encouraged to take advantage of these opportunities to find out more about our program.

For admission to the BSPH in Environmental Health Sciences we require a grade of C or better earned at UNC–Chapel Hill in at least one course (numbered above 100) per group in three of the following five groups:

- Biology (Preferred BIOL 201, 202);
- Chemistry (Preferred CHEM 102/102L, 261);
- Programming and modeling: COMP 116 (or approved alternatives BIOL 201H, BIOL/MATH 452 or GEOG 595);
- Calculus (Preferred MATH 231 or 241, 232 or 283, 233);
- Physics (PHYS 114 and 115, or 118 and 119).

Undergraduates interested in the BSPH in ENHS should therefore plan to take as many of our STEM required courses as possible during their freshman and sophomore years, so that they have the minimum academic qualifications in hand at the time of application. The Director of Undergraduate Studies (DUS) and the ESE Office of Student Services staff will be happy to work with prospective majors (by appointment or by email) to verify that these requirements are on track to being met.

Applications are currently submitted online through the ApplyNow/Slate system and open in October. The deadline for application usually falls in in mid-February. Students admitted in the Spring semester formally enter the BSPH for the Fall semester of their Junior year, and follow that semester's Undergraduate Bulletin degree requirements. Fall admission (applications open in September, close in mid-October) may also be possible for students who have met our academic requirements by that time.

In addition to the above-mentioned academic qualifications (which are documented by examination of the student's transcript in ConnectCarolina (the University of North Carolina at Chapel Hill's data repository based on PeopleSoft) the following materials are required for evaluation:

- A personal statement
- A resume or CV
- Three letters of recommendation

The admission decision

Although grades in the above-mentioned STEM fields are the first thing that we look at, to ensure that our students have a strong science foundation and will not struggle in our advanced classes, applicants are evaluated on the entirety of their application, not solely on grades and GPA. A stratospheric GPA will not compensate for a poorly argued or irrelevant personal statement. Conversely, a motivated and

eloquent personal statement, or evidence of prior involvement in and passion for research or other environmental-health-related activities, can tip the scales in favor of admission.

We aim to make admission decisions in time for students to make plans before registration for the Fall semester. Although the DUS will communicate decisions informally by email as soon as they are made, the formal offer of admission will be made officially through the SPH Office of Student Affairs; instructions on how to accept or decline admission will be included in this communication. Currently the SPH Office of Student Affairs is planning to send out offers of admission around the time of Spring Break.

First steps after admission

The DUS will make our BSPH ENHS Sakai site (Sakai.unc.edu)which serves as a repository for program-related documentation including forms and worksheets) available to incoming students, and will use the Sakai sign-up function to schedule advising sessions (usually clustered in the last two weeks of March, before registration for Fall courses opens in early April). At this first advising session the overall course of study and the student's specific goals will be reviewed.

The ESE Department usually schedules a social event on an afternoon in mid-April, incoming students are invited to attend to get to know the incoming cohort and the rest of the Department.

Advising

Student advising is overseen by the Director of Undergraduate Studies (DUS); individual student advising is distributed among the department's faculty members. Undergraduate students are encouraged to meet regularly with the DUS and review their Tar Heel Tracker each semester. Students interested in one of the concentrations will be advised and mentored by an environmental sciences and engineering faculty member whose expertise is relevant to the concentration. The DUS and staff of the ESE Student Services Office will verify that coursework requirements for the concentration have been met. The DUS and the ESE Office of Student Services staff work with current and prospective majors by appointment. Departmental academic advising is particularly important for those majors who are considering going on to the dual bachelor's–master's degree.

Each student has a degree-specific electronic worksheet that is stored in their drop-box on the BSPH Sakai site, where it is accessible for consultation and updating by the student, the DUS, and the advising faculty members.

The DUS schedules (through the ENHS Sakai site) individual advising sessions open to all enrolled and incoming undergraduates in the Spring semester (approximately two weeks before registration for the Fall semester) and in the Fall semester (approximately two weeks before registration for the Spring semester).

Course selection

Are There Recommended/Required Course Sequences ?

ENVR230 is best taken in the Fall of your Junior year (first semester in the BSPH program) – it is taught Fall only.

ENVR430 is also taught in Fall only, undergraduates usually take this course in the Fall of their Senior year. All students should have completed Chemistry through Organic (or better still, Organic I (261), Organic II (262) and Biochemistry (CHEM430), and BIOL202 (and BIOL205/252) before taking ENVR430. Students on the Pre-Med track will automatically conform with these guidelines if they aim to have completed all their pre-med course-work before they take the MCAT (usually the summer before their final year at the latest).

In general ENVR courses are taught only once per calendar year. The SPH Core courses are taught every academic semester, and once in the summer (on-line).

Second Majors and Minors

Can I combine a Second Major/a Minor/a Second Minor with the BSPH ?

Yes, though the effort involved varies with the extent of overlap of the respective programs. [Chemistry](#) and/or [Biology](#) are frequent choices for minors. The [Pre-med curriculum](#) pretty much covers a Chemistry minor and a Biology minor. The latter requires one additional course numbered above 400 and one "course with a lab" (other than BIOL101) beyond the BSPH ENHS requirements. The former requires CHEM 241 + Lab and CHEM 262 + lab beyond the BSPH ENHS requirements. Minors such as Spanish are easily accommodated and have been popular. Several of our undergraduates are currently minoring/have minored in Entrepreneurship (logical tie-in to developing green technology). Second Majors have most commonly been Chemistry or Mathematics (usually students who had previously been Math majors). Other more esoteric subjects (such as Romance Languages) have been pursued, by individuals sufficiently motivated to tackle fields with no overlapping course-work.

Note that all prior major and minor declarations are expunged when a student transfers to the School of Public Health, so these will have to be (re-) declared /authorized. The best time to do this is in September of your Junior year (first semester in the BSPH).

To declare a minor (or two minors) complete the SPH [form](#) and have it signed by the DUS.

Completion of a second major requires permission of the SPH Associate Dean of Academic Affairs and of the relevant second Department, as described: [Second Major Guidelines](#). See the DUS to start this process. Note also that a second major in the College of Arts and Sciences will require completion of the full range of General Education Connections (8 courses) as opposed to the 5 Connections courses required for the BSPH.

Study Abroad

Can I combine the BSPH with Study Abroad ?

Yes, the key is advance planning. Courses taken through Study Abroad may be able to meet the General Educational requirements, the Basic Science requirements, or the Advanced Environmental Science Elective requirements. Consult the Director of Undergraduate Studies as you start planning your Study Abroad. Getting appropriate credit for courses taken through Study Abroad can be tricky, but ultimately this is feasible.

Research

A research rotation or project is not required, however we encourage undergraduate students to gain some experience of research as they consider their options for graduate school or careers after graduation.

How Do I Get Involved in Research ?

One good way is to identify areas of research that you are interested in, then seek out Faculty members in Environmental Sciences and Engineering (potential Research Advisors) who are working in those areas. Feel free to talk to other students in ENHS about the labs in which they are carrying out research. The Office of Undergraduate Research maintains a searchable data-base of Undergraduate Research Opportunities. The ESE Student Services Office will periodically circulate information about specific research opportunities. Initiate contact with potential Research Advisors by email (or as specified in the position advertisement), then follow up in person (make appointment). Think long-term: your Research Advisor is also a potential reference for Graduate School or employment opportunities, and a sponsor for the Plus1 Masters program, which allows completion of a Masters degree in one year beyond the undergraduate degree. The usual time-line is to identify a Research Advisor in the Fall of your Junior year (first semester in the BSPH), join that lab and register for ENVR695 so that you can receive academic credit in the Spring of that year, then if things go sufficiently well that you could write an Undergraduate Honors Thesis based on your research, register for ENVR691H in the Fall of your Senior year and ENVR692H in the Spring of your Senior year.

What if my Research Experience does not Have the Potential to Lead to an Honors Thesis ?

That's perfectly fine, ENVR695 can be taken for credit more than once, so you can continue in the lab you originally chose, or you can switch to another lab to gain experience in a different field.

Honors Thesis

Undergraduate Honors Research in ENVR- ENHS

OVERVIEW
An Honors research project provides Undergraduate Students with the opportunity to plan and carry out research designed to answer a specific research question, under the guidance of a faculty Research Advisor. Participation in Honors research requires a minimum Grade Point Average of 3.3 at all times. Your findings are written up in the form of a Senior Honors Thesis, and defended in a public seminar (Honors Defense). The Thesis and Defense are evaluated by your Undergraduate Honors Committee. The ENHS Director of Undergraduate Studies serves as overall Departmental Honors Advisor.

Students who successfully complete a senior honors thesis project will have the designation 'Honors' or 'Highest Honors' printed beside their names in the Commencement bulletins and recorded on their diplomas and transcripts. [Source: Senior Honors Thesis Guidelines for Academic Units, Faculty Advisors, and Students]

SELECTION OF RESEARCH ADVISOR
Your Research Advisor is the Faculty Member who agrees to host you in her/his laboratory and who ultimately oversees your research. The Research Advisor is usually (though not necessarily) a member of the Department of Environmental Sciences and Engineering (ESE). One good way to find a Research Advisor is to identify areas of research that you are interested in, then seek out individuals working in those areas. Feel free to talk to other students in ENHS about the labs where they are carrying out research. The Office of Undergraduate Research maintains a searchable data-base of Undergraduate Research Opportunities. The ESE Student Services Office will periodically circulate information about specific research opportunities. Initiate contact with potential Advisors by email (or as specified in the position advertisement), then follow up in person (make appointment). Your Research Advisor may assign a senior graduate student or postdoc as your day-to-day supervisor, but should be available for career and academic advice, as well as overseeing your research. Think long-term: your Research Advisor is also a potential reference for Graduate School or employment opportunities, and a sponsor for the Plus1 Masters program.

UNDERGRADUATE HONORS COMMITTEE
Your Undergraduate Honors Committee is composed of your faculty Research Advisor, one other faculty member from the Department of Environmental Sciences and Engineering, and a third member who can be a faculty member, a postdoctoral fellow/associate, or a senior graduate student, who has been closely involved in your research. You should start thinking about identifying potential committee members as your research takes shape, and you should formally form your committee by the mid-semester break of the semester in which you will be defending your Honors Thesis.

OPPORTUNITIES FOR FUNDING:
Undergraduates have opportunities to apply to HonorsCarolina for small grants (usually up to $ 500) to purchase supplies or needed services for their Honors Research Projects. Award of such a grant looks good on your Resume. A call for applications goes out both Fall and Spring semesters, usually in January or early September, with a deadline of late January or late September. For more information see: http://honorscarolina.unc.edu/research/senior-honors-thesis/
Summer research can be supported by Honors Mentored Research Fellowships, through the UNC-CH Office of Undergraduate Research.

Normally you would register for ENVR691H (Honors Research) in the Fall of your Senior year when you are carrying out the bulk of your Honors research, and for ENVR692H (Honors Thesis) when you are writing and defending your Thesis in the Spring - i.e. the final semester before your May graduation. (If a December graduate, adjust semesters accordingly).

ENVR691H and 692H are set up as three-credit courses with different section numbers reflecting the different faculty members available to serve as Research Advisors. Currently ConnectCarolina offers the lowest section number as the default. You will need to click around to get a drop-down menu with a choice of section numbers, from which you should choose the appropriate one. If your chosen Research Advisor is not listed then see the Student Services Office or the DUS for help. Also, after you have registered, go back and check that ConnectCarolina is showing the desired credits/section. If these are incorrect and it's before the end of drop-add, you should be able to fix this yourself by dropping and re-registering. If it's after Drop/Add or you're having trouble, see the Student Services Office for help.

TIME-LINE (FOR MAY GRADUATION) (For December Graduation the deadline for defending is usually in the week before Thanksgiving - adjust your time-frame accordingly).

End of January: Lab work should be just about finished - maybe a few loose ends to tie up.

Middle of February: First draft of Thesis to Research Advisor.

Mid-February - Mid March: Work with Research Advisor to edit/revise Thesis until it is ready for Prime Time.

Mid-March:
- o Form Committee
- o Schedule day and time for Defense - this will involve (probably extensive) negociation with your committee.
- o Book room for Defense - book room for 2 hours (Online request: http://sph.unc.edu/resource-pages/room-av- reservations/http://www.sph.unc.edu/forms/sphroomres/sphrequest.html). Look at both classrooms and conference spaces. Consider the size of the potential audience that might attend : lab-mates, friends, room-mates, BSPH cohort. Also book computer and projector if these are not permanently installed in your selected room.

~3rd Week in March (two weeks-10 days before defense):
- o Circulate Final Draft of Thesis to Committee.
- o Double-check that day/time/room scheduled are still OK.
- o Email the ENVR Student Services Office with
  - ▪ Your defense day, time, room

- Title of your Honors Thesis
- Abstract of your Thesis
- Graphic to be included in your Defense announcement (optional)
- Names of your Research Advisor and Committee Members

Last week in March: Prepare your presentation (usually Powerpoint or similar)

First Week in April (before Honors reporting deadline - Monday April 10th 2017 for May graduation and Monday, November 13th, 2017 for December graduation): Defend Thesis

Second-Third Week in April: Make final revisions to Thesis

By Last Day of Classes: Turn in final "perfect" .pdf files of Title Page and Thesis to the Carolina Digital Repository (https://cdr.lib.unc.edu/forms/honors-thesis.form) and two bound hard copies of Thesis to the Student Services Office.

FORMAT OF THE HONORS THESIS
Length 20 ~ 30 pages double spaced, 12pt, plus appendix if appropriate.

Two bound (in Acco binder) copies of the final Thesis (after all revisions requested by the Committee have been completed) should be turned in to the Student Services Office. One bound copy is retained in the Department files, the other goes to the student's Research Advisor.

The ENHS Honors Thesis includes the following components:

Title Page see model
Abstract 150 to 200 words
Acknowledgments both personal and institutional e.g. funding
Table of Contents
List of Tables (if more than ~ 3 are included)
List of Figures (if more than ~ 3 are included)
Introduction
Materials and Methods
Results
Discussion/Conclusions
References.
Appendix if appropriate

HONORS DEFENSE

The Honors Defense is a public seminar in which you will present the results of your research, using visual aids (e.g. Powerpoint) as appropriate. In 30-40 minutes, introduce your Specific Aim(s), describe the Background and context of your research, your experimental design (and hypothesis if appropriate), your experiments and the results that you obtained. Finish with a discussion of the significance of your findings, and the implications for Environmental Health. The general audience will then have the opportunity to ask questions. After the open questions (and possibly a short break, and/or private discussion among the committee), the committee will meet in closed session with the candidate to ask more detailed questions about the research, the presentation and interpretation of the results, the conclusions, and potentially any other material that a student graduating from ENHS could reasonably be expected to know. At the conclusion of the closed session the candidate will be excused while the committee confer among themselves to evaluate the Thesis and the Defense.

GRADING

At the conclusion of the Defense, the student will be judged to have Passed, Passed with Honors, or Passed with Highest Honors.

- o Pass: The Thesis and its defense are acceptable.
- o Honors: The Thesis and its defense are excellent.
- o Highest Honors: The Thesis and its defense are outstanding, comparable in calibre and quality to a good Masters' degree candidate.

Grading will be based on both the Thesis and the oral presentation. The Thesis will be evaluated on clarity and logic of general writing, articulation of goals, clarity of presentation of results, interpretation of results, discussion of significance, and appropriate placement into context. The Oral Presentation will be evaluated on organization, clarity, appropriateness of visual aids, and the candidate's handling of questions both from the general audience and from the Committee.

AFTER THE DEFENSE

The Committee will make recommendations for revisions of the Thesis. The final revised version should be signed on the cover page by the Committee members to signify their approval of the final revised version. Two bound (in Acco binder) copies of the final Thesis (after all revisions requested by the Committee have been completed) should be turned in to the Student Services Office and a .pdf file of the final Thesis should be uploaded to the Carolina Digital Repository.

ELECTRONIC SUBMISSION OF THESIS (Copied from Senior Honors Thesis Guidelines for
Academic Units, Faculty Advisors, and Students)
Students will submit their theses electronically via the Carolina Digital Repository (CDR). Submissions are due by the last day of class in the semester in which students complete their

theses. The University Library will catalog electronic theses and make them available to the public.

Students should follow these steps to submit their completed thesis to the CDR:

1. Log in to https://cdr.lib.unc.edu/forms/honors-thesis.form using Onyen.

2. Complete required fields and upload documents:

"Degree granted" will be Bachelor of Science in Public Health (from drop-down menu).
"Major/minor" will be Environmental Health Sciences.

REQUIRED DOCUMENT #1-A scanned copy of their thesis cover page only,
signed by the thesis advisor, in pdf format using the following naming convention:
"GraduationYear_LastName_Cover.pdf" (ex. 2013_Clemmons_Cover.pdf)

REQUIRED DOCUMENT #2-The thesis in PDF format using the following naming convention:
"GraduationYear_LastName.pdf" (ex. 2013_Clemmons.pdf)
OPTIONAL DOCUMENTS–Additional supplemental files in PDF format using the this naming convention:
GraduationYear_LastName_SupplementalFileNumber.pdf"
(example: 2013_Clemmons_2.pdf)

Students who have supplemental files larger than 500MB should contact the CDR
staff at cdr@unc.edu to arrange an alternative file transfer method.

3. Click "Submit Deposit"
Each student's thesis will be held in the CDR until that student's graduation date, when Honors Carolina will clear the thesis for online publication. Once published, theses will be publicly accessible via the Carolina Digital Repository website.
Students may request a one-or two- year delayed release of their work via the CDR.
Such requests must be submitted in writing to
honorscarolina@unc.edu
before the last day of class in the semester of submission.

Practicum

Academic credit can be obtained for completion of a relevant Internship or Practicum experience, as ENVR 593, Undergraduate Practicum in Environmental Health Sciences. ENVR593 is not required, but can be substituted for ENVR698 (Capstone), which is required. ENVR 593 satisfies the Experiential Education (EE) General Education Connections requirement. The practicum provides students an opportunity to apply the knowledge and skills being acquired through their coursework and further develop and demonstrate attainment of program competencies.

OVERVIEW

ENVR593 provides a mechanism by which undergraduate students can get academic credit for mentored practical extracurricular activities that complement and enrich their studies in Environmental Health Sciences. Such activities typically include internships or volunteer work with an appropriate Agency (e.g. Public Health Departments, non-profits, NGOs) and projects with organizations such as Engineers without Borders. (The University Career Services Office offers resources to help locate internships.) The essential features are that the activity be environmental health-related, be conducive to personal and professional development (i.e. not "just making coffee and running photocopies"), and overseen by an identified professional in the field who serves as a mentor rather than merely a supervisor. In order to earn academic credit the student must write and turn in an original report that both describes the activity and offers scholarly reflection on the significance and impact of that activity. The length of the report will be commensurate with the credit-hours undertaken, which in turn reflect the level of effort out into the practicum activities. As a rough guideline 3 credit-hours reflect approximately 120 hours of concentrated full-time effort, or the equivalent pro-rated over a longer period of time.

FACULTY ADVISOR

A member of the Faculty of the Department of Environmental Sciences will serve as Practicum Advisor and will have primary responsibility for grading the practicum report. Register for ENVR593 under this faculty member's section number.

REGISTERING FOR ENVR593 - CAUTION

ENVR593 is set up as a variable-credit course (credits commensurate with level of effort, see above) with different section numbers reflecting the different faculty members who will be advising you and grading your report. Currently ConnectCarolina offers 1 credit and the lowest section number as the default. You will need to click around to get a drop-down menu with a choice of numbers of credit-hours and another menu with a choice of section numbers, from which you should choose the appropriate ones. Also, after you have registered, go back and check that ConnectCarolina is showing the desired credits/section. If these are incorrect and it's before the end of drop-add, you should be able to fix this yourself by dropping and re-registering. If it's after Drop/Add or you're having trouble, see the ESE Student Services Office for help.

FORMAT OF THE PRACTICUM REPORT
Length proportional to number of credit-hours, e.g. ~ 10 pages (single spaced, 12pt Serif font, 11 pt SanSerif, 1 inch margins) for 3 credit-hours. Electronic or hard copy according to the preference of the Practicum Faculty Advisor.

Introduction: Setting the stage.	-Describe the agency/organization in which the practicum is performed, its mission and goals. -Describe the purpose of the practicum and how it fits with the agency mission/goals(context) -Describe your own goals (with respect to knowledge gained, professional development, personal development) in undertaking the practicum.
Narrative: What you actually did.	-Your activities, arranged logically, in narrative (not diary) form, with documentation that substantiates level of effort (number of hours worked). -Different project undertaken, how you balanced priorities -Your relationship/interactions with your mentor - contributions to learning and development -Tangible products, e.g. reports written, latrines dug, web-pages designed...
Discussion: Reflections on the outcome	-Your accomplishments - How what your accomplishments relate to what you actually set out to achieve (original goals) - Significance and impact of what you actually accomplished (both with respect to the host agency and with respect to your own personal and professional development.
References (if appropriate)	As needed to document cited facts. No specific style (e.g. Chicago) is required so long as the format is consistent and informative.

DEADLINE
The practicum report should be turned in to the Faculty Advisor by the last day of classes.

GRADING
Grading will be based on clarity and logic of general writing, articulation of goals, discussion of accomplishments, and appropriate placement into context.

Checkpoints and Milestones

Students can monitor their own progress towards graduation with Tar Heel Tracker, the ConnectCarolina degree audit system, and on their worksheet, by updating it in their drop-box on the BSPH Sakai site, and by meeting (by appointment, preferably, with the DUS). The DUS schedules blocks of time for advising appointments before registration opens each semester (available through the BSPH Sakai site).   Key events consist of:

- Initial advising with DUS for program planning: Spring of Sophomore year, usually just after Spring Break (after admission, but before registration for Fall courses). Advising appointments will be scheduled through the BSPH Sakai site.
- Declaration of Minors and Second Majors: Target Fall of Junior year (see the DUS, and page 9 of this Handbook).
- Pre-graduation advising with DUS: Fall of Senior year (for May graduation), usually just after Fall Break (before registration for Spring courses). Advising appointments will be scheduled through the BSPH Sakai site.
- Application to graduate: at time of registration for the final semester.

Plus the standard University-wide deadlines each semester to add or drop courses, declare pass/fail, apply for funding…

Applying to graduate

The application to graduate in May becomes available online in ConnectCarolina at the time of registration for Spring courses for the senior year, usually in early November. Online application remains open until mid-February.

For December graduation, online applications open at the time of registration for Fall courses, and close sometime in October (exact deadlines vary from year to year).

Graduation

The School of Public Health holds its own May graduation ceremony, usually in Memorial Hall (with ample room for guests) on Saturday afternoon before the Sunday University-wide graduation. The SPH ceremony is a much smaller and more personal affair, each undergraduate gets to walk across the stage and shake hands individually with the Dean, and there is a reception with light refreshments afterwards in the Atrium of the School of Public Health.

Appendix: Matrices of Competencies

Core Competencies	Course Number and Name	Course Number and Name	Course Number and Name	Course Number and Name	Course Number and Name	Course Number and Name	Course Number and Name	Other Learning Experiences
1. Demonstrate basic knowledge in the fundamental sciences and mathematics*	BIOL 201 (P) Ecology and Evolution	BIOL 202 (P) Molecular Biology and Genetics	CHEM 102, 120L (P) General Descriptive Chemistry and Lab	CHEM 261 (P) Introduction to Organic Chemistry	MATH 233 (P) Calculus of Functions of Several Variables	PHYS 116/118 (P) Mechanics PHYS 117/119 (P) Electromagnetism and Optics	PHYS 104/114 and 105/115 (P) General Physics I and II	COMP 116 (P) Introduction to Scientific Programming
2. Describe the relationship between public health and environmental sciences and engineering.	ENVR 430 (P) Health Effects of Environmental Agents	ENVR 230 (P) Environmental Health Issues	ENVR 475** (R) Global Climate Change: Interdisciplinary	ENVR 421 (R) Environmental Health Microbiology	ENVR 433 (R) Health Hazards of Industrial Operations	ENVR 470 (R) Environmental Risk Assessment	ENVR 468 (R) Advanced Functions of Temporal GIS	ENVR electives
3. Identify major issues in environmental sciences and engineering.	ENVR 430 (P) Health Effects of Environmental Agents	ENVR 230 (P) Environmental Health Issues	ENVR 403 (R) Environmental Chemistry Processes	ENVR 421 (R) Environmental Health Microbiology	ENVR 475** (R) Global Climate Change: Interdisciplinary	ENVR 404 (R) Life Cycle Assessment, Energy and Environment		ENVR electives
4. Demonstrate broad knowledge in the core fields of public health.	BIOS 600 (P) Biostatistics	EPID 600 (P) Epidemiology	HBEH 600 (P) Social and Behavioral Sciences in Public Health	HPM 600 (P) Introduction to Health Policy and Management	ENVR 430 (P) Health Effects of Environmental Agents	ENVR 230 (P) Environmental Health Issues		
5. Demonstrate written and oral communication skills related to environmental sciences and engineering issues within a public health context.	ENVR/ENEC 698 (P) Environment and Ecology Capstone	ENVR 593 (P) Undergraduate Practicum	ENVR 230 (P) Environmental Health Issues	ENVR 430 (P) Health Effects of Environmental Agents				ENVR 692H (R) Honor's Thesis ENVR Electives

P=Primary, R=Reinforcing

*Listed courses represent a sampling of biology, math, chemistry, physics and computer courses demonstrating proficiency in the discipline.

Environmental Health Science Core Competencies	Course Number and Name	Course Number and Name
1. Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety	ENVR 430 Health Effects of Environmental Agents (P)	ENVR 230 Environmental health Issues (R)
2. Describe the direct and indirect human, ecological and safety effects of major environmental and occupational agents	ENVR 430 Health Effects of Environmental Agents (P)	ENVR 403 Environmental Chemistry Processes (R)
3. Specify current environmental risk assessment methods	ENVR 430 Health Effects of Environmental Agents (P)	ENVR 470 Environmental Risk Assessment (R)
4. Describe genetic, physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards	ENVR 430 Health Effects of Environmental Agents (P)	ENVR 230 Environmental health Issues (R)
5. Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity	ENVR 230 Environmental health Issues (P)	ENVR 610 Global Environmental Health Inequalities (R)
6. Explain the general mechanisms of toxicity in eliciting a toxic response to various environmental exposures	ENVR 430 Health Effects of Environmental Agents (P)	ENVR 442 Biochemical and Molecular Toxicology (R)
7. Develop a testable model of environmental insult	ENVR 430 Health Effects of Environmental Agents (P)	ENVR/ENEC 698 Environment and Ecology Capstone (P) Or ENVR 593 Undergraduate Practicum (P)

8. Describe federal and state regulatory programs, guidelines and authorities that control environmental health issues	ENVR 230 Environmental health Issues (P)	ENVR 430 Health Effects of Environmental Agents (R)

P=Primary, R=Reinforcing

Students in this degree program also develop core public health competencies as described in the Gillings Schoolwide Handbook.

Please refer to the competency matrices at the end of this document to review the learning experiences through which students in the BSPH in Environmental Health Sciences develop and attain these competencies.

Competencies	Course Number and Name	Course Number and Name	Other Learning Experiences
Biostatistics			
1. Describe the roles biostatistics serves in the discipline of public health	BIOS 600 Principles of Statistical Inference (P)	ENVR 430 Health Effects of Environmental Agents (R)	
2. Distinguish among the different measurement scales and the implication for selection of statistical methods to be used based on these directions	BIOS 600 Principles of Statistical Inference (P)	ENVR 468 Advanced Functions of Temporal GIS (R)	
3. Apply descriptive techniques commonly used to summarize public health data	BIOS 600 Principles of Statistical Inference (P)	ENVR 430 Health Effects of Environmental Agents (R)	
4. Describe basic concepts of probability, random variation and commonly used probability distributions	BIOS 600 Principles of Statistical Inference (P)	ENVR/ENEC 698 Environment and Ecology Capstone (R)	
5. Apply common statistical methods for inference	BIOS 600 Principles of Statistical Inference (P)	ENVR/ENEC 698 Environment and Ecology Capstone (R)	

Competencies	Course Number and Name	Course Number and Name	Other Learning Experiences
6. Describe preferred methodological alternatives according to the type of study design for answering a particular research question	BIOS 600 Principles of Statistical Inference (P)	ENVR 430 Health Effects of Environmental Agents (R)	
7. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question	BIOS 600 Principles of Statistical Inference (P)	ENVR/ENEC 698 Environment and Ecology Capstone (R)	
8. Interpret results for statistical analysis found in public health	BIOS 600 Principles of Statistical Inference (P)	ENVR 430 Health Effects of Environmental Agents (R)	
9. Develop written and oral presentations based on statistical analyses for public health professionals and educated lay audiences	BIOS 600 Principles of Statistical Inference (P)	ENVR 430 Health Effects of Environmental Agents (R)	
10. Apply basic informatics techniques with vital statistics and public health records. In the description of public health characteristics and in public health research and evaluation	BIOS 600 Principles of Statistical Inference (P)	ENVR 430 Health Effects of Environmental Agents (R)	
Epidemiology			
1. Explain the application of epidemiology for informing scientific, ethical, economic and political discussion of health issues	EPID 600 Principles of Epidemiology (P)	ENVR 430 Health Effects of Environmental Agents (R)	
2. Apply the basic terminology and definitions of epidemiology	EPID 600 Principles of Epidemiology (P)	ENVR 593 Undergraduate Practicum (R)	
3. Identify key sources of data for epidemiologic reports	EPID 600 Principles of Epidemiology (P)	ENVR 593 Undergraduate Practicum (R)	

Competencies	Course Number and Name	Course Number and Name	Other Learning Experiences
4. Calculate basic epidemiology measures	EPID 600 Principles of Epidemiology (P)	ENVR 593 Undergraduate Practicum (R)	
5. Evaluate the strengths and limitations of epidemiologic reports	EPID 600 Principles of Epidemiology (P)	ENVR 430 Health Effects of Environmental Agents (R)	
6. Draw appropriate inferences from epidemiologic data	EPID 600 Principles of Epidemiology (P)	ENVR 430 Health Effects of Environmental Agents (R)	
7. Communicate epidemiologic information to lay and professional audiences	EPID 600 Principles of Epidemiology (P)	ENVR 593 Undergraduate Practicum (R)	
8. Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of epidemiologic data	EPID 600 Principles of Epidemiology (P)	ENVR 430 Health Effects of Environmental Agents (R)	
9. Identify the principles and limitations of public health screening programs	EPID 600 Principles of Epidemiology (P)	ENVR 593 Undergraduate Practicum (R)	
Social and behavioral sciences			
1. Describe the role of social and community factors in both the onset and solution of public health problems.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 430 Health Effects of Environmental Agents (R)	
2. Identify the causes of social and behavioral factors that affect health of individuals and populations.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 230 Environmental Health Issues (R)	
3. Identify basic theories, concepts and models from a range of social and behavioral disciplines that are used in public health research and practice.	HBEH 600 Social and Behavioral Science in Public Health (P)		

Competencies	Course Number and Name	Course Number and Name	Other Learning Experiences
4. Apply ethical principles to public health program planning, implementation and evaluation.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 593 Undergraduate Practicum (R)	
5. Specify multiple targets and levels of intervention for social and behavioral science programs and/or policies.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 593 Undergraduate Practicum (R)	
6. Identify individual, organizational and community concerns, assets, resources and deficits for social and behavioral science interventions.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 593 Undergraduate Practicum (R)	
7. Use evidence-based approaches in the development and evaluation of social and behavioral science interventions.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 593 Undergraduate Practicum (R)	
8. Describe the merits of social and behavioral science interventions and policies.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 430 Health Effects of Environmental Agents (R)	
9. Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 430 Health Effects of Environmental Agents (R)	
10. Identify critical stakeholders for the planning, implementation and evaluation of public health programs, policies and interventions.	HBEH 600 Social and Behavioral Science in Public Health (P)	ENVR 230 Environmental Health Issues (R)	
Health Policy and Management			
1. Identify the main components and issues of the organization, financing, and delivery of health services in the U.S.	HPM 600 Intro to Health Policy and Management (P)	ENVR 430 Health Effects of Environmental Agents (P)	
2. Discuss the policy process for improving the health status of populations.	HPM 600 Intro to Health Policy and Management (P)	ENVR 430 Health Effects of Environmental Agents (R)	

Competencies	Course Number and Name	Course Number and Name	Other Learning Experiences
3. Describe the legal and ethical bases for public health and health services.	HPM 600 Intro to Health Policy and Management (P)	ENVR 432 Occupational Safety and Ergonomics (R)	
4. Apply quality and performance improvement concepts to address organizational performance issues.	HPM 600 Intro to Health Policy and Management (P)	ENVR 430 Health Effects of Environmental Agents (R)	
5. Use "systems thinking" for resolving organizational problems.	HPM 600 Intro to Health Policy and Management (P)	ENVR 593 Undergraduate Practicum (R)	
6. Use the principles of program planning, development, budgeting, management and evaluation to organizational and community initiatives.	HPM 600 Intro to Health Policy and Management (P)	HBEH 600 Social and Behavioral Sciences in Public Health (P)	
7. Communicate health policy and management issues using appropriate channels and technologies.	HPM 600 Intro to Health Policy and Management (P)	ENVR 593 Undergraduate Practicum (R)	