

**Course Title: Water-Health Research ENVR 890-005  
(McGavran 1303, Mondays and Wednesdays, 2-2:50PM)**

**Co-Instructors:**

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[other ESE Faculty involved in water-related research and who may be involved in the course include: Rose Cory, Greg Characklis, Mark Sobsey, Mike Aitken, Marc Serre]

**Purpose**

To orient students who intend to undertake research in aspects of water-health and to submit a research thesis as part of their studies.

To provide orientation in research conception, design, planning and implementation; to introduce students to a diverse range of approaches and tools that may be applied in water-related research; to coach students in development of their own research design.

**Scope and General Organization**

Presented as two sub-courses:

*Part 1* on reviewing and interpreting a body of literature, identifying a credible research focus, question and hypotheses and designing and implementing research. This 2 credit sub-course occurs in the fall semester and is intended for students in their first year after admission. Typically each issue is dealt with by an introduction by faculty member plus Q&A in one week followed by student-lead presentation the following week. Substantive preparation will be required by students between sessions.

*Part 2* providing guidance on preparation of thesis, abstract, thesis presentation and a publishable peer review paper. This 1 credit sub-course occurs in the spring semester and is intended for students in their last year before targeted graduation date. While normal contact time for a 1 credit course is 50 minutes it is anticipated that class duration will be greater than this minimum. (1.25 hours). Typically each session begins

with a brief introduction of the theme at hand and most time is spent in student discussion.

The focus on water-health provides opportunity to explore inter-disciplinary issues within this field and to use water related examples to ensure familiarity with research concepts, approaches and tools.

**Eligibility and Pre-requisites**

Course is open to PhD students and Masters students intending to prepare a research-focused dissertation or technical report on an aspect of water and health.

Undergraduate Honors students are admissible at discretion of instructors (for first course in junior or senior year as appropriate).

Course is highly discussion driven and therefore capped at 12-15 participants. Priority will be given to (a) students advised by collaborating faculty; (b) students with collaborating faculty on their committee; (c) other UNC-CH students engaged in water-related research.

**Fall Component ENVR 890-005 Part 1**

<b>ENVR 890-005 Part 1: Learning Objectives</b>	
<i>Content</i> learning objectives	<i>Skill</i> learning objectives
Familiarity with examples of major groups of research methods. Understanding of issues and limitations in considering appropriateness of methods to research questions. <ul style="list-style-type: none"> <li>• Systematic literature review and meta analysis</li> <li>• Experimental and quasi-experimental research</li> <li>• Qualitative research</li> <li>• Modeling</li> <li>• Community and survey based research</li> <li>• Mixed methods and triangulation</li> </ul> Requirements of ethics and IRBs	<ul style="list-style-type: none"> <li>• Reviewing and interpreting research study reports (papers)</li> <li>• Reviewing and interpreting a body of evidence</li> <li>• Ability to apply appropriate statistical methods to design of examples of the major research method groups</li> <li>• Research proposal writing</li> </ul>

**Curriculum**

<b>Section</b>	<b>Sessions</b>
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Course introduction	<ul style="list-style-type: none"> <li>• Understanding of course flow and structure, grading and deadlines;</li> <li>• Understanding of scope of course and of underlying theme</li> </ul>
Reviewing literature and identifying a research question	<ul style="list-style-type: none"> <li>• Reviewing a paper</li> <li>• Interpreting a body of evidence (background literature review)</li> <li>• Conducting a background literature review</li> <li>• Developing a problem statement and research question</li> <li>• Assessment part 1</li> </ul>
Developing research objective and hypotheses	<ul style="list-style-type: none"> <li>• Framing a research question, developing hypothesis/sub-questions</li> <li>• Identifying and justifying research methods</li> </ul>
Planning research approach and methods	<ul style="list-style-type: none"> <li>• Systematic literature review and meta-analysis</li> <li>• Experimental and quasi-experimental research</li> <li>• Qualitative research</li> <li>• Modeling</li> <li>• Community and survey-based research</li> <li>• Mixed methods and triangulation</li> </ul> <p>(NB each of the above will deal with (a) when is it useful (b) when is it not useful (c) overview and principles (d) basic statistics relevant to design, sample size etc and (e) issues of bias and approaches to its control)</p> <ul style="list-style-type: none"> <li>• Ethics and IRBs</li> </ul>
Writing a research proposal	<ul style="list-style-type: none"> <li>• Research-user perspectives and identifying the prospective value of research</li> <li>• Characteristics of winning proposals, perceptions and demands of grant-awarding bodies</li> <li>• Designing dissemination and promotions plans for research outputs – target audiences and mechanisms</li> <li>• Back-checking: internal and external validity, will my research answer the research question I set out with?</li> </ul>

### **Course materials**

There is no required textbook. Recommended preparatory readings will be identified for most sessions and assignments will require additional literature search and further unspecified reading.

### **Student Evaluation**

*Summary*

- Written assignments: 50%
- Class participation: 50% (25% presentation, 25% participation in discussion)

*Explanation*

Written assignments will take the form of progressive preparation of a research proposal using a format similar to that employed by many grant-awarding bodies, with corresponding guidelines and page limits. At the last meeting of each course section, each student will be expected to submit and briefly present for peer (class) comment the draft section of the corresponding part of their proposal. At the end of the course, the compiled proposal will constitute the written assignment and will be graded accordingly by the instructors.

Class participation will be graded according to the brief presentations made by students of their own assignment sections and according to their contribution to the discussion of the presentations of assignment sections made by other students. See Annex 1 for scoring criteria.

Notes:

- content evaluation is on the final submission, draft presentations are evaluated on the basis of presentation and discussion (not content).
- Honor code requirements will be strictly enforced and submission may be subject to on-line plagiarism checks.

**Spring Component ENVR 890-005 Part 2**

<b>ENVR 890-005 Part 2 Objectives</b>	
<i>Content learning objectives</i>	<i>Skill learning objectives</i>
<i>Pending</i>	<i>pending</i>

Attendees are normally expected to be in their last semester of the program in question. Spring course sessions sequentially address the issues and stages in preparing and presenting a high-quality thesis (and, or incorporating a paper for peer review journal publication), including the associated presentation and defense.

**Curriculum**

*pending*

**Course materials**

There is no required textbook.

**Student Evaluation**

*Pending*

## Annex 1: Grading of Written Assignments

Each section of the written assignment will be scored according to the following criteria. Overall grade will be based on the aggregate of scores. Guidelines and word limits will be strictly enforced (eg for a section with a 500 word maximum then no account will be taken of any text beyond the 500<sup>th</sup> word)

Score	3	2	1
Clarity	All statements are necessary and clearly expressed (precise, not open to mis-interpretation).	Some excess material not essential or included or statements not clearly expressed.	Multiple statements not clearly expressed (remainder substantively clear).
Comprehensiveness/ completeness	Report captures the full breadth of issues as described in assignment.	Report omits minor aspects of the breadth of the issue as described in the assignment that do not impact overall understanding by reader.	Report omits aspects of breadth of issue as described in assignment that would lead some readers to misunderstand the conclusion(s).
Veracity	No detected errors or ambiguity of interpretation.	Some ambiguity of interpretation and/or errors of detail having limited impact on overall conclusion.	Few examples of substantive error or ambiguity of interpretation <i>or</i> multiple examples that collectively impact on overall conclusion.
Presentation/ Structure	Report is well-structured (logical flow and structure assists reader in navigating and understanding report).	Logic flow has minor inconsistencies and/or structure unclear (eg content does not match sub-titles).	Logic flow not readily evident <i>or</i> structure substantively unclear.
Synthesis	Report successfully conveys the complexity/scale of the issue to the reader.	Reader has an incomplete outline of the complexity or scale of the issue.	Reader may substantively misunderstand the complexity or scale of the issue.

Footnotes:

For all rows a zero score applies to non-submission or performance below that of the right hand column.

## Annex 2: Grading Scheme for Student Presentations

Grades will be based on aggregate scoring for all four sub-sections of the draft proposal.

Score	3	2	1
Timekeeping (with reasonable allowance for management of interruptions)	Effectively on time eg +/- ½ minute	Slightly over or under time eg 4mins < presentation > 6mins	Substantively over or under time eg 3mins < presentation > 7mins
Slides or equivalent (includes density and relevance of information) (inadequate or omitted citations lead to a zero score)	Individual slides clearly legible. Words/figures/equivalent convey ideas clearly and support/follow spoken word.	Few slides not clearly legible or where slide material does not support spoken word.	Several slides not clearly legible and/or where slide material does not support spoken word.
Response to/management of questions and interruptions	Responds to interruptions without loss of control of presentation. Conveys the speaker as generally knowledgeable while recognizing limits of their knowledge and expertise without undermining the value of the presentation.	Listener is potentially skeptical about level of knowledge or expertise of speaker or responses perceived as not focused on question or interruptions disturb flow of presentation.	Speaker does not respond to a questions; or unfocused responses to multiple questions; or speaker conveys self as lacking basic familiarity with subject or substantively loses flow of presentation.
Flow/structure	Logical flow to presentation; component themes/messages are in balance.	Logic flow present but not self-evident to listener or some imbalance in attention given component themes/messages.	Logic flow not detectable and or several imbalances in attention given to component themes/messages.
Audience engagement* (eg not read out from notes or slides; makes eye contact; secures attention of audience)	Compelling: speaker able to engage most of audience in presentation and to elicit discussion; highly responsive to audience.	Convincing: speaker able to engage some of audience; moderately responsive to audience; some reading of presentation material or from notes.	Adequate: speaker able to engage few of audience or elicit few questions; audience attention wanders; significant direct reading and/or failure to make eye contact.

\* Audience engagement based on performance of speaker rather than actual response of audience

### **Annex 3: Grading of discussion of student presentations (ie in discussion of presentations made by other students)**

As an indication of how scoring will be performed in any given session, each student will be graded according to the *quality* of their contribution to discussion as follows:

- No intervention/question; or interventions that hinder overall development of discussion without benefit to understanding or clarification\*: 0
- Relevant comment made that is not focused on scope of assignment, or new information provided that does not contribute to developing overall (group) understanding of assignment: 1
- Intervention/question made that contributes to enhancing overall understanding of assignment theme (includes placing theme in wider context relevant to course, succinct presentation of new relevant information): 2

\*includes clarification of issues that would reasonably be expected to have been clear from core background reading or prior learning

One score will be generated per student per discussion session ie scoring is driven by quality, not quantity of participation in any given session