# Field Experiences in Natural Infrastructure

ENGR 8990
Fall 2025

**Instructional Team:** Brian Bledsoe and Kyle McKay

**Credit Hours:** 1

**Weekly schedule:** 4-day weekend (Thursday-Sunday) in the fall or spring

**Course Description:**

This experiential, field-based course will cover various topics related to the planning, design, and execution of natural infrastructure for water resource management. Students will explore these topics through fieldwork components, engaging in hands-on activities and gaining practical experience. Field sites around Athens and/or coastal GA will be visited to observe and study the interaction of natural systems and infrastructure. These activities aim to deepen understanding of concepts discussed in other UGA courses on natural infrastructure and nature-based solutions to bridge the gap between theoretical knowledge and real-world application. The course also offers a unique opportunity for students to collaborate with professionals, experts, and local stakeholders involved in diverse ecosystems. To achieve a stimulating and immersive learning experience, this interdisciplinary course is intended for students from engineering, ecology, environmental design, natural resources, marine sciences, anthropology, economics, and other relevant and related fields. Safety protocols and guidelines will be provided to ensure the well-being of all participants during fieldwork.

**Teaching Mode:**

The primary teaching mode for the field-intensive course is fieldwork, where students actively engage with experts to visit and interact with a wide range of ecosystems. Guided field trips to relevant sites will be organized, enabling students to observe and study real-world examples, interact with professionals, and deepen their understanding of water systems. The instructor will also incorporate demonstrations and experiments to illustrate key concepts and techniques.

**Representative Case Studies and Field Activities:**

- *Freshwater semesters*: various stormwater Green Infrastructure (GI) sites, Tanyard Branch, Middle Oconee River to discuss environmental flows, Bear Creek Reservoir, White Dam, Alcovy Wetland, stream geomorphic surveys, benthic invertebrate sampling

- *Coast semesters*: living shorelines, oyster reefs, barrier islands, salt marshes, Thin Layer Placement of Dredged Materials, coastal stormwater GI, horizontal levees, other forms of Beneficial Uses of Dredged Material

**Course objectives:**

Upon completion of this course, students will be able to:

1. Understand the principles and concepts of natural infrastructure and its role in water resource management.
2. Analyze the complex interactions between natural systems and built infrastructure within the context of water resource management.
3. Apply theoretical knowledge to real-world scenarios through fieldwork activities focused on natural infrastructure.
4. Develop practical skills in assessing, designing, and implementing natural infrastructure for effective water resource management.
5. Evaluate the environmental, social, and economic benefits and challenges associated with natural infrastructure projects.
6. Collaborate effectively with professionals, experts, and stakeholders to address complex issues related to natural infrastructure.
7. Critically evaluate the effectiveness and performance of natural infrastructure projects in improving water resource management.
8. Foster an interdisciplinary approach by integrating knowledge from diverse fields to enhance natural infrastructure practices.
9. Investigate policy frameworks and regulatory considerations relevant to the planning and implementation of natural infrastructure projects.
10. Reflect on personal and professional growth in understanding the value and potential of natural infrastructure in addressing challenges in water resource management.

**Safety precautions:**

Safety is of paramount importance during this field-intensive course, as students will be actively engaged in fieldwork, which may involve traversing challenging terrains. To ensure the well-being of all participants, it is crucial to adhere to safety protocols and guidelines. Students and instructors will pack the following essential items to promote safety in the field:

- Personal protective equipment
- Safety gear like helmets and high-visibility vests if necessary.
- First aid kit to address minor injuries and provide basic medical assistance.
- Sun protection — sunscreen, sunglasses, and hats
- Hydration and nutrition — Sufficient water and energy-rich snacks to stay hydrated and nourished
- Permits or other documents as determined by instructors

**Evaluations:**

Competencies to be obtained in this course: A - Systems thinking competency; B - Anticipatory competency; C - Normative competency; D - Strategic competency; E - Collaboration competency; F - Critical thinking competency; G - Self-awareness competency; H - Integrated problem-solving competency

The following evaluation methods will be used to assess student performance in the course:

- **Fieldwork Performance:** Students' active participation and demonstration of practical skills during fieldwork activities will be evaluated. This assessment fosters the development of collaboration competency by requiring students to work effectively in teams and engage with professionals and stakeholders. It also encourages systems thinking competency as students observe and analyze the complex interactions between natural systems and built infrastructure.

  **Competencies to be developed: A & E**

- **Fieldwork Reports:** Students will submit reports based on their fieldwork activities, which contribute to the development of critical thinking competency. These reports should showcase students' understanding of the observed interactions, their ability to critically analyze the data collected, and their reflection on the experiences. Additionally, the reports provide an opportunity for students to integrate problem-solving competency by proposing practical solutions based on their analysis.

  **Competencies to be developed: F & H**

- **Presentations:** Individual or group presentations on selected topics related to water systems, nature-based solutions, or case studies enhance critical-thinking competency as students articulate their knowledge, analyze data, and engage in discussions. Collaboration competency is also developed as students interact with peers and present their findings and insights. Additionally, self-awareness competency is fostered as students reflect on their progress and receive feedback from their peers and instructors.

  **Competencies to be developed: E, F & G**

- **Self-Reflection:** Throughout the course, students will engage in self-reflection exercises, promoting self-awareness competency. They will assess their personal and professional growth, identify areas for improvement, and set goals for further development. This reflective practice encourages students to reflect on their learning, values, and the potential of natural infrastructure in addressing water resource management challenges.

  **Competencies to be developed: G**

**Grading and Assessment:**

There are no assignments. Grades will be allocated for active participation in course (50%) and active participation in group project and exercise (50%). All grades are final.