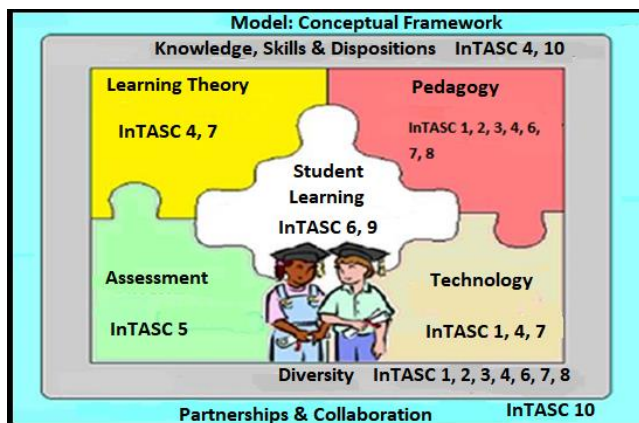


Course Syllabus
Campbellsville University
Division of Natural Science

I. Title of Course: **ENV 516, Stream Ecology for Teachers, 3 semester hours**



II. Course Description: A study of the ecology of freshwater lakes and rivers.

III. Course Objectives:

- a. To provide students with general knowledge of freshwater ecosystems.
- b. To expose students to a variety of methods used in freshwater biology.
- c. To provide students with knowledge sufficient to prepare them for additional study or employment in aquatic biology or environmental education.

IV. Course outline:

- a. Water as a resource.
- b. Physical and chemical characteristics of water
- c. The origins and features of lake basins and stream channels
 1. Hydrologic cycle
 2. Hydrologic processes in streams
 3. Hydrologic processes in lakes and reservoirs
- d. Overview of aquatic organisms
- e. Viruses, bacteria, algae, protozoa, avascular plants, vascular plants
- f. Invertebrate animals
- g. Fishes
- h. Aquatic biodiversity issues
- i. Water chemistry
 1. Oxygen
 2. Carbon
 3. Nitrogen and phosphorus
- j. Chemical toxicants and pollutants
- k. Nutrient acquisition, storage and cycling
- l. Eutrophication

- m. Community ecology
- n. Freshwater ecosystems

V. Evaluation: Final grades will be determined by student performance on lecture exams (40%) and on other assignments (60%). Grade will be determined from 3 one-hour examinations and a final exam. The final may consist of old and new material or all new material. All exams will be announced 2 weeks in advance. Grades will be calculated on a 10-point scale. Other assignments including curriculum development/aquatic lesson plans and research paper and presentations on aquatic subjects of environmental interest will determine the remainder of the grade. For clinical experience, students will demonstrate subject matter and technical proficiency by conducting a student-led field trip for a minimum of FOUR HOURS. The project will address the relationship of one or more course topics in aquatic biology to the environment in an instructional setting. Candidates are to submit a clinical hour form. In addition to these evaluative assignments, students are expected to complete an aquatic invertebrate collection. The collection will emphasize and demonstrate knowledge regarding identification, taxonomy and systematics as well as the use of aquatic invertebrates in environmental analysis. The collection will consist of a minimum 10 Orders, 20 Families and 20 Genera.

Exams/Quizzes	100-200 points
Research Paper and Presentations	100 points
Student Leadership Project	200 points
Taxonomy/ID project	100
Total	500-600 points

PROFESSIONAL STANDARDS addressed in this course:

Aligned with→ Assessment→ (point values)	KTPS/ InTASC Diversity Indicators	KTPS/ InTASC	ILA Standards	Technology (Yes or No)	SPAs (NAAEE Guidelines)	CAEP
To provide students with general knowledge of freshwater ecosystems. Exams/Quizzes Taxonomy/ ID Project	4M	4J, 4L, 4M, 4P, 5J, 5M	1.1, 5.3	Yes	1.2, 1.3, 3.3	1.1, 1.2, 1.3, 3.1

To expose students to a variety of methods used in freshwater biology. Research Paper/ Presentation Clinical Hours		4A,C,G,H, 5B, C	1.1	Yes	1.1, 1.2, 1.3, 2.1, 3.1	1.1, 1.2, 1.3, 3.1
To provide students with knowledge sufficient to prepare them for additional study or employment in aquatic biology or environmental education. Student Leadership Project		5J, 5K, 9N	1.1, 2.2, 6.1, 6.3, 7.1	Yes	Various	1.1, 1.2, 1.3, 3.1

CU Diversity Proficiencies (from KTPS)

1B The teacher creates developmentally appropriate instruction that takes into account individual learners' strengths, interests, and needs and that enables each learner to advance and accelerate his/her learning.

1G The teacher understands the role of language and culture in learning and knows how to modify instruction to make language comprehension and instruction relevant, accessible, and challenging.

2H The teacher understands students with exceptional needs, including those associated with disabilities and giftedness, and knows how to use strategies and resources to address these needs.

2N The teacher makes learners feel valued and helps them to learn to value each other.

3F The teacher communicates verbally and nonverbally in ways that demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives learners bring to the learning environment.

4M The teacher knows how to integrate culturally relevant content to build on learners' background knowledge.

6G The teacher effectively uses multiple and appropriate types of assessment data to identify each student's learning needs and to develop differentiated learning experiences.

7B The teacher plans how to achieve each student's learning goals, choosing appropriate strategies and accommodations, resources, and materials to differentiate instruction for individual and groups of learners.

9H The teacher knows how to use learner data to analyze practice and differentiate instruction accordingly.

10Q The teacher respects families' beliefs, norms, and expectations and seeks to work collaboratively with learners and families in setting and meeting challenging goals.

Interstate Teacher Assessment and Support Consortium **(InTASC)**

InTASC 1 Learner Development

InTASC 2 Learner Differences

InTASC 3 Learning

Environments

InTASC 4 Content Knowledge

InTASC 5 Application of
Content

InTASC 6 Assessment

InTASC 7 Planning for
Instruction

InTASC 8 Instructional
Strategies

InTASC 9 Professional Learning and Ethical Practice

InTASC 10 Leadership and Collaboration

International Literacy Association **(ILA)**

Standard 1 Foundational Knowledge

Standard 2 Curriculum and

Instruction Standard 3

Assessment and Evaluation

Standard 4 Diversity

Standard 5 Literate Environment

Standard 6 Professional Learning and
Leadership

**Council for Accreditation of Educator
Programs (CAEP)**

Standard 1 Content and Pedagogical
Knowledge Standard 2 Clinical
Partnerships and Practice

Standard 3 Candidate Quality, Recruitment, and
Selectivity Standard 4 Program Impact

Standard 5 Provider Quality Assurance and Continuous Improvement

**Specialized Professional Association (SPA)
Standards**

(i.e. early childhood, special education, school
counselors)

NAAEE Standards for the Initial Preparation of Environmental Educators

1. STANDARD 1. Nature of Environmental Education and Environmental Literacy. Candidates demonstrate knowledge of the evolution, purposes, defining characteristics, and guiding principles of environmental education, as well as the fundamentals of environmental literacy. They understand that environmental education is an evolving field. This knowledge provides a solid foundation on which environmental educators can develop and continue to improve their own practice. [Note: This standard relates to the ability of the candidates to define environmental education and the components of environmental literacy. Standard 2 relates to the degree to which the candidates are themselves environmentally literate.]
 - 1.1 Candidates demonstrate an understanding of how environmental education has evolved over time and continues to change.
 - 1.2 Candidates demonstrate an understanding of the defining characteristics and guiding principles of environmental education.
 - 1.3 Candidates demonstrate an understanding of the components of environmental literacy.
2. STANDARD 2. Environmental Literacy of Candidates. Candidates demonstrate the knowledge, skills, and dispositions associated with environmental literacy. They use technology as a tool for collecting, analyzing and communicating information about the environment. [Note: Standard 2 relates to the degree to which the candidates are themselves environmentally literate. Standard 1 relates to the ability of the candidates to define environmental education and define the components of environmental literacy.]
 - 2.1 Candidates demonstrate environmental inquiry skills, and use technology as a tool to answer their own questions.

2.2 Candidates demonstrate an understanding of the processes and systems that comprise the environment, including Earth as a physical system, the living environment, and human social systems and influences.

2.3 Candidates identify, select and investigate environmental issues and use technology as a tool when conducting these investigations.

2.4 Candidates demonstrate an understanding of the importance of exercising the rights and responsibilities of environmental citizenship.

2.5 Candidates identify and evaluate the need for action on specific environmental issues, identify possible action projects, and evaluated potential outcomes of those action projects.

2.6 Candidates use the results of their investigations to plan, carry out, and evaluate action projects designed to address selected environmental issues.

3. **STANDARD 3. Learning Theories and Knowledge of Learners.** Candidates demonstrate an understanding of theories of learning and human development, learning processes, and individual differences. They demonstrate respect for their students as unique individuals. Candidates apply this knowledge to create positive, effective and responsive learning environments for all students³ in environmental education.

3.1 Candidates impact diverse students' learning by applying theories of learning and development when planning, delivering, and improving environmental education instruction.

3.2 Candidates impact diverse students' learning by applying an understanding of learning processes when planning, delivering, and improving environmental education.

3.3 Candidates impact diverse students' learning by applying an understanding of ability levels and cultural and linguistic backgrounds when planning, delivering, and improving environmental education instruction.

4. **STANDARD 4. Curriculum: Standards and Integration.** Candidates demonstrate an understanding of how the unique features of environmental education can be used in the design and enrichment of standards-based curricula and school programs.

4.1 Candidates align NAAEE's Guidelines for Learning (PreK-12) and associated environmental literacy components with national, state, and district content standards.

4.2 Candidates use alignment results to select, adapt, and develop environmental education curricular and instructional materials.

4.3 Candidates seek opportunities to integrate environmental education into standards-based curricula and school programs.

5. **STANDARD 5. Instructional Planning and Practice.** Candidates identify and differentiate among a variety of instructional strategies and tools, including instructional technology that enhance environmental learning. They plan and deliver instruction that promotes environmental literacy and creates stimulating and motivating climates for learning for diverse learners.

5.1 Candidates describe and critically review a range of instructional materials, resources, technologies, and settings for use in environmental education.

5.2 Candidates impact students' learning by selecting and implementing instructional strategies and technologies that meet diverse students' needs and lead to the development of environmental literacy.

5.3 Candidates develop technology- rich environmental education instructional plans that address diverse students' needs.

5.4 Candidates impact diverse students' learning by delivering developmentally, culturally and linguistically appropriate and effective environmental education instruction.

6. STANDARD 6. Assessment. Candidates possess the knowledge, abilities, and commitment to make assessment integral to curriculum and instruction in environmental education, thereby fostering continuous intellectual, social, emotional, and physical development of each student. Candidates demonstrate an understanding of how assistive technologies can be used in assessment. Candidates use assessment as a means of on-going evaluation of effective teaching and learning.

6.1 Candidates integrate assessment that meets the needs of diverse students into environmental education instruction.

6.2 Candidates impact diverse students' learning by using assessment data, collected and analyzed with the aid of technology, to inform environmental education instruction.

6.3 Candidates impact diverse students' learning by communicating assessment results and achievement to appropriate individuals.

7. STANDARD 7. Professional Growth in Environmental Education. Candidates recognize the importance and benefits of belonging to a professional community, and understand that professional development is a life-long endeavor and an indispensable asset to becoming a contributing member of the environmental education profession. Candidates understand and accept the responsibilities associated with practicing environmental education.

7.1 Candidates identify the benefits and recognize the importance of belonging to a professional environmental education community.

7.2 Candidates engage in environmental education professional development opportunities, including technology-based opportunities.

7.3 Candidates provide accurate, balanced, and effective environmental education instruction.

7.4 Candidates develop a rationale for environmental education and understand the need to advocate for the field of environmental education.

VI. Requirements:

- a. Students are expected to read associated text and handouts as assigned and be prepared to discuss these and related topics in class.
- b. Regular and punctual attendance is expected and required as is specified in the student handbook. Students should notify the instructor within two days of an exam if an exam is missed for a valid reason (death, sickness) in order that a makeup exam may be scheduled. Otherwise, there are no excused absences.
- c. The course will involve field trips where students may get wet or dirty. Students will be required to dress accordingly.
- d. Students will develop aquatic biology/ecology lesson plans/curricula using local aquatic resources including the watershed, pond, streams and springs of Campbellsville University's Clay Hill Memorial Forest.

- e. Students will apply problem solving skills to a contemporary aquatic environmental issue. This may take the form of an individual or group report.
- f. Graduate students will complete an aquatic invertebrate collection and environmental analysis based on that collection to demonstrate a higher level of subject matter expertise and application and synthesis of knowledge.
- g. Students are expected to demonstrate academic integrity. Cheating or plagiarism will not be tolerated. Academic dishonesty may lead to the students' dismissal from the course.
- h. Students will turn off all cell phones during class.

VII. Security

In case of emergency call: (270) 789-5555 Campus Security Office
(270) 403-3611 Security cell phone

VIII. Disability Statement

Campbellsville University is committed to reasonable accommodations for students who have documented learning and physical disabilities, as well as medical and emotional conditions. If you have a documented disability or condition of this nature, you may be eligible for disability services. Documentation must be from a licensed professional and current in terms of assessment. Please contact the Coordinator of Disability Services at 270-789-5192 to inquire about services.

IX. Literature

Hall, Gordon E. Reservoir fisheries and limnology. QL627.R48
 Welch, E.B. Ecological effects of wastewater: applied limnology and pollution effects. QH545.S49
 Wetzel, Robert. Limnological analyses. QH96.57.A1
 Lind, Owen. Handbook of common methods in limnology. QH96.57.A1L55
 Thornton, K.W. Reservoir limnology. QH541.5.R4.R47
 Dudley, D. Aquatic insects. QL472.W54
 Ford, Timothy. Aquatic microbiology: an ecological approach QR105.A73
 Hackney, C.T. Biodiversity of the southeastern United States: aquatic communities. QH104.5s59B56
 Ward, J.V. Aquatic insect ecology. QL472.W37
 Werner, S. Aquatic chemistry: an introduction emphasizing chemical equilibria in natural waters. QB855.S78
 Wilber, C.G. Turbidity in the aquatic environment: an environmental factor in fresh and oceanic waters GB665.W556
 Rheinheimer, G. Aquatic microbiology. QR105.R49513
 Fassett, N. Manual of aquatic plants, QK105.F3
 McCafferty, W. Aquatic entomology: the fisherman's and ecologists' guide...QL473.M35

Merritt, R.W. Introduction to the aquatic insects of North America. QL473.I57
Pennak, R.W. Freshwater invertebrates of the US. QL141.P45
Hotchkiss, Neil. Common marsh, underwater, and floating leaved plants of the US
and Canada. QK115.H67
Muirhead-Thomson, R. Pesticides and freshwater fauna. QP82.2.P4
Anonymous. Entrophication: causes, consequences, correctives...QH96.A1 I63
Prescott, G.W. Algae of the western Great Lakes area...QK571.P67