Course code: BIOL3462
Course Title: THE ECOLOGY OF FRESHWATERS
Credits: 3
Level: 3
Semester: 2

Pre-requisites: Either BIOL1262 Living Organisms I and BIOL1263 Living Organisms II or BIOL1261 Diversity of Organisms OR (BIOL1065 Diversity of Plants and Animals and AGRI1012 Microbiology) AND (BIOL2XXX Fundamentals of Ecology OR BIOL1462 General Ecology and Biometry).

Anti-requisite: BIOL2062 Freshwater Biology

COURSE DESCRIPTION:
This course provides an overview of characteristics, biodiversity and ecology of freshwater systems, e.g. rivers, lakes, wetlands, and other low salinity inland aquatic environments. The course will cover the characteristics and variety of freshwater systems; the diversity, biology and ecology of living organisms found associated with these systems; the structure and function of freshwater communities and ecosystems; threats to freshwater systems and management strategies to provide sustainable benefits for ecosystems and human wellbeing.

Students are expected to have a basic foundation in ecology and biodiversity. In addition to providing a foundation of theoretical knowledge, this course will emphasise practical skills and expose students to field and laboratory approaches for studying freshwater systems. It is an interactive ‘hands-on’ course where students are expected to prepare, participate and perform in an active way to engage with the content in a variety of ways. Assessment is designed to encourage students to work continuously with the course materials, explore and critically analyse research in this rapidly developing field.

PURPOSE OF THE COURSE/RATIONALE:
This is a core course for the Ecology & Environmental Biology specialisation in the Department of Life Sciences and is an essential area in environmental sciences, environmental biology and environmental management. It also broadens the scope of studies in biology, plant biology and zoology.

Freshwater systems are diverse environments that support unique communities of organisms and provide invaluable ecosystem services for human survival and well-being. At the same time they are heavily impacted by humans since they integrate all activities on land, in the water and even the atmosphere. Understanding of these systems is necessary for their effective management.

INSTRUCTOR INFORMATION:
Name of course coordinator: Mary Alkins-Koo
Office address and phone: Room 218, Zoology offices, Floor 2, New wing, Natural Sciences Building
Email address: Mary.Alkins-Koo@sta.uwi.edu
Office hours: Mondays 10-11am, Fridays 11-12am
Preferred method of contact: Email
Communication policy: Students should use their UWI email account for communication and can expect a response within 48 hours.

LETTER TO THE STUDENT:
Welcome to ‘The Ecology of Freshwaters’. In this course you will be introduced to freshwater systems which provide essential water resources and food, they moderate the impact of natural disasters and provide many other ecosystem services essential for human survival and wellbeing. The course will be taught in blended mode comprising both face-to-face and online delivery. You are expected to engage with the materials provided online, in face-to-face lectures and tutorials as well as explore and interact with these to develop the essential skills of critical thinking (clarity, accuracy, relevance, logic, breadth, depth, precision, significance, completeness and fairness). Activities will be diverse and you are strongly encouraged to ask questions, offer new ideas, problem solve and think innovatively to maximise the value of your learning experience.

Please read the Course Outline carefully and keep the Course Schedule close to hand as it contains all the activities and assessments during the semester. In particular take note of the policy on plagiarism and attendance requirements.

We are here to ensure your success in this course and at UWI generally and encourage you to come to us with any academic or other challenges you may face that could affect your attendance and performance.

I look forward to meeting each of you and engaging in productive stimulating discussions over the coming semester.
Dr Mary Alkins-Koo.
Course Coordinator

CONTENT:
Topics will include:
- Origins and distribution of freshwaters
- Physicochemical characteristics of freshwaters
- Freshwater habitats and biodiversity
- Ecology of running waters
- Ecology of standing waters
- Ecology of freshwater wetlands
- Human interactions with freshwater systems
- Investigating freshwater systems

GOALS/AIMS:
This course aims to
- Introduce students to the characteristics and diversity of freshwater systems
- Develop a student’s competence in the methods and approaches for research in freshwater systems
- Expand a student's knowledge of the diversity and biology of living organisms by reference to freshwater organisms in particular
- Review the ecology of a range of freshwater systems stressing general concepts that allow for an understanding of their biodiversity, community structure and function
- Evaluate the range of benefits derived from these systems, how humans interact with them, and suggest approaches for managing and living sustainably with such ecosystems.

GENERAL OBJECTIVES:
The general objectives of this course are to
• provide course materials, activities and assessment using both face-to-face and online modalities
• facilitate opportunities for students to engage with general concepts and specific examples to develop a comprehensive understanding of the nature of freshwater systems and their biodiversity
• guide students in critically analysing and exploring questions in freshwater biology and ecology using investigative hands-on approaches
• facilitate discussion on the relationship between freshwater systems and human wellbeing and solutions for ensuring sustainable provision of such benefits

**LEARNING OUTCOMES:**
At the end of this course students should be able to
• Give examples of the diversity of freshwater systems, compare them and discuss their distinguishing characteristics
• Describe the physicochemical characteristics of a range of standing and running waters and discuss and evaluate the factors which determine these physicochemical features
• Review and evaluate the methods used for measuring basic physicochemical parameters and sampling the biota in a range of freshwater systems in a variety of contexts
• Give examples of the major groups of freshwater flora and fauna and describe their biology (classification, distinguishing features) and ecology (habitats, adaptations, interactions)
• Discuss the factors that determine the distribution and abundance of freshwater biota in standing and running waters
• Discuss the physicochemical and biotic factors that influence the structure and function of freshwater communities
• Review concepts and hypotheses accounting for the structure of ecological communities in standing and running waters and their functioning in terms of transfer of energy and nutrients
• List the values of freshwater systems, describe the range of human uses of these systems, and discuss human impacts on freshwater environments, communities and ecosystems
• Propose general approaches for management of these systems based on a scientific understanding of these systems.

**COURSE ASSESSMENT:**
Assessment will be based on a student’s final mark from the coursework components below.

<table>
<thead>
<tr>
<th>Component</th>
<th>% Final Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>Final exam</td>
<td>50%</td>
<td>2-hour written exam with 5 essay questions</td>
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<tr>
<td>Coursework</td>
<td>50%</td>
<td>Broken down as follows:</td>
</tr>
<tr>
<td>In-course tests</td>
<td>20%</td>
<td>2 tests (each 10%) based on multiple choice, true/false, short response questions or essay</td>
</tr>
<tr>
<td>Tutorials, online activities</td>
<td>10%</td>
<td>Performance in face-to-face and online discussions and activities</td>
</tr>
<tr>
<td>Practicals</td>
<td>20%</td>
<td>Performance and reporting of 4 practical exercises</td>
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**ASSIGNMENTS:**
• 2 coursework tests (20%): 2 tests (each 10%) each 50 minutes duration including multiple choice, true/false, short response questions
• Tutorials, online activities (10%): Continuous evaluation of participation and performance and contributions throughout the semester (discussions, wiki/glossary, blogs)
• Practicals (20%): Practical performance and reporting of 4 practical exercises during the semester

EVALUATION:
• Feedback on the course will be obtained informally from students on an ongoing basis by regular interactions and meetings among students, demonstrators, teaching assistants and the Course Coordinator in practicals and tutorials.
• Formal feedback will be via election of Class Representatives who sit on the Departmental Student-Staff Liaison Committee meetings held twice during the semester. Class reps will channel both concerns and commendations to the meeting as guided by the Department’s Standard Operating Procedures.
• Formal evaluation of the entire course will be accomplished via a UWI Course Evaluation questionnaire administered anonymously and confidentially at the end of the semester.
• All feedback will be considered on an ongoing basis and corrective action or adjustments made or discussed with students promptly or incorporated the following year.

TEACHING STRATEGIES:
Contact hours: 36 h
Lectures: 22 h
Tutorials: 6 h
Practicals: 8 h (4 x 4 h = 16h practicals)

• Lectures: Lectures will provide valuable synthesis and evaluation of the growing body of available information, update current issues and events, and prioritise content relevant to course assessment.
• Practicals: Fortnightly practicals will provide hands on experience for students to gain skills required for conducting well designed field and laboratory sampling and experiments in a variety of situations; to problem solve and trouble shoot in real-life situations; and gain a better appreciation of the environment and the organisms of freshwater systems. Participation and performance in the practicals will be assessed as well as reports based on the practical activities.
• Tutorials: Tutorials will cover course topics in a highly interactive format using a variety of collaborative active learning techniques. In addition to clarifying details of course content, specific transferrable skills will be addressed e.g. essay and report writing, critiquing and oral presentation.
• myelearning: The online teaching tool, myeLearning, will be used extensively during this course for
  • communication among students and staff (email, discussions)
  • official posting of important notices (coursework assessment notices, instructions, and in-course results)
  • provision of course details, lecture notes, practical guides, tutorial briefings
  • provision of recommended resource materials and links to resources on specific websites
  • self-test quizzes, questionnaires, surveys
  • interactive activities such as discussions, wikis, glossaries, blogs

RESOURCES:
Most resources are available myeLearning including
• Lecture presentations including learning objectives, summaries, recommended readings and links to papers, articles and websites with interactive resources and videos for those who prefer to learn using these modalities
‘General Resources’ provides direct links to general websites, articles and publications relevant to the whole course
Tutorials may have specific supporting resources particularly on skills development

Essential and Recommended texts are in the Reserve Section, UWI Main Library or via links in the course outline and myelearning

Readings:

Web links:

**COURSE CALENDAR:**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURES</th>
<th>PRACTICALS</th>
<th>TUTORIALS</th>
<th>Assignments</th>
</tr>
</thead>
</table>
| 1.   | 1. Course Introduction  
2. Origins and distribution of freshwaters | | | |
| 2.   | 3. Physicochemical parameters  
4. Physicochemical parameters | Tutorial 1 | | |
| 3.   | 5. Freshwater habitats and biota  
6. Diversity and scale in running waters | Practical 1: Investigating freshwaters | | |
| 4.   | 7. Conditions and microdistribution  
8. Longitudinal patterns in rivers | Tutorial 2 | | |
| 5.   | 9. River ecosystems  
10. River Continuum Concept | Practical 2: River ecology | | |
| 6.   | 11. Floodplain Rivers  
12. Flood-Pulse Concept | Tutorial 3 | In-course Test 1 |
| 7.   | 13. Diversity of standing waters  
14. Stratification and mixing | Practical 3: Pond ecology | | |
| 8.   | 15. Lake communities  
16. Lake ecosystems | Tutorial 4 | Online activity |
| 9.   | 17. Tropical lakes  
18. Freshwater wetlands | Practical 4: Data analysis & report writing | | |
| 10.  | 19. Temporary waters  
20. River regulation | Tutorial 5 | | |
| 11.  | 21. Watershed processes & management  
22. Pollution | Tutorial 6 | | |
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<td>12.</td>
<td>23. Freshwater ecosystems and human well being</td>
<td>In-course Test 2</td>
</tr>
<tr>
<td>13.</td>
<td>24. Revision/review</td>
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**ADDITIONAL INFORMATION:**
- Students are reminded that they must attend a minimum of 75% of the practical sessions and tutorials. Failure to do so will result in debarment from the final examination.
- As a general principle, medicals or other excuses may only excuse a student’s presence at an assigned time. Students must still complete the assigned work (make-up lab report or make-up test) in order to obtain the marks for that item of coursework. The student is responsible for liaising with the Course Coordinator or Teaching Assistants to ensure the assigned make-up is completed.
- Students are hereby informed that plagiarism is forbidden and all unsupervised coursework items must be accompanied by a Coursework Accountability Statement in order to be assessed. Specific items may require submission through Turnitin on myeLearning. Refer to ‘University Regulations on Plagiarism’ available from [http://sta.uwi.edu/resources/documents/Exam_Regulations_Plagiarism.pdf](http://sta.uwi.edu/resources/documents/Exam_Regulations_Plagiarism.pdf).

**HOW TO STUDY FOR THIS COURSE:**
- Attendance is mandatory for lectures, tutorials and practicals. Prior preparation is strongly advised to able to fully participate in activities and obtain the full value of the sessions.
- Thorough use should be made of the resources provided and students are strongly advised to become familiar with them and start utilising them from the first week. Regular updates on course progress and materials are also highly recommended and you should be checking into myelearning on a frequent regular basis to review materials, assignments and activities.
- Students are encouraged to interact regularly with staff on their projects, even outside of the assigned tutorial times to ensure prompt, satisfactory solution of any problems and to monitor progress.