**Course Syllabus for a Short Course on Plant Ecophysiology in the Southern Appalachian Mountains – (June 2025)**

**Instructors:**

Dr. Howard S. Neufeld, Department of Biology, Appalachian State University, Boone, NC

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**Syllabus**

The class will be divided between learning instrumentation, using instrumentation, and engaging in field work. Evenings will be reserved for holding discussions about ecophysiological topics learned that day. In the second week of the course, students will conduct a field experiment of their choosing concerning the ecophysiology of plants native to the Southern Appalachian Mountains, and then present those results at the end of that week.

We will also visit various unique habitats in the Southern Appalachians, such as forest understories in both deciduous and evergreen habitats, streamside habitats, balds, and rock outcrops. Each of these habitats support unique assemblages of plants with diverse ecophysiological adaptations.

Students will be graded on their proficiency in learning instrumentation and theory, and on their field work, experiments, and presentations. There will be one open-book essay exam. The grading schema is as follows:

Proficiency and Use of Instrumentation: 25%; Field Work: 25%; Field Trips: 15%

Exam: 15%; Presentations: 20%; The grading scale can slide depending on class performance.

**Literature Required**

The instructor will provide papers for reading and discussions as well as handouts that provide protocols for operating the various instruments used.

**Class Schedule**

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| **Month** | **Time of Day** | | |
| **Morning** | **Afternoon** | **Evening** |
| Monday  May 22 | Welcome and Hike in Botanical Garden/Forest | Introduction to Plant Water Relations | Discussions on Plant Water Relations |
| Tuesday  May 23 | Measuring Water Potentials\* | Measuring Pressure-Volume Curves | Discussions on Diurnal Trends in Plants |
| Wednesday  May 24 | Measuring Plant Hydraulics | More on Plant Hydraulics | Discussions of Plant Hydraulics |
| Thursday  May 25 | Introduction to Gas Exchange Theory | Measuring Plant Gas Exchange in the Field | Discussions of Plant Gas Exchange |
| Friday  May 26 | Measuring Light Response Curves | Measuring Plant Gas Exchange in the Field | What do Plants do at Night? |
| Saturday  May 27 | Measuring Responses of Plants to Rising CO2 | Plant Responses to CO2 in the Field | Discussion of Climate Change Impacts |
| Sunday  May 28 | Day Off | | |
| Monday  May 29 | Field Trip to the Smokies – Relating Habitats and Plant Ecophysiology | | |
| Tuesday  May 30 | Setting Up Field Experiments | More Field Work and Pigment Analyses | Discussion of Experimental Design |
| Wednesday  May 31 | Experiments in the Field | Continued Field Work | Data Analysis |
| Thursday  June 1 | Further Data Analyses\*\* | Preparation of Presentations | Roundtable Discussions |
| Friday  June 2 | Presentations | Presentations | Relaxing Dinner and Farewell |

\*Trip to Satulah Mountain rock outcrop site, which is in Highlands

\*\*Trip to McKinney Meadow, a grassy field site in Cashiers, a town near Highlands

**Field Trips**

Much of the work we do in this course will be field-oriented and take place on the campus of the Highlands Biological Station. However, we will visit other sites such as Satulah Mountain, where we can see plants adapted to growing on rock outcrops, McKinney Meadows, where we can see old-field plants, and of course, the Smokies where we will follow changes in habitats as we move from low elevation cove-hardwood forests to high elevation spruce-fir forests and grassy balds. We will view each of these unique habitats in the context of how plants adapt their physiology to cope with both environmental stresses as well as dealing with competition from neighboring species.