ES/BL 307 - CLIMATE AND THE VEGETATION IN THE BLACK FOREST AND THE SWISS ALPS
IES Abroad Freiburg

DESCRIPTION:
Students will be introduced to the climate, regional climates and some microclimates in the Black Forest and the Swiss Alps and their impact on vegetation. Students will learn to recognize vegetation zones. They will also learn about the Biosphere-Atmosphere interactions and how to measure different climatic and physiological parameters that are relevant for vegetation development. They will be able to detect microclimatic influences on habitats. Moreover they will be capable to understand possible influences of climate warming and fluctuations on the vegetation cover. This course includes several half / and full-day excursions / field trainings.

CREDITS: 3 credits

CONTACT HOURS: 45 hours

LANGUAGE OF INSTRUCTION: English

PREREQUISITES: Basic knowledge of climate/weather and vegetation ecology, enjoy the outdoors and be moderately fit for hikes (6 miles/ 10 km; 2600 feet altitude difference/800m in one day).

ADDITIONAL COST: None

METHOD OF PRESENTATION:
- Lectures
- Student summaries
- Seminar discussions
- Student presentations
- Group work
- Field studies

Additional material comes from Moodle. This platform is also the place to share assignments and to follow recent developments in the field. Participation is part of the student's grade, therefore it is expected that all students contribute during classes.

REQUIRED WORK AND FORM OF ASSESSMENT:
- Course participation - 20%
- Short presentation in small groups – 20%
- Field trip reports - 30%
- Final Exam - 30%

LEARNING OUTCOMES:
By the end of the course students will be able to:
- understand that the current vegetation cover is a result of previous and actual regional climates and microclimates
- demonstrate special aspects about alpine climate
- recognize important plant species which were examined during the course to show climatic adaption and resilience
- prescribe how climate influences the distribution and composition of the vegetation and how the plant cover can influence climate
- analyze vertical vegetation zones and their response on climatic fluctuations
- analyze the impact of regional climate and microclimate on the physical form of alpine plants
- measure meteorological parameter of the air, parameter of the soil and physiological parameter of different low level and alpine plants.

- use Assmann´s Aspirated Psychrometer, thermometers, laser thermometers, barometer, photometer and a fluorometer and understand how they work
- drill core samples and to interpret those concerning climatic influence
- differentiate the plasticity of plants and plant societies in respect of global warming
- assess ecological risks and opportunities under changing environmental conditions.
- communicate the gained knowledge in oral (short presentation, discussions, round table discussions) and written form (field report)

Attendance Policy (see also the detailed version on Moodle ESS Academics page)

IES Abroad courses are designed to utilize the unique contribution of the instructor; the lecture/discussion format is regarded as the **primary mode of instruction**. Therefore, attendance is mandatory. Any unexcused absence will incur a penalty on your final course grade. Deductions from grades due to absences are based on contact hours (= 45 minutes). Any unexcused absence will result in a penalty on your final course grade (1 unexcused contact hour absence - 1%, 2nd unexcused contact hour absence -2%, 3rd unexcused contact hour absence – 3% and so on). Any student who misses more than 25% of a course (= more than 11 contact hours), whether the absences are excused or are unexcused, will receive an "F" as the final grade in the course.

ESS courses may have entire course blocks that take place on one day in addition to longer field trips that count for several contact hours. In this case, the actual missed contact hours are added together, and the absences are sanctioned according to the rule above. If you are late for a planned field trip, you will generally not be able to join the trip, since the group needs to leave on time and cannot wait for one person. Punctuality is therefore essential here. If you miss a class, it is **your responsibility** to make up on everything that was covered in class. Tests/presentations missed during unexcused absences **cannot be made up.**

Arriving late for class: Punctuality is important for the planned course schedule. If you are late for class, the late time will be recorded and added up at the end of the course. You will receive a grade reduction based on the accumulated amount of missing contact hours (as outlined above; i.e., if you were late by 15 minutes on 3 days, your grade would be reduced by 1% for 1 missing contact hour).

LATE OR FAILURE SUBMISSION OF ASSIGNMENTS: Late submission of assignments or failure of submission of assignment results in the grade F of that particular assignment. This does not apply to late or non-submission due to illness with an excused absence.

Excused absence: Please call the IES Center before the start of your first class if you are ill and would like to be excused from your course, as outlined in the "Cell Phone and Attendance Policy" handed out during orientation. Student Affairs staff will decide whether your absence can be excused directly or whether a doctor's note is necessary. Absences due to religious observances and family emergencies may be excused at the discretion of the Center Director, with written approval. A petition for an excused absence due to a religious holiday needs to be submitted 2 weeks in advance. If permission is granted, the student needs to inform the Academic Dean, the Student Affairs Team and their instructors. Absences due to private travel or travel delays cannot be excused, even with advanced notice.

ACADEMIC INTEGRITY CODE:

Students are expected to abide by the IES Abroad Code of Academic Integrity. The detailed IES Abroad academic integrity code can be accessed on Moodle.

All work submitted by a student for academic credit should constitute the student's own original work. Regardless of the quality of work, plagiarism will result in a failing grade for the course and/or an academic review and possible expulsion from the program. Plagiarism may be broadly defined as "copying of materials from sources, without acknowledging having done so, claiming other's ideas as one's own without proper reference to them, buying materials such as essays/exams, and using AI-generated content without disclosure."

As AI tools continue to evolve, learning how to use them responsibly is an important emerging skill. Some of our courses allow students to explore the use of generative artificial intelligence (GAI) tools such as ChatGPT for some assignments and assessments. The instructor of each course will communicate whether GAI may be used in a course and provide specific guidelines and procedures for its appropriate use.

Updated information on your course and readings, including additional readings from journalistic articles, can be found on the Moodle platform at https://moodle.iesabroad.org/login/index.php

CONTENT:

Week	Content	Assignments and Readings
Week 1	Session 1: Welcome and introduction to course resources & structure and registration for student presentations Lecture: Global atmospheric circulation, climate and weather. Meteorological parameters. Vegetation zones – global, regional, local	• Daniel Scherrer (2010) • PH. Stoutjesdijk (1992) : Chapter 4 • Christian Körner (2003): Chapter 1,3,4,7 • John M. Wallace (2006): Chapter 2, 9
	Session 2: Lecture: Microclimates and microhabitats. Life forms, adaptions, modification, acclimation and niches of alpine plants	• William Prescott Lowry (1974) : Chapter 2,10 • Christian Körner (2003) Chapter 2, 5, 6, 8
	Session 3: Lecture: Vegetation and climate of the Black Forest. Measurement of meteorological parameters	• John M. Wallace (2006): Chapter 8, 9 • Christian Körner (2003) Chapter 9,11,12,13
	Session 4: Field trip to the St. Wilhelm Valley	
	Session 5: Lecture: Dendrochronology and climate (case study)	• Schweingruber, F.H. (1996) • Anstett, M., Bogenrieder, A. (2005)
Week 2	Session 6: Field trip to the nature reserve Buchswald in Grenzach with practical dendrochronology and field measurements (Numbering must be consistent	
	Session 7: Lecture: Biosphere-atmosphere interactions and the concept of “limitation”. Vegetation and climate of the Swiss Alps	• Ellenberg H. (2009): Chapter C, D • Christian Körner (2003) Chapter 17
	Session 8: Field trip to the Swiss Alps	
	Session 9: Field trip to the Swiss Alps	

	Session 10: Field trip to the Swiss Alps	
Week 3	Session 11: Lecture: Climate fluctuation, climate warming and effect on vegetation cover	
	Session 12: Student presentations	
	Session 13: Student presentations	
	Session 14: Student presentations	
	Session 15: Final exam	

For all excursions solid walking/hiking shoes/boots are necessary. Be prepared with proper clothing in case of rain and cool temperatures. You will get advance notice when to bring a lunch.

COURSE-RELATED TRIPS:

- Black Forest / Swiss Alps

REQUIRED READINGS:

- Anstett, M., Bogenrieder A. (2005): Naturforschende Gesellschaft Freiburg 95/2: Dendrologische und ökologische Untersuchungen an Buxus sempervirens im Buchswald bei Grenzach, English abstract
- Ellenberg, H. (2009): Vegetation ecology of Central Europe. Cambrige Univ. Press, 4th ed
  - Chapter C: pp 388-403
  - Chapter D: pp 467-469
- Körner, C. (2003): Alpine Plant Life (2nd Edition), Springer Verlag
  - Chapter 1: pp 1-3, 7
  - Chapter 2: pp 9-12
  - Chapter 3: pp 21-26
  - Chapter 4: pp 38-45
  - Chapter 5: pp 47-52
  - Chapter 6: pp 70-74
  - Chapter 7: pp 80-92
  - Chapter 8: pp 106-114
  - Chapter 9: pp 133-139
  - Chapter 11: pp 171-175, 180-186, 196-200
  - Chapter 12: pp 114-119
  - Chapter 13: pp 121-123
  - Chapter 17: pp 296-298
- Lowry, William P. (1974): Weather and Life (4th Edition), Academic Press
  - Chapter 2: pp 9-12
  - Chapter 10: pp 163-181

- Scherrer, D., Körner, C. (2010): Topographically controlled thermal-habitat differentiation buffers alpine plant diversity against climate warming. Journal of Biogeography, Blackwell Publishing: pp 1-11
- Schweingruber, F.H. (1996): Treerings and Environment Dendroecology. Verlag Paul Haupt: pp 442-447, pp 499
- Stoutjesdijk, PH., Barkman, J.J. (1992): Microclimate – Vegetation and Fauna. Opolus Press AB: (Chapter 4: pp 136-141, pp 164-166).
- Wallace, John M., Hobbs Peter V. (2006): Atmospheric Science - An Introductory Survey. Elsevier:
  - Chapter 2: pp 41-44, pp 48-56
  - Chapter 8: pp 343-344
  - Chapter 9: pp 391-395, pp 404-408, pp 410-411

RECOMMENDED READINGS:

- Barry, Roger G., Chorley, Richard G. (1992): Atmosphere, Weather & Climate (6th Edition), Routledge: Chapter 7: pp 279-290
- Lowry, William P. (1974): Weather an Life (4th Edition), Academic Press: Chapter 7: pp 113-121.

Appendix:

Course Participation

Students are expected to participate in debates with questions related to the readings and Students are required to complete all reading assignments and will be expected to demonstrate this through regularly assigned homework, pop quizzes, and/or insightful and relevant contributions to in-class discussion. All these components will count toward the class participation grade. Participation also applies to course-related trips, outings and/or special events in and around Freiburg. A rubric for participation is available in the appendix and on Moodle.

Rubric for course participation:

A	**Excellent participation** The student's contributions reflect an active reading of the assigned bibliography. Skillfully synthesizes the main ideas of the readings and raises questions about the applications and implications of the material. Demonstrates, through questions and comments, that they have been capable of relating the main ideas in the readings to the other information discussed in the course and with their own life experience. The student makes informed judgments about the readings and other ideas discussed in class, providing evidence and reasons. They respectfully state their reactions about other classmates' opinions and can contribute to the inquiry spiral with other questions. The student gets fully involved in the completion of the class activities.
B	**Very good participation** The student's contributions show that the assigned materials are usually read. Most of the time, the main ideas are identified, even though sometimes it seems that applications and implications of the information read were not properly reflected upon. The student can construct over others' contributions, but sometimes seems to interrupt the shared construction to go over tangents. They are respectful of others' ideas. Regularly involved in the activities but occasionally loses concentration or energy.
C	**Regular participation** The participant evidences a regular reading of the bibliography but in a superficial way. They try to construct over others' ideas, but commonly provide comments that indicate a lack of preparation about the material. Frequently, contributions are shallow or unarticulated with the discussion in hand.

F	**Insufficient participation** Consistently, the participant reads in a shallow way or does not read at all. Does not participate in an informed way and shows lack of interest in constructing over others' ideas.