**BL/ES 325 - FIELD BOTANY SOUTHWEST GERMANY**
IES Abroad Freiburg

**DESCRIPTION:**
A sound knowledge of plant species, an understanding of ecological relationships and competence in identifying and mapping plants in the field are indispensable tools in many areas related to environmental research, evaluation, planning and protection. In this course, students will learn to recognize the most important plant families of the Northern hemisphere and to successfully validate the identity of species based on text-based keys and digital tools. Hands-on training will be provided during field trips where students will be able to apply identification skills to investigate local vegetation types in the geo- and biodiverse Upper Rhine Valley in southwestern Germany. With the help of ecological indicator species established for Central Europe, students will analyze local site and management schemes and put these into a continental and global context. Emphasis is given to the traditional and modern role of humans in shaping the composition and structure of plant communities in southwestern Germany. Students will specifically learn about local plants that are noxious weeds in novel environments in North America and how management schemes can draw from ecological analysis of the home site conditions. Students will be able to build upon this framework of skills and knowledge in potential future careers, especially in a time where there is a lamentable shortage of field-savvy experts.

**CREDITS:** 3 credits

**CONTACT HOURS:** 45 hours (taught in the form of a 3-week module)

**LANGUAGE OF INSTRUCTION:** English

**PREREQUISITES:** basic understanding of biological concepts; enjoy the outdoors and be moderately fit for hikes (6 miles/ 10 km; 1000 feet altitude difference/350m in one day), or by digression of faculty.

**ADDITIONAL COST:** none

**METHOD OF PRESENTATION:**
- Lectures
- Field study
- Student presentations
- Moodle

**REQUIRED WORK AND FORM OF ASSESSMENT:**
- Course participation - 10%
- Bioblitz (field-based plant records) - 10%
- Student presentation - 15%
- Field reports – 15%
- Midterm Exam - 20%
- Final Exam - 30%

**Course Participation** – 10%
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.

**Bioblitz (field-based plant records)** - 10%
Students are requested to contribute at least 50 plant records to a course-specific iNaturalist project. Records are to be taken with

images that show sufficient details for unambiguous identification by peers. The total of records is to represent the diversity of species studied in detail during the course. This forms one important baseline dataset for ecological analyses of habitat type and habitat quality.

**Student presentation**- 15%
Each student is to give a short presentation (~ 5 minutes, PPT slides) of an assigned plant species using the correct terminology for vegetative and generative morphological characters. Emphasis should be given to characters that are representative at the genus- and family-level. In addition, the student is asked to elaborate briefly on the plant's ecological indicator values and its diagnostic value for habitat identification. Topics/species will be assigned on the first day of class. A rubric for presentation is available on Moodle.

**Field report** – 15%
Students are requested to write a report of one of the field trips following a standardized structure including a) basic information (date, location, route), a summary of the factual information provided by the instructor, b) a summary of the field survey, c) a reflection on the personal learning outcome and connection to in-class discussions and readings. Overall framework: 500-700 words, plus images, figures and/or tables

**Midterm Exam** - 20%
In the midterm exam students are asked a) to assign plant individuals to the correct plant family, b) analyze and describe diagnostic morphological characters and character states and c) identify species and validate their names using the suite of analogous and digital tools. A focus is lain on native species to Central Europa that are invasive elsewhere and vice versa. Students will have 90 minutes to complete the exam in class.

**Final Exam** - 30%
In the final exam students are asked to describe a plant community in terms of its systematic composition, structural diversity, species abundance, and ecological site conditions. Students will have 90 minutes to complete the exam in class.

**LEARNING OUTCOMES:**
By the end of the course students will be able to:

- Describe, analyze and categorize morphological characters and character states of plant species from a representative set of plant families
- Identify plant species and validate the species names using a suite of analogous and digital tool
- Photograph and document plant records in the field
- Analyze and synthesize the systematic and structural composition of plant communities
- Diagnose local plant communities with the help of ecological indicator values established for Central Europe and put these into a continental and global context. Investigate the impact of introduced species from North America to SW Germany

**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 |
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| **Week 1** | Session 1: Plants – the green part of the blue planet<br><br>• Welcome and introduction<br>• Plant (pub) quiz<br>• Evolution, evolutionary innovations, systematics<br>• Taxonomy and classification<br>• Importance of plants<br><br>Assignment of presentation topics for session 6. | • Install photo-ID apps (e.g. Seek, Pl@ntNet, Flora Incognita) and recording apps (iNaturalists)<br><br>• Sosef et al., Botanical classification and nomenclature, pp. 9-22, 27-30 (18 pages) |
| | Session 2: Identifying plants | • Moodle exercise - Plant identification |

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| | • Analogous and digital tools for plant identification and validation<br>• Morphological analysis of plants<br>• Creating comparative tables and identification keys | • Beentje, The Kew plant glossary, pp. 145-184 (10 pages)<br>• Sosef et al., Botanical classification and nomenclature, pp. 44-50 (7 pages) |
| | Session 3: Plant families (Part I)<br><br>• Buttercup or crowfoot family (Ranunculaceae)<br>• Legume, pea, or bean family (Fabaceae)<br>• Rose family (Rosaceae)<br>• Cabbage family (Brassicaceae)<br>• Pink or carnation family (Caryophyllaceae)<br>• Mint, deadnettle, or sage family (Lamiaceae)<br>• Aster, daisy, or sunflower family (Asteraceae)<br>• Bellflower family (Campanulaceae)<br>• Celery, carrot or parsley family (Apiaceae)<br><br>Session may include short outings to field sites. | • Moodle exercise: Plant family recognition (I)<br><br>• Heywood Flowering plant families of the world, pp. 35-38, 46-51, 68-71, 82-84, 89-91, 158-188, 179-181, 273-276, 280-283 (62 pages) |
| | Session 4: Plant families (Part II)<br><br>• Orchids (Orchidaceae)<br>• Lily family (Liliaceae)<br>• Daffodil family (Amaryllidaceae)<br>• Iris family (Iridaceae)<br>• Grass family (Poaceae)<br>• Sedge family (Cyperaceae)<br>• Rush family (Juncaceae)<br><br>Session may include short outings to field sites. | • Moodle exercise: Plant family recognition (II)<br><br>• Heywood, Flowering plant families of the world, pp. 341-342, 363-365, 374-375, 376-377, 378-379, 384-388, 390-395 (22 pages) |
| | Session 5: Field trip Botanical Garden Freiburg<br><br>• Recognizing plant families<br>• Diversity and plasticity within plant families<br>• Growth forms and life form | • Moodle exercise: Life forms<br>• Prepare for Students presentations |
| **Week 2** | Session 6: Student presentations<br><br>• A list of presentation topics will be distributed first day in class and assigned to students. | |
| | Session 7: Field trip to Schönberg | • Bioblitz (Part I) |

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| | • Identification of plant families and diagnostic species<br>• Analysis of floristic and structural composition of plant communities<br>• Abiotic and biotic factors to be observed in the field<br>• Interpreting signs of land use<br>• Weedy species<br>• Nature conservation | • Leuschner and Ellenberg, Vegetation Ecology of Central Europe. Volume I, pp. 3-28, 65-69, 105-106 (33 pages) |
| | Session 8: Mid-term exam | • Leuschner and Ellenberg, Vegetation Ecology of Central Europe. Volume II., pp. 597-688 (92 pages) |
| | Session 9: Field trip to Kappel<br><br>• Identification of plant families and diagnostic species<br>• Analysis of floristic and structural composition of plant communities<br>• Abiotic and biotic factors to be observed in the field<br>• Interpreting signs of land use<br>• Weedy species<br>• Nature conservation | • Bioblitz (Part II)<br><br>• Leuschner and Ellenberg, Vegetation Ecology of Central Europe. Volume I, pp. 71-74 (4 pages) |
| | Session 10: Floristic and ecological analysis of plant communities<br><br>• Levels of plant diversity<br>• Floristic community assembly<br>• Ecological indicator values<br>• Physiognomy of plant communities | • Analysis of plant records from the field using various online resources (e.g. https://floraveg.eu) |
| **Week 3** | Session 11: Field trip to Schauinsland<br><br>• Identification of plant families and diagnostic species<br>• Analysis of floristic and structural composition of plant communities<br>• Abiotic and biotic factors to be observed in the field<br>• Interpreting signs of land use<br>• Weedy species<br>• Nature conservation | • Bioblitz (Part III) |

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| | Session 12: Vegetation patterns and their drivers<br><br>• Abiotic and biotic factors<br>• Traditional and modern land-use practices<br>• Strategies for conservation priorities<br><br>• Discuss applications for future careers in the field | • Leuschner and Ellenberg, Vegetation Ecology of Central Europe. Volume I, pp. 30-65 (36 pages) |
| | Session 13: Final exam | • Field reports to be handed-in (deadline 11:59pm)<br>• End of bioblitz project (deadline 11:59pm) |

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:**

- Botanical Garden Freiburg
- Schönberg: lower montane belt on base-rich soils
- Kappel: lower montane belt on acidic soils
- Schauinsland: upper montane belt on acidic soils
- Short trips within walking distance of the institute

**REQUIRED READINGS:**

- Beentje, Henk. *The Kew plant glossary: an illustrated dictionary of plant terms.* 2nd edition. Richmond: Kew publishing, 2016.
- Heywood, Vernon H. (ed). *Flowering plant families of the world.* Updated & revised edition. Buffalo, N.Y.: Firefly Books, 2007.
- Leuschner, Christoph and Ellenberg, Heinz. *Vegetation Ecology of Central Europe. Volume I. Ecology of Central European Forests.* Berlin: Springer, 2017.
- Leuschner, Christoph and Ellenberg, Heinz. *Vegetation Ecology of Central Europe. Volume II. Ecology of Central European Non-Forest Vegetation: Coastal to Alpine, Natural to Man-Made Habitats.* Berlin: Springer, 2017.
- Sosef, Marc et al. *Botanical classification and nomenclature - an introduction*. Version 1. Zenodo, 2020. URL https://zenodo.org/record/3706707

**Appendix**:

**Rubric for course participation**:

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| **A** | **Excellent participation**<br>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. |

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| **B** | **Very good participation**<br>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**<br>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**<br>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. |