SYLLABUS

Plant and Animal Biocoenology (Community Ecology)

Academic year 2025-2026

1. Information regarding the programme

1.1. Higher education institution	Babeș-Bolyai University
1.2. Faculty	Biology and Geology
1.3. Department	Taxonomy and Ecology
1.4. Field of study	Biology
1.5. Study cycle	Master (2 years)
1.6. Study programme/Qualification	Systemic Ecology and Conservation / M.Sc.
1.7. Form of education	Full-time study

2. Information regarding the discipline

2.1. Name of the discipline	Plant and Animal Biocoenology					Discipline code	BME3301
2.2. Course coordinator				Dan Gafta			
2.3. Seminar coordinator				Dan Gafta			
2.4. Year of study	2	2.5. Semester	3	2.6. Type of evaluation	E	2.7. Discipline regime	Compulsory

3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	4	of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laborator	28
Time allotment for individual study (ID) and self-study activities (SA)					**hours**
Learning using manual, course support, bibliography, course notes (SA)					40
Additional documentation (in libraries, on electronic platforms, field documentation)					28
Preparation for seminars/labs, homework, papers, portfolios and essays					15
Tutorship					10
Evaluations					5
Other activities:					
3.7. Total individual study hours	98				
3.8. Total hours per semester	154				
3.9. Number of ECTS credits	6				

4. Prerequisites (if necessary)

4.1. curriculum	Principles of Systemic Ecology
4.2. competencies	Tabular calculations and graph production in electronic spreadsheets Report design and production

5. Conditions (if necessary)

5.1. for the course	Logistic support (computer connected to a digital video-projector device)
5.2. for the seminar /lab activities	Logistic support (laptop/computer running under Windows 10/11 for each student) Software for numerical analysis (R) Real and simulated data sets in electronic format Compulsory attendance of students at minim 80% of the seminars

6. Specific competencies acquired

Professional/essential competencies	Ability to prepare a protocol for plant and animal community sampling according to the habitat type, species biological traits and study aims Ability to detect the dominant dynamic processes driving the species composition of biocoenoses Ability to analyse quantitatively the structure and diversity of ecological communities
Transversal competencies	Developping the capacity of undertaking the ecologic management of biodiversity and natural habitats Using the acquired knowledge in new circumstances Applying the theoretical knowledge to practical problems

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	Understanding the importance of Biocoenology through the complex relations between the extant species and, between the latter and their abiotic environment
7.2 Specific objective of the discipline	Learning the basic concepts and methodologic approaches used in the analysis of the structure, dynamics and diversity of ecological communities Learning about the main intracoenotic connections Learning about the complex assembly rules of species in communities Learning about the functional approach in the study of biocoenoses Understanding the consequences of disturbance on the stability and functioning of the ecological communities

8. Content

8.1 Course	Teaching methods	Remarks
Current theories about the concept of ecological community (biocoenosis)	Lecture with video presentation support	
Functional approach in studying ecological communities: functional types and ecological strategies	Lecture with video presentation support	
Sampling the terrestrial communities	Lecture with video presentation support	
Interspecific relationships driving the structure and dynamics of ecological communities	Lecture with video presentation support	
Models of species co-existence in communities	Lecture with video presentation support	
Modelling the distribution of species abundance in ecological communities	Lecture with video presentation support	
Organisation of ecological communities	Lecture with video presentation support	
Disturbance and community stability: inertia and resilience	Lecture with video presentation support	

Predictability of ecological successions	Lecture with video presentation support	
Multispecific spatial structure of ecological communities	Lecture with video presentation support	
Ecological determinism and role of the species/functional diversity at community level	Lecture with video presentation support	
Estimating the alpha, beta and gamma diversity	Lecture with video presentation support	
Extrapolating the island biogeography theory to the study of the structure of ecological communities	Lecture with video presentation support	
Compositional dissimilarity of ecological communities: species nestedness and turn-over	Lecture with video presentation support	

Bibliography

Begon M., Townsend C.R., 2021. Ecology: from Individuals to Ecosystems. 5th edition. Blackwell, Oxford.
Garnier E., Navas M.L., Grigulis K., 2016. Plant Functional Diversity. Oxford University Press, Oxford.
Magurran A.E., 2013. Measuring Biological Diversity. Wiley-Blackwell, Chichester.
Morin P.J., 2011. Community Ecology. Wiley-Blackwell, Chichester.
Sher A., Molles M., 2021. Ecology: concepts and applications. 9th edition. McGraw-Hill, New York.
van der Maarel E., Franklin J. (eds.), 2013. Vegetation Ecology, 2nd. ed. Wiley-Blackwell, Chichester.

8.2 Seminar / laboratory	Teaching methods	Remarks
Fitting the empirical distribution of cumulative relative abundance of the species composing an ecological community	Practical application on computer	
Estimation of alpha- and beta-diversity within-communities and respectively, between-communities	Practical application on computer	
Analysis of the specific dissimilarity between two or more groups of communities (ANOSIM)	Practical application on computer	
Estimation of species richness through the procedure of species rarefaction and extrapolation	Practical application on computer	
Estimation of functional diversity at community level	Practical application on computer	
Predicting the species composition of communities along successions through the method of Markov chains	Practical application on computer	
Estimating the width and overlap of ecological niches pertaining to the co-occurring species in communities	Practical application on computer	
Analysis of species patterns between communities: nestedness and turn-over	Practical application on computer	
Working out a project reporting the structural analysis of a set of ecological communities at student's choice	Working independently on data analysis and reporting the results	The report preparation covers six seminars (12 hours)

Bibliography

Gardener M., 2014. Community Ecology - Analytical Methods Using R and Excel. Pelagic Publishing, Exeter.
vegan: Community Ecology Package (https://cran.r-project.org/web/packages/vegan/vegan.pdf)
vegetarian: Jost Diversity Measures for Community Data (https://cran.r-project.org/web/packages/vegetarian/vegetarian.pdf)
coenocliner: Coenocline Simulation (https://cran.r-project.org/web/packages/coenocliner/coenocliner.pdf)
EcoSimR: Null Model Analysis for Ecological Data (https://cran.r-project.org/web/packages/EcoSimR/EcoSimR.pdf)
betapart: Partitioning Beta Diversity into Turnover and Nestedness Components (https://cran.r-project.org/web/packages/betapart/betapart.pdf)
cooccur: Probabilistic Species Co-Occurrence Analysis (https://cran.r-project.org/web/packages/cooccur/cooccur.pdf)
FD: Measuring functional diversity (FD) from multiple traits, and other tools for functional ecology (https://cran.r-project.org/web/packages/FD/FD.pdf)
cluster: Finding Groups in Data (https://cran.r-project.org/web/packages/cluster/cluster.pdf)

fpc: Flexible Procedures for Clustering (https://cran.r-project.org/web/packages/fpc/fpc.pdf)
coin: Conditional Inference Procedures in a Permutation Test Framework (https://cran.r-project.org/web/packages/coin/coin.pdf)
indicspecies: Relationship Between Species and Groups of Sites (https://cran.r-project.org/web/packages/indicspecies/indicspecies.pdf)

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The course has an updated, similar content to those given in other European and north-American universities and is adapted to different skill levels of the students

The course content is focused on practical issues related to the structural analysis of ecological communities, and thus has the features of an applied science

During seminars, the students have the opportunity to propose changes for the course improvement and the conformation of its content to the labour market requirements

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	Knowledge of the information content	Writing exam	75%
	Ability to use the acquired knowledge in a new context		
10.5 Seminar/laboratory	Ability to perform and interpret the specific structure of ecological communities	Project evaluation	25%
10.6 Minimum standard of performance			
Knowledge of at least 50% of the information that pertains to the given courses Acquiring the skills (in proportion of at least 60%) practised during seminars The minimum grade obtained in each of the two examinations (the writing test and the project evaluation) should be at least 5			

11. Labels ODD (Sustainable Development Goals)

Date:
10th of January, 2025

Signature of course coordinator

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Signature of seminar coordinator

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Date of approval:
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Signature of the head of department

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