NAME OF THE COURSE	Ecology II					
Code	PMB512	Year of study	2			
Course teacher	Assistant Professor Sanja Puljas, PhD	Credits (ECTS)	4			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			30	15		
Status of the course	Mandatory	Percentage of application of e-learning	20			

COURSE DESCRIPTION

Course objectives	The main goal of the course is to understand the principles and structure and functioning of higher ecological systems (population-community relationship). Through theoretical and practical knowledge about the structure and dynamics of populations, interactions between populations, and the structure and functioning of biological communities, students will understand the importance of biodiversity and the stability of ecosystems on Earth. The acquired knowledge can be applied in the management of living resources on Earth, as well as in the protection of individual species, habitats, communities and entire ecosystems.
Course enrolment requirements and entry competences required for the course	Attended course of Ecology I
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Application of the concept of population dynamics and the ability to estimate population growth based on input parameters. Understanding the nature of interactions between populations. Training to solve practical problems related to the outcomes of competition, and the impact of predation, parasitism and mutualism on populations. Ecological concept of community. Establishing rules and understanding the relationship between diversity and community stability. Ability to apply knowledge in biodiversity conservation.
Course content broken down in detail by weekly class schedule (syllabus)	Lecture 1. Spatial structure of populations Elements of spatial structure of populations (distribution, dispersion density), types of dispersion of individuals in the population (group, uniform, random), population density estimation, population size, unitary and modular organisms, territoriality and distribution affect the spatial structure of populations (isolation mechanisms). Lecture 2. Age structure of populations Phases in the life cycle of an individual (pre-reproductive, reproductive and post-reproductive), rates of fecundity and mortality, life tables (types of life tables, variables in the life table), types of survival curves. Lecture 3. Population dynamics (growth and fluctuations) Defining the concept of population dynamics, population growth and types of population models, the dependence of growth rate on environmental conditions, the relationship between organism size and growth rate, fluctuations in population size and what causes them. Lecture 4. Metapopulation Definition of metapopulation, metapopulation dynamics, mathematical model of metapopulation, rescue effect, correlated disappearance. Lecture 5. Strategies in extending the species Life cycle and reproduction, number of offspring and their size, reproduction and biomass, r-selection and K-selection. Lecture 6. Competition Definition of competition, principle of competitive exclusion, competition and ecological niche, differentiation of ecological niches, feature spacing, Lotka-Volterra mathematical model of competition and Tilman's model of competition.

	Lecture 7. Exploitation interactions Definition of the terms consumer and resource, definition of exploiters (predators, parasites, pathogens, parasitoids, herbivores), influence of exploiters on the structure and dynamics of victim populations (prey and hosts), competition and herbivory, related cyclic predispositions or oscillations hosts and parasites. Lecture 8. Mathematical model of predation Lotka-Volterra mathematical model of predation, Volterra's rule, notion of functional response, types of functional response, Holling's "disk equation", notion of refuge (Huffaker's experiment), Nicholson-Bailey parasitoid-host model, infection model, optimal nutrition theory. Lecture 9. Mutualism and coevolution Definition of mutualism, mutualism and symbiosis - differences, types of mutualism (trophic, defensive, propagating), definition of coevolution, types of coevolution, antagonistic relations and coevolution, mutualistic interactions and coevolution. Lecture 10. Concept and structure of community Defining community, functional groups of species and trophic species, characteristic and dominant species, mathematical models of distribution of species abundance in the community, diversity indices, indices of uniformity and rank-abundance curve, mathematical description of species number and size of study area, dilution method; food chain and food networks, structure of the food network, types of food networks. Lecture 11. Stability of communities Direct and indirect interactions in food networks, a historical overview of ideas about the relationship between complexity and community stability. Lecture 12. Spatial structure of the community and periodism in the life of communities Habitat fragmentation and the notion of "marginal effect", start-up as a form of spatial structure of communities, periodism in community life, seasonal, day-night and lunar periodism in community life, reasons for periodicity. Lecture 13. Community Development Successions; colonization of disturbed habitats, changes in communities during succession. Lecture 14. Biodiversity (1) Definition of biodiversity, levels of biodiversity measurement, diversity of traits, genetic diversity, taxonomic diversity. Lecture 15. Biodiversity (2) Regional / historical and local / deterministic view of biodiversity, island biogeography theory, competition and negative relationship of species distribution, unbalanced biodiversity regulation models, closed system models, open system models, "moderate disturbance hypothesis", "lottery hypothesis", biological impact diversity of ecosystem functions. SEMINARS: During the semester, seminars are held, some of which are related to teaching units, while others change and depend on the wishes of students or some current events in the field of ecology and environmental protection.	
Format of instruction	☒ lectures ☒ seminars and workshops ☐ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☒ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Students' presence in the amount of at least 70% of scheduled lectures, student seminar work.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.5	Research		Practical training	
	Experimental work		Report		(Other)	
	Essay		Seminar essay	0.5	(Other)	
	Tests	1	Oral exam		(Other)	
	Written exam	2	Project		(Other)	

Grading and evaluating student work in class and at the final exam	The final grade is the sum of the points on the written colloquia during the semester or written exam in the exam period.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	Šolić, M. 2014. Ekologija populacija. Institut za oceanografiju i ribarstvo, Split, 347 str. http://fliphtml5.com/homepage/bxnx	5	Yes
	Šolić, M. 2016. Ekologija zajednica i ekosustava. Golden marketing –Tehnička knjiga, Zagreb (u tisku) http://www.gmtk.hr/web/index.asp?str=51270		
	Šolić, M. 2015. Kvantitativne metode u ekologiji zajednica. Institut za oceanografiju i ribarstvo, Split. 134str. http://fliphtml5.com/homepage/bxnx	5	Yes

Optional literature (at the time of submission of study programme proposal)	-Šolić, M. 2009. Ljepota različitosti –ekološki uzroci biološke raznolikosti na Zemlji. Izvori, Zagreb, 288 str. http://fliphtml5.com/homepage/bxnx -Ricklefs, R.E. and Miller, G.L. 1999. Ecology. (4. Ed.) W.H. Freeman and Company. 896 pp. -Begon, M., Townsend, C.R. and Harper, J.L. 2005. Ecology: From Individuals to Ecosystems. (4. Ed.), Wiley-Blackwell. 752 pp. -Krebs, C.J. 2009. Ecology: The Experimental Analysis of Distribution and Abundance. 2000. (6. Ed.). Benjamin Cummings. 655 pp
Quality assurance methods that ensure the acquisition of exit competences	-Taking attendance of students during classes. -Students' survey evaluation of teacher's work. -Feedback from graduated students on the relevance of the course content.
Other (as the proposer wishes to add)	Consultations are taking place according to the agreement with the students or by e-mail: spuljas@pmfst.hr