

Course name:**Population ecology of trees**

ECTS	2
Course status	optional, facultativ
Course final assessment /evaluation of outcomes	graded credit
Prerequisite	Course in basic ecology

Main field of study:**Forestry**

Educational profile	General academic
Code of studies and education level	MSc
Semester of studies	summer
Language of instruction	English

Course offered by:

Name of faculty offering the course	Faculty of Forestry
Name of department offering the course	Department of Forest Biodiversity
Course coordinator	Prof. dr hab. inż. Jerzy Szwagrzyk

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands			
LES_POPET_W01	the basics of population processes in plant populations	LES2_W01	RL
LES_POPET_W02	the role of population processes in shaping the dynamics of forest communities	LES2_W02 LES2_W07	RL
LES_POPET_W03	differences in the rate of demographic processes in different tree species	LES2_W03 LES2_W04	RL
SKILLS – student is able to			
LES_POPET_U01	identify and formulate tree population ecology problems relevant to forest management based on natural patterns	LES2_U06 LES2_U10	RL
LES_POPET_U02	perceive unsolved problems in tree population ecology, analyse them and correctly interpret the results obtained	LES2_U01 LES2_U02 LES2_U05 LES2_U07	RL
LES_POPET_U03	conduct observations and measurements aimed at solving specific problems in tree population ecology	LES2_U06	RL
SOCIAL COMPETENCIES – student is ready to:			
LES_POPET_K01	critically evaluate and discuss the cognitive and practical value of contemporary knowledge	LES2_K01	RL
LES_POPET_K02	critically appraise oneself, the teams in which one works, and lead and take responsibility for the group and act in an entrepreneurial manner	LES2_K02	RL
LES_POPET_K03	to resolve complex ethical issues relating to the profession; to develop the achievements, cultivate the ethos and uphold the ethics of the forestry profession	LES2_K03	RL

Teaching contents

Lectures		15 hours
Topics	<p>Functional relationships in trees: the Shinozaki model. Physical limits to tree growth. Growth strategies for height: the A. Mäkelä model.</p> <p>Adaptive tree geometry: the Horn model. Crown morphology and light requirements. Relationship of assimilative area to shoot morphology. Light penetration through the crown</p> <p>Living space of the individual versus population density. Self-thinning principle: the $-3/2$ rule. Inter-individual interactions and modular growth.</p> <p>Growth rate vs. capture of environmental resources. The role of an individual's architecture in the course of competition. Symmetric and asymmetric competition.</p> <p>Variation in growth rate versus survival in different tree species. Defence mechanisms and their costs: the Craig Loehle hypothesis.</p> <p>Vegetative regeneration in forest trees. Mass flowering and seed production. What controls synchronous seed production in trees? Seed dispersal and its aerodynamic properties</p> <p>The role of animals in tree seed dispersal. Janzen's model: survival probability as a function of distance from individuals of one's own species. Seed bank in forest trees</p> <p>Tree population ecology and management in forests</p>	
Accomplished learning outcomes	LES_POPET_W01 LES_POPET_W02 LES_POPET_W03	
Means of verification, rules and criteria of assessment	Assessment of class activity. The contribution of the lecture activity grade to the final evaluation is 30%.	
Classes		8 hours
Topics	<p>Development of field data collection methods</p> <p>Selection of the study site</p> <p>Analysis of data collected during fieldwork</p> <p>Interpretation of the results of the analyses</p> <p>Preparation and presentation of results</p>	
Accomplished learning outcomes	LES_POPET_U01 LES_POPET_U02 LES_POPET_U03 LES_POPET_K01 LES_POPET_K02 LES_POPET_K03	
Means of verification, rules and criteria of assessment	<p>Presentation resulting from the analysis of the results of the field exercises.</p> <p>The share of the mark in the final evaluation is 50%.</p>	
Field exercises		7 hours
Topics	A study of the population structure of woody species on overgrown fallow land near Krakow.	
Accomplished learning outcomes	LES_POPET_U03 LES_POPET_K02	
Means of verification, rules and criteria of assessment	<p>Demonstration of practical skills</p> <p>The contribution of the mark for the field exercises to the final evaluation is 20%.</p>	
References:		
Basic	<ol style="list-style-type: none"> 1. Harper J. L. 1990. Population biology of plants. Eighth impression. Academic Press, London 2. Crawley M. J. (Ed.) 1997. Plant Ecology. Second Edition. Blackwell Science, Oxford. 3. Oliver C. D., Larson B. C. 1992. Forest Stand Dynamics. McGraw & Hill, New York 	
Supplementary	<ol style="list-style-type: none"> 1. Van der Maarel E. (Ed.). 2005. Vegetation Ecology. Blackwell Publishing, Oxford 2. Horn H. H. The Adaptive Geometry of Trees 	

Structure of learning outcomes

Area of academic study: R – Agricultural sciences, L - Forestry	2	ECTS **
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Structure of student activity

Contact hours	45	hrs.	1.8	ECTS**
Including:				
lectures	15	hrs.		
classes and seminars	15	hrs.		
consultations	5	hrs.		
participation in research	5	hrs.		
obligatory traineeships	0	hrs.		
participation in examination	5	hrs.		
e-learning	0	hrs.	0	ECTS**
student own work	5	hrs.	0.2	ECTS**

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

** stated with an accuracy to 0.1ECTS, where 1 ECTS = 25 - 30 hours of classes