Course Unit Descriptor

Study Programme: Agronomy

Course Unit Title: Forest ecosystems and climate changes

Course Unit Code: 9.AGR096

Name of Lecturer(s): Srđan Stojnić

Type and Level of Studies: PhD studies

Course Status (compulsory/elective): Elective

Semester (winter/summer): /

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face and distance learning

Number of ECTS Allocated: 7

Prerequisites: /

Course Aims:

The aim of the course is that doctoral students acquire knowledge about the impact of projected climate changes on forest ecosystems, as well as the role of forest ecosystems in mitigating climate change. In the scope of the course, doctoral students will learn about the direct and indirect impact of climate change on forest ecosystems, which will be reflected in the movement of species ranges, changes in tree growth, the increase in the negative impact of harmful insects and pathogenic fungi on forest ecosystems and the intensification of the impact of abiotic disturbances (e.g. drought, forest fires, late frosts, windbreaks, etc.). The subject represents the basis for further examination of climate models and adaptive forest management.

Learning Outcomes:

Acquiring knowledge about the impact of projected climate changes on forest ecosystems and the importance of forest ecosystems in mitigating the negative effects of climate change.

Syllabus:

Theory

1. Forest ecosystems and climate change, 2. Direct and indirect impact of climate change on forest ecosystems, 3. Impact of biotic factors on forests (harmful insects, pathogenic fungi, etc.), 4. Impact of abiotic factors on forests (droughts, floods, storms, etc.), 5. The impact of climate change on the distribution of forest tree species and the growth of forest trees, 6. The impact of climate change on the physiological performacnes of forest trees, 7. Climate change and forest genetic resources, 8. Forest plantations and natural forests in the function of mitigating climate change.

Practice

Consultations will be organized for doctoral students, where they will be able to get information about the subject itself, the literature, the possibilities of involvement in the implementation of experimental research, as well as the obligations they have in order to successfully pass the exam. PhD students will be involved in setting up and monitoring of field and laboratory experiments related to the influence of biotic and abiotic stress factors on various functional traits of forest tree species, studying the adaptive potential of trees, assessing the genetic diversity of different populations, etc.

Required Reading:

- Lindner, M., Maroschek, M., Netherer, S., Kremer, A., Barbati, A., Garcia-Gonzalo, J., Seidl, R., Delzon, S., Corona, P., Kolstrom, M., Lexer, M., Marchetti, M. (2010). Climate change impacts, adaptive capacity, and

vulnerability of European forest ecosystems. Forest Ecology and Management 259, 698-709.

- Allen, C.D., Macalady, A.K., Chenchouni, H., Bachelet, D., McDowell, N., Vennetier, M., Kitzberger, T., Rigling, A., Breshears, D.D., Hogg, E.H., Gonzalez, P., Fensham R., Zhangm, Z., Castro, J., Demidova, N., Lim, J-H., Allard, G., Running, S.W., Semerci, A., Cobb, N. (2010). A global overview of drought and heat-induced tree mortality reveals emerging climate change risks for forests. Forest Ecology and Management 259, 660-684.
- Lindner, M., Fitzgerald, J.B., Zimmermann, N.E., Reyer, C., Delzon, S., van der Maaten, E., Schelhaas, M-J., Lasch, P., Eggers, J., van der Maaten-Theunissen, M., Suckow, F., Psomas, A., Poulter, B., Hanewinkel, M. (2014). Climate change and European forests: What do we know, what are the uncertainties, and what are the implications for forest management? Journal of Environmental Management 146, 69-83.
- Fady, B., Cottrell, J., Ackzell, L., Alía, R., Muys, B., Prada, A., González-Martínez, S.C. (2016). Forests and global change: what can genetics contribute to the major forest management and policy challenges of the twenty-first century? Regional Environmental Change 16, 927-939.
- Archaux, F., Wolters, V. (2006). Impact of summer drought on forest biodiversity: what do we know? Annals of Forest Science 63, 645-652.

Weekly Contact Hours: 8	**Lectures: 4**	**Practical work: 4**

Teaching Methods:

Lectures combined with interactive teaching, seminars, consultations and mentoring work with students.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	
Practical work		oral exam	70
Preliminary exam(s)		…….	
Seminar(s)	30		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.