COURSE OF DOCTORAL STUDIES

Course title	Field of science (branch) code	University / Faculty	Institute / Department
Aerobiology	Natural Sciences, (Physical Geography) N 006 / (Ecology and environmental) science N 012	Vilnius University / Faculty of Chemistry and Geosciences	Institute of Geosciences / Department of Hydrology and climatology

Study methods	Number of credits allocated	Study methods	Number of credits allocated
Individual work	8	Practical work	1
Consultations	1	Seminars	

Course annotation

The course aims to create an environment for acquiring the latest aerobiological knowledge and using them to solve the problems related to complex strategic atmospheric bioaerosol dispersion and develops the ability to plan and perform international research on airborne pollen and microscopic fungal spores.

Study topics. Peculiarities and interdisciplinarity of the aerobiology science knowledge development. The role of international cooperation in state-of-the-art aerobiology. International and national networks on aerobiological monitoring and research quality assurance. Aerobiology terminology and research methodology. Sources of bioaerosol. Peculiarities of pollen allergenic potential. Conventional (manual) and automated pollen dispersion monitoring and eDNA methods. Assumptions and challenges of real-time bioaerosol data collection and identification. Eumetnet AutoPollen program. Peculiarities of the airborne pollen season. Plant phenology and airborne pollen calendars. Evaluation of meteorological parameters effect on bioaerosol dispersion. Long-range transport of pollen and microscopic fungal spores. Effects of atmospheric pollutants on bioaerosol. Pollen load modelling and forecasting. Use of aerobiological data for various purposes; in biodiversity (mostly invasive species), climate change and public health research. Use of remote sensing technologies and mobile apps in aerobiology. Dissemination of information on pollen and spores load.

Practical research/works. Identification of pollen and fungal spores. Evaluation of long-range transport of pollen. Comparative analysis of pollen dispersal models Silam and Cosmo-Art.

Required readings

Sofiev, M., & Bergmann, K. C. (Eds.). 2012. Allergenic pollen: a review of the production, release, distribution and health impacts.

Damialis, A., Traidl-Hoffmann, C., & Treudler, R. 2019. Climate change and pollen allergies. Biodiversity and health in the face of climate change, 47-66.

Galán, C., Smith, M., Thibaudon, M., Frenguelli, G., Oteros, J., Gehrig, R., ... & Brandao, R. 2014. Pollen monitoring: minimum requirements and reproducibility of analysis. Aerobiologia, 30(4), 385-395.

Clot, B., Gilge, S., Hajkova, L., Magyar, D., Scheifinger, H., Sofiev, M., ... & Tummon, F. 2020. The EUMETNET AutoPollen programme: establishing a prototype automatic pollen monitoring network in Europe. Aerobiologia, 1-9.

Bastl, K., Kmenta, M., & Berger, U. E. 2018. Defining pollen seasons: background and recommendations. Current allergy and asthma reports, 18(12), 1-10.

Recommended reading

Šaulienė, I., Šukienė, L., Daunys, G., Valiulis, G., Vaitkevičius, L., Matavulj, P., ... & Sofiev, M. 2019. Automatic pollen recognition with the Rapid-E particle counter: the first-level procedure, experience and next steps. Atmospheric Measurement Techniques, 12(6), 3435-3452.

Sofiev, M. 2017. On impact of transport conditions on variability of the seasonal pollen index. Aerobiologia, 33(1), 167-179.

Veriankaitė, L., Šaulienė, I., & Bukantis, A. 2010. The modelling of climate change influence on plant flowering shift in Lithuania. Žemdirbystė (Agriculture), 97(1), 41-48.

Šikoparija, B., Marko, O., Panić, M., Jakovetić, D., & Radišić, P. 2018. How to prepare a pollen calendar for forecasting daily pollen concentrations of Ambrosia, Betula and Poaceae? Aerobiologia, 34(2), 203-217.

Galán, C., Ariatti, A., Bonini, M., Clot, B., Crouzy, B., Dahl, A., ... & Sofiev, M. 2017. Recommended terminology

for aerobiological studies. Aerobiologia, 33(3), 293-295.
Davies, J. M., Berman, D., Beggs, P. J., Ramón, G. D., Peter, J., Katelaris, C. H., & Ziska, L. H. 2021. Global climate change and pollen aeroallergens: a southern hemisphere perspective. Immunology and Allergy Clinics, 41(1), 1-16.
Šaulienė I., Kainov D., Šukienė L., Greičiuvienė J. 2015. Alerginis rinitas: kaip išvengti? – Vilnius,– 73 p.

Consulting lecturers name, surname	Degree	The most important works in the field of science (branch) have been published during the last 5 years
Inga Šaulienė	Dr.	**Sauliene**, I., Sukiene, L., Kazlauskiene, V. 2019. The assessment of atmospheric conditions and constituents on allergenic pollen loads in Lithuania. Journal of environmental management, 250, 109469. **Šaulienė**, I., Šukienė, L., Daunys, G., Valiulis, G., Lankauskas, A., Kokina, I., Gerbreders. V., Gavarāne, I. 2019. Detection and Microscopy of Alnus glutinosa Pollen Fluorescence Peculiarities. Forests, 10(11), pp. 959, **Šaulienė**, I., Šukienė, L., Daunys, G., Valiulis, G., Vaitkevičius, L., Matavulj, P., Brdar, S., Panic, M., Sikoparija, B., Clot, B., Crouzy, B., Sofiev, M. 2019. Automatic pollen recognition with the Rapid-E particle counter: the first-level procedure, experience and next steps. Atmospheric Measurement Techniques, 12(6). **Sauliene, I.,** Sukiene, L., Zaleskiene, E., Saulys, A., Aukselis, K. 2018. Assessment of Former Manors as Rural Landscape Elements: Case Study of Northern Lithuania Notulae Botanicae Horti Agrobotanici Cluj-Napoca, 46(2), 670-678. Matyasovszky, I., Makra, L., Tusnády, G., Csépe, Z., Nyúl, L. G., Chapman, D. S., <…>, **Sauliene**, I. & Mányoki, G. 2018. Biogeographical drivers of ragweed pollen concentrations in Europe. Theoretical and Applied Climatology, 133(1-2), 277-295. Ritenberga O., Sofiev M., Siljamo P., Saarto A., Dahl A., Ekebom A., **Sauliene** I., Shalaboda V., Severova E., Hoebeke L., Ramfjord, H. 2018. A statistical model for predicting the inter-annual variability of birch pollen abundance in Northern and North-Eastern Europe. Science of the Total Environment. 615, pp. 228-239, Matyasovszky, I., Makra, L., Tusnády, G., Csépe, Z., Nyúl, L. G., Chapman, D. S., **Sauliene**, I. <…>, Bullock J.M. Biogeographical drivers of ragweed pollen concentrations in Europe. Theoretical and Applied Climatology, (2017). 133(1-2), 277-295. Galán C., Ariatti A., <…>, **Sauliene** I, Skjoth C., Smith M., Sofiev M. 2017. Recommended terminology for aerobiological studies. Aerobiologia, 33(3), 293-295. Sikoparija B., Skjøth C. A., <…>, **Šaulienė** I., <…>, Smith M. 2017. Spatial and temporal variations in airborne Ambrosia pollen in Europe. Aerobiologia. 33(2), 181-189. Sikoparija, B., <…>, **Šaulienė**, I., <…>, Zemmer, F. 2017. Pollen-monitoring: between analyst proficiency testing. Aerobiologia, 33 (2), 191-199. **Šaulienė, I.,** Šukienė, L., Kainov, D., Greičiuvienė, J. 2016. The impact of pollen load on quality of life: a questionnaire-based study in Lithuania. Aerobiologia, 32 (2), 157-170.
Laura Šukienė	Dr.	Sauliene, I., **Sukiene, L.,** Kazlauskiene, V. 2019. The assessment of atmospheric conditions and constituents on allergenic pollen loads in Lithuania. Journal of environmental management, 250, 109469. Šaulienė, I., **Šukienė, L.,** Daunys, G., Valiulis, G., Lankauskas, A., Kokina, I., Gerbreders. V., Gavarāne, I. 2019. Detection and Microscopy of Alnus glutinosa Pollen Fluorescence Peculiarities. Forests, 10(11), pp. 959, Šaulienė, I., **Šukienė, L.,** Daunys, G., Valiulis, G., Vaitkevičius, L., Matavulj, P., Brdar, S., Panic, M., Sikoparija, B., Clot, B., Crouzy, B., Sofiev, M. 2019. Automatic pollen recognition with the Rapid-E particle counter: the first-level procedure, experience and next steps. Atmospheric Measurement Techniques, 12(6). Sauliene, I., **Sukiene**, L., Zaleskiene, E., Saulys, A., Aukselis, K. 2018. Assessment of Former Manors as Rural Landscape Elements: Case Study of Northern Lithuania

		Notulae Botanicae Horti Agrobotanici Cluj-Napoca, 46(2), 670-678. Šaulienė, I., **Šukienė**, L., Kainov, D., Greičiuvienė, J. 2016. The impact of pollen load on quality of life: a questionnaire-based study in Lithuania. Aerobiologia, 32 (2), 157-170.

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Committee Chairman assoc. prof. dr. D. Pupienis