Course Unit Descriptor

Study Programme: Agronomy

Course Unit Title: Meteorology

Course Unit Code: 19.URV012

Name of Lecturer(s): Prof. Branislava Lalić; Assoc. Prof. Igor Balaž

Type and Level of Studies: Undergraduate studies

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Winter

Language of instruction: English

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

Number of ECTS Allocated: 6

Prerequisites: None

Course Aims:

This is an interdisciplinary course in which principles of meteorology, climatology and hydrology are applied to agricultural systems. The course provides a broad-based introduction to meteorology, with emphasis on understanding the physical processes describing the most important atmospheric processes. Main aim of the course are: i) to educate students in methods of measurement and in evaluation of the meteorological and biometeorological observations; ii) to master the procedures of meteorological data analysis and their proper utilization in terrain; iii) to manage methods of the agrometeorological forecast, climatological and agroclimatological zonation.

Learning Outcomes:

Understanding of complex physical and biological relationships and interactions in the soil-plant atmosphere system. Knowledge on determination of physical and biological (crop) parameters important for: a) plant growth, b) understanding of energy and water balance causes and consequences, c) heat and mass flows between soil, atmosphere and plants. Aforementioned knowledge and skills should serve as a basis for better analysis and understanding of agrometeorological and plant production phenomena and problems:
1. Insight into how short- and long-wave radiation interacts with the plants. 2. Knowledge about atmospheric circulation. 3. Knowledge about water vapor in atmosphere. 4. Insight into how natural and anthropogenic drivers affect the Earth's climate. 5. Application of meteorology in agronomy. 6. Insight into meteorological measurements and observations.

Syllabus:

Theory

1. Introduction. Short description of meteorology. Meteorological elements. Weather and climate. Organization of meteorological observations; 2. Composition of the atmosphere. Origin of the atmosphere and its structure. Vertical distribution of air density and pressure; 3. Atmospheric radiation. Sunshine radiation. Earth's and atmospheric long wave radiation. Ultraviolet radiation. Heat budget of atmosphere, soil and water. Atmospheric pressure; 4. Water vapor in atmosphere. Evaporation. Evapotranspiration. Clouds and precipitation; 5. Atmospheric fronts. Wind. General circulation of atmosphere; 6. Introduction to climatology. Climatology elements and factors. Climate classification; Climate change. Climate change in agriculture. Sources and trends of climate change. Potential impact of climate change on plant production; 8. Selected chapters in agrometeorology. Meaning of term agrometeorology and its role. Impact of weather and climate on plants development. Impact of weather and climate on plant diseases and pests development. Severe weather prediction and protection. Impact of UV radiation on plants. Numerical weather prediction, basic terms and outputs of numerical simulations. Application of numerical weather prediction. Remote sensing in meteorology and agriculture. RADAR measurements and its application. Satellite observations and its application.

Practice

Meteorological observations and data processing. Methods of measuring and processing of: shortwave and long wave radiation; air humidity elements; evaporation and transpiration intensity; precipitation; soil temperature. Methods of air temperature measuring and calculation of active temperature sum. Drought. Selyaninov Hidrotermal coefficient. Frost prediction. Accomplishments of meteorological conditions for plant pests and diseases developing. Contemporary techniques in meteorological observations and data processing.

Required Reading:

1) Lalić, B., Eitzinger, J., Dalla Marta, A., Firanj Sremac, A., Orlandini, S., Pacher, B., 2018: Agricultural Meteorology and Climatology, Firenze University Press, pp. 354. ISBN 978-88-6453-795-5 (online).
2) Stigter, K., 2010: Applied Agrometeorology, Springer-Verlag, Berlin, pp. 347.
3) Ahrens, D.C, 2011: Essentials of Meteorology: An Invitation to the Atmosphere, Brooks/Cole, CA,USA, pp. 528.

Weekly Contact Hours: 5	**Lectures:** 45	**Practical work: 30**

Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	**Final exam**	points
Active class participation	0	written exam	20
Test I, II and III	30	oral exam	30
Preliminary exam(s)	20	…….	