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| **Title and code** of the subject: **Climatology and Hydrogeography, MTMVG7002A** | **ECTS Credit:3** |
| **Type** of the subject: compulsory / optional | |
| **Ratio of theory and practice:** (credit%) 70/30 | |
| **Type and number of classes per semester**: 2 hour(s) lecture and 1 hour(s) practice per **semester**  **Number of classes per week. 2 +1** | |
| **Type of exam**: exam / practical course mark | |
| **Subject in the curriculum:** semester 1 | |
| Preliminary requirements:- | |

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| **Summary of content - theory**: |
| Course objectives: The aim of the course is to provide knowledge on the terminology of climatology; to understand the basics of the functioning of the climate system, to understand the interactions between climate forming factors and their impacts; to gain a picture on the temporal and spatial patterns of climate elements and on the anomalies in the climate system of the Earth.   1. Definitions of meteorology, processes of the atmosphere 2. Structure and component of the atmosphere. Changes of components of the atmosphere. Solid and liquid components of the atmosphere 3. Dry and wet air. Measures of the humidity 4. Universal gas equation for wet air. Adiabatic processes of wet air. Barometric formula and its practical applications 5. Precipitation forming, types. Acidic rain 6. Weather fronts 7. Atmospheric forces and balance. Condensation. Cloud types 8. Subsurface waters 9. Morphometric background of watersheds. Classification of rivers, headwaters and valley networks 10. River drainage networks, classification of river channel types. The flow regime. Processes of erosion, transportation and accumulation. Sediment transport of fluvial systems 11. Floods and flash floods. Overview of the Danube watershed and the main rivers of Hungary. Problems of Inland excess water 12. Managing river channels 13. The application of Remote Sensing and Geographic Information Systems in hydrogeography |
| **Summary of content - practice**: |
| Skills to be learnt:     1. Devices of the meteorological measurements. The weather station 2. Ombrometer, ombrograph and the modern alternatives 3. Measuring temperature and the requirements 4. Measuring humidity 5. Potential and real evapotranspiration 6. Possibilities of the prediction and measurements 7. Measuring practice 8. Visiting an active meteorological station 9. Flume experiments: basic concepts, development of different channel types 10. Flume experiments: formation of alluvial fans and delta estuaries. 11. Flume experiments: concepts of surface development in lowland areas. 12. Remote sensing of fluvial environments – delineation of water-related areas by spectral indices. 13. GIS-based methods for determining flow patterns 14. GIS-based methods for determining flow patterns, scenario analyses |
| **Literature, handbooks in English** |
| 1. Charlton, R. (2008). Fundamentals of Fluvial Geomorphology. Routledge, New York. 2. Brierley, G.J., Fryirs, K.A. (2005). Geomorphology and River Management: Applications of the River Styles Framework. Wiley-Blackwell Publishing. 3. John E. Oliver (ed) (2005): Encyclopedia of wolrd climatology. Springer 4. C Donald Ahrens: Metorology today. An introduction to weather, climate, and the environment. |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**  * Knows the actual theories and models of climatology and hydrogeography based on scientific background, furthermore, is aware of his/her specific field's possible directions of development. * Knows the deeper connections and the relating theories between climatology, meteorology and fluvial geomorphology. * Knows the specific research methods and abstraction techniques of climatology and geography in terms of learning and problem solving capabilities, furthermore, the capability of elaborating practical features of theoretical questions. * Knows the practical methods for field investigations and laboratory analysis that allows working in the field of climatology and hydrogeography.  1. **Skills:**  * Able to define special professional problems by using versatile, interdisciplinary approach, to reveal and formulate the theoretical and practical background needed to solve them. * Able to apply the special research methods of climatology and hydrogeography and its abstraction techniques in practice to develop alternative solutions within any narrower field of geography. * Able to plan, organize, and manage meteorological and geographical researches in any workplaces e.g. research-development institutes and administration. * Able to apply graphic and mapping procedures required by meteorology and geography.  1. **Attitude:**  * Undertakes those comprehensive and distinct conditions and professional identity; which constitute the specific character, personal and community role of his area of expertise. * Aims to resolve tasks related to climatology-based or geographical matters in co-operation with the employees taking into consideration their professional view. * Effectively and credibly conveys the comprehensive and detailed issues of his occupation, his commitment to sustainable development leads and forms his actions. * Takes a proactive role in his work, uses the results of his professional activities at the service of the community. * Has developed professional identity and vocation.  1. **Autonomy and responsibility:**  * Deals with creation and modelling of theoretical and practical systems require general and special climatological and geographical skills with a high level of autonomy and responsibility. * States her/his personal case in climatological and geographical issues in known decision-making situations and take responsibility for their social and environmental consequences. * Leads teams of professionals. * Applies a wide variety of techniques and methods independently in practice in contexts at different levels of complexity and computability. |

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| **Responsible lecturer: Dr. Szabó Szilárd** |
| **Other lecturer(s): Bertalan László, Dr. Lázár István** |

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| **Terms of course completion:** |
| Theory:  Oral exam  Practice:   1. Completing assignments / exercises (60%) 2. Submitting essay or giving presentation (00%) |
| **Form of examination:** |
| Oral exam |
| **Requirement(s) to get signature:** |
| Completing written exercises  Giving presentation or submitting written essay |

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| **Exam questions:** |
| 1. Describe the structure and component of the atmosphere. 2. Explain the cyclone mechanism. 3. Compare the extratropical and tropical cyclones. 4. Specify and compare the weather fronts. 5. Specify the precipitation types. 6. Describe the acid rains. 7. Describe the condensation. 8. Specify the cloud types 9. Specify the types of subsurface waters 10. Compare the infiltration in karsts, sandy and clay sediments. 11. What is a sensitive hydrogeological water source? 12. Introduce the Flow regime. Describe the main hydrometric measurement methods and main hydrological terms. 13. River Management and Engineering – concepts, limits, consequences? 14. What are the main river channel types? What are the main morphometric variables to describe the changes in the fluvial environment? 15. Introduce different type of Digital Elevation Models. How can we use them in terms of determination of drainage patterns of a river system? |