SWARM Winter school in UACEG-Sofia

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GENERAL DESCRIPTION

- **Suggested period:** 22 November - 3 December 2021
  - ➢ 2 weeks (10 working days)
- **Online classes**
  - 4 topics, 4 teachers
- Individual or Group Tasks for students for some of the topics
- Final group discussion

N.B. During one of these 2 weeks UACEG can welcome WB Teaching Staff for training (in place, if allowed by COVID-19 restrictions)

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PRELIMINARY AGENDA - 1

Monday	Tuesday	Wednesday	Thursday	Friday
Topic – **Hydrological and Hydraulic modelling**	Topic – **Irrigation Systems and Drought Management**	Topic – **Investments in Irrigation Infrastructure**	Topic – **Water Management Optimization Problems**	Topic – **Water Management Examples - Vit river case study**
Lectures • Introduction • Types of models • Rainfall – Runoff models • Hydraulic models • 1D, 2D and 3D models • Model applications • Floodplain modelling • Flood early warning systems Practical work with 1D or 2D models Students work (in groups or individually)	Lectures • Introduction • Irrigation Schemes in Bulgaria • Irrigation Schemes and Systems – general • Crop Response to Water. Yield-Water relationship • Management Issues of Irrigation Schemes. • Water Metering and Efficiency of Irrigation Schemes • Structuring the GIS database for need of Management of Irrigation Schemes	Lectures • Introduction • Investments in Irrigation Infrastructure and Water Saving Requirements • Determining Potential Water Savings due to investments **Assignment of Task # 1** – Estimation of Efficiency of an Irrigation Scheme and Determination of Potential Water Saving due to Investments in Irrigation Infrastructure Students work (in groups or individually)	Lectures • Optimization Problems in Water Management • Linear Programming • Resource Allocation Problem • Transportation Problem • Prioritization of Investments in Irrigation Infrastructure – Multicriteria analysis **Assignment of Task # 2** – Solving a simple Optimization Task related to Water Resources Management Students work (in groups or individually)	Lectures • Introduction • Vit Watershed • WEAP modelling • Optimization • Scenarios and scenarios optimization • Water account tables **Consultation Time**

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PRELIMINARY AGENDA - 2

Monday	Tuesday	Wednesday	Thursday	Friday
Topic – **Hydraulic structures / Dams and reservoirs-1**	Topic – **Hydraulic structures / Dams and reservoirs-2**	Topic – **Hydraulic structures / Dams and reservoirs-3**	Topic – **Climate change and water management**	**Discussion and Presentation**
Lectures Elements of dam engineering • Planning of water resource projects • Embankment dam types; Concrete dam types • Spillways, outlets and ancillary works • Loads on dams • Presentation of interesting examples of dams and reservoirs Students work (in groups)	Lectures Embankment dam engineering • Classification and engineering characteristics of soils • Principles of embankment dam design • Seepage, stability, and stress analysis • Settlement and deformation • Rockfill embankments • Examples Students work (in groups)	Lectures Concrete dam engineering • Principles of concrete dam design • Gravity dam analysis • Concrete for dams; The roller-compacted concrete gravity dam • Design features and construction • Dam Monitoring and Operation • Examples Students work (in groups)	Lectures • Introduction • Climate change/variations and its impact on water resources • How to evaluate climate change • Mitigation measures • Presentation of projects Students work (in groups)	• Students present the results of Tasks # 1 and # 2. • Students present their work on themes assigned in lectures in previous days of the course • Discussion

WB Teaching staff training

- **Suggested period:**
  - 1 week in the period 22 November - 3 December 2021
- **In person** (if possible)
- Topic: ***Bulgarian experience in teaching the subject "Optimization of Irrigation and Drainage Systems" from the Master curriculum of Irrigation&Drainage Engineering at UACEG***

Thank you for your attention!