

## Rural engineering (IIIrd Year of study, Vth Semester)

Credit value (ECTS) 4

### Course category

Specialized (Compulsory)

### Course holder:

Prof. PhD. Daniel BUCUR

### Discipline objectives (course and practical works)

The aim of the course is to provide students with the knowledge and skills needed to substantiate and optimize decisions about:

- water management in agriculture and water supply of rural communities;
- rational use of land related to all territorial structures, through responsible management of natural resources and environmental protection;
- balanced development, economic and social, in compliance with the specifics of each area.

The practical training aim to familiarize students with the design and operation of all technical and biological works, with long-term effect, through which:

- the surfaces with unproductive soils or with low fertility are capitalized;
- combating the effects of natural phenomena that adversely affect crops;
- conditions are created to increase the quality of life.

### Contents (syllabus)

Course (chapters/subchapters)
<b>The object and importance of the discipline of Rural Engineering</b>
<b>General hydraulics:</b> the laws of equilibrium and motion of liquids and solids partially or totally immersed in a liquid; applications of hydraulics in rural engineering works.
<b>Irrigation of field crops, vegetables and meadows:</b> establishing the elements of the irrigation regime; techniques for distributing water to plants (surface runoff, sprinkling and micro-sprinkling, dripping)
<b>Arrangement of agricultural lands affected by water excess:</b> economically permissible duration of excess moisture on agricultural lands; surface drainage; underground drainage; design of intercepting drainage for collecting water from seep areas
<b>Arrangement of agricultural lands for soil erosion control:</b> cover methods; barrier methods.
<b>Regularization of watercourses:</b> characteristics of natural riverbeds; riverbed regularization works; shore protection works.
<b>Protection against floods:</b> general considerations regarding floods; the effects of dam on the river's hydrological regime; design and execution of dams.
<b>Regulation of watercourse flows through reservoirs:</b> Conditions for the location of a reservoir with dam; determination of water volumes characteristic of reservoir; reservoir dam; outlet works and spillway; operation and maintenance of dam reservoirs

Practicum
Discharge coefficient for nozzles and orifices

<b>Determining the hydraulic geometry parameters of channels</b>
<b>Irrigation regime (rate, number, and time of water applications to crops)</b>
<b>Irrigation scheduling</b>
<b>Subsurface drainage design on agricultural lands</b>
<b>Design of natural erosion control methods</b>
<b>Channel and terrace design</b>
<b>Location of a reservoir with dam and determination of the volume of tributary water</b>
<b>Drawing the curves of volumes and surfaces of a reservoir</b>
<b>Determination of the volumes characteristic of the reservoir</b>
<b>Sizing of the reservoir dam</b>
<b>Design of outlet works and spillway</b>
<b>Drawing of the level profile through the axis of the dam and calculation of the volume of embankments</b>
<b>Evaluation of rural engineering works</b>

## References

1. Bucur D. ed., 2019 - Advanced Evapotranspiration Methods and Applications, IntechOpen, London, DOI: 10.5772/intechopen.73720, 128 pages, ISBN: 978-1-78985-811-2 <https://www.intechopen.com/books/current-perspective-to-predict-actual-evapotranspiration>.
2. Bucur D. ed., 2016 - *River basin management*, InTech, Rijeka, ISBN 978-953-51-2604-1, DOI: 10.5772/61557, 316 pages, - <http://dx.doi.org/10.5772/61557>). *eroziunii solului*, Relal Promex Publisher, Bucharest, 245 p, ISBN 973-85863-6-4.
3. Bucur D., 2007 - *Conservation of agricultural lands through land improvement works* (in Romanian), “Ion Ionescu de la Brad” Publishing House, Iasi.
4. Bernas J., Konvalina P., Brom J., Moudry J., Vesela T., Bucur D., Dirja M., Shim S., 2019 - Agrotechnology as Key Factor in Effective Use of Water on Arable Land. In: Assessment and Protection of Water Resources in the Czech Republic. Springer Water. Springer, Cham, pp. 275-312 DOI [https://doi.org/10.1007/978-3-030-18363-9\\_12](https://doi.org/10.1007/978-3-030-18363-9_12).
5. Niacsu Lilian, Bucur Daniel, Ionita Ion; Codru Ionut-Costel Codru, 2022 - *Soil Conservation Measures on Degraded Land in the Hilly Region of Eastern Romania: A Case Study from Puriceni-Bahnari Catchment*. Water, 14, 525.
6. Savu P., Bucur D., 2009 - *Watercourses regularization* (in Romanian), “Ion Ionescu de la Brad”, Iasi, 232 p, ISBN 978-973-147-028-3
7. Savu P., Bucur D., Jitareanu S. I., 2005 - *Land improvements and crop irrigation - practical training*, (in Romanian), “Ion Ionescu de la Brad”, Iasi.

## Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Exam	Grid test	70%
Appreciation of the activity during the semester	Oral assessment during the semester, verification tests and final laboratory colloquium.	30%

## Contact

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