SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of civil engineering
1.3	Department	Department of Structural Mechanics
1.4	Field of study	Civil engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	CCIA/ Civil engineer
1.7	Form of education	Full time
1.8	Subject code	25

2. Data about the subject

2.1	Subject name	HYDRAULICS					
2.2	Subject area	Civil engineering					
2.3	Course responsible/lecturer	Sl.dr.ing. Botos Marius – marius.botos@mecon.utcluj.ro					
2.4	Teachers in charge of seminars	Sl.dr.ing. Botos Marius – marius.botos@mecon.utcluj.ro Drd.ing Kisfaludi Bak Zsombor					
2.5 Year of study	II	2.6 Semester	3	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	1
Exams and tests	3
Other activities	

3.7	Total hours of individual study	44
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	-

5. Requirements (where appropriate)

5.1	For the course	Classroom with blackboard, videoproiector
5.2	For the applications	Labroom with hydraulic stands,

6. Specific competences

Professional competences		After completing the syllabus, the students will be able to: ☐ To calculate hydrostatic pressures and forces; ☐ To calculate water supply systems of a town/plant; ☐ To calculate unitary canalization network; ☐ To calculate the collection of underground water with several wells; ☐ To draw Remour curves on a river; ☐ To calculate water purifying plant; ☐ To recognize components and parts of water treatment station or purifying plant.
Cross competences		Applying efficient and responsible individual and team work strategies, punctuality, industriousness in their projects. Applying efficient communication in team work. Development of self-expression, vocabulary and technical culture. Development of their technical status and active adaptation to new technical specifications.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To develop skills in Hydraulics that includes deterministic way of thinking by procedural approaches.
7.2	Specific objectives	Assimilation of theoretical and practical aspects of Hydraulics. Capability of applying concepts of Theoretical Hydraulics to Hydrotechnical constructions design.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Short history. Connection with other disciplines. Liquids physical abilities. Fundamental law of hydrostatics. Hydrostatic pressure.		
2.	Devices for measuring hydrostatical pressure. Hydrostatic forces on plane surface.		
3.	Hydrostatic force on curvilinear surfaces. Hydrodynamics. Introductive notions.		
4.	Laws of hydrodynamics. Euler's equations. Bernoulli's equation.		
5.	Bernoulli's equations geometrical interpretation. Head loss in hydraulic installations.		
6.	Hydraulic systems with pressure flow. Distribution network - ring network-open network		
7.	Pumping systems of water. Economical calculation of a pumping plant.		
8.	Aquifer layers. Characteristics of an aquifer layer. Determining of characteristics.		
9.	Collecting wells and drains for intakes of underground water. Calculation of systems of wells and drains. Tapping of underground water using several wells		
10.	Water Supply. Characteristic flows.		
11.	Water catching and treatment.		

12.	Accumulation of water. Aqueduct of water and constructions associated with it.		
13.	Constructions of drinking water supply systems.		
14.	Centralized systems of canalisation. Purifying of waste water.		

Bibliography

8.2. Applications/Seminars		Teaching methods	Notes
1.	Presentation of laboratory, measures for work protection.		
2.	Hydrostatic pressure. Evaluation. Units of measure.		
3.	Hydrostatic forces on plane surfaces-horizontal -vertical		
4.	Hydrostatic forces on plane inclined surfaces		
5.	Hydrostatic forces on curvilinear surfaces (cylindrical).		
6.	Hydrostatic forces on plane surfaces. (Experimental work)		
7.	Demonstration of Bernoulli's theorem (Experimental work)		
8.	Head loss in hydraulic installations. Distributed losses. (Experimental work)		
9.	Head loss in hydraulic installations. Local losses. (Experimental work)		
10.	Determination of permeability coefficient (Experimental work)		
11.	Collection of underground wells with collecting wells. Calculation of collecting wells. Number of wells needed.		
12.	Dimensioning of a water supply networks.		
13.	Dimensioning of a unitary sewerage system. Inflow calculation.		
14.	Dimensioning of a unitary sewerage system. Design of sewerage system.		

Bibliography

1. D. Cioc – Hidraulica , Bucuresti,EDP 1975
2. M. Ghiurconiu – Hidraulica si lucrari edilitare, Timisoara, 1965, IPT
3. Frank M. White - Fluid Mechanics, McGraw-Hill Series in Mechanical Engineering,
4. Munson, Bruce R., Young, Donald F., Okiishi, Theodore H., Huebsch, Wade W. Fundamentals of Fluid Mechanics, Sixth Edition,ISBN 978-0470-26284-9, John Wiley & Sons,.
5. J. EVET- 2500 SOLVED PROBLEMS IN FLUD MECHANICS AND HYDRAULICS, McGraw-Hill
Course notes: http://constructii.utcluj.ro/cursuri

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Theory (3-4 questions from theory,) + Solving one application (1.5 hours)	Written test	80%
Applications	Activity during the semester (portfolio with solved problems)		20%

10.4 Minimum standard of performance			
Solving and handing over of laboratory works by deadlines and getting at least 5 points individually at 2-3 of the three assessment criteria.			

Date of filling in: 01.10.2018		Title Surname Name	Signature
	Lecturer	Sl.dr.ing Botos Marius	
	Teachers in charge of application	Sl.dr.ing Botos Marius	

Date of approval in the department ……..

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Head of department
Prof.dr.ing. Cosmin Chiorean

Date of approval in the faculty ……………

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Dean
conf.dr.ing. Nicolae Chira