

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	Structures
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil, Industrial and Agricultural Buildings /Engineer (English language)
1.7	Form of education	Full time
1.8	Subject code	53.00

2. Data about the subject

2.1 Subject name	Foundations						
2.2 Course responsible/lecturer	Conf.dr.ing. Nicoleta – Maria ILIEȘ, nicoleta.ilies@dst.utcluj.ro						
2.3 Teachers in charge of laboratory	S.L.dr.ing. Olimpiu Cristian MUREȘAN, olimpiu.muresan@dst.utcluj.ro S.L.dr.ing. Iulia Consuela PRODAN, iulia.prodan@dst.utcluj.ro						
2.4 Year of study	IV	2.5 Semester	1	2.6 Assessment	E	2.7 Subject category	DS DOB

3. Estimated total time

3.1 Number of hours per week	6	3.2 of which, course:	3	3.3 applications	3
3.4 Total hours in the curriculum	156	3.5 of which, course:	42	3.6 applications	42
Individual study					hours
Manual, lecture material and notes, bibliography					28
Supplementary study in the library, online and in the field					10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					28
Tutoring					2
Exams and tests					4
Other activities					
3.7 Total hours of individual study	72				
3.8 Total hours per semester	156				
3.9 Number of credit points	6				

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.2 Competence	

5. Requirements (where appropriate)

5.1. For the course	Cluj-Napoca, Str. G. Barițiu Nr. 25, Amphitheatre
5.2. For the applications	Cluj-Napoca, Str. G. Barițiu Nr. 25, Geotechnics Laboratory

6. Specific competences

Professional competences	<ul style="list-style-type: none"> – Recognizing elements and foundations structures for buildings, in civil engineering, – Design of elements and foundations structures in civil engineering, – Technological and economical design for geotechnical works, – Organizing and conducting geotechnical works, for civil, industrial and agricultural buildings – Following quality and durable development requirements specific to geotechnical works
Cross competences	<ul style="list-style-type: none"> – Responsible execution of professional tasks , in restricted autonomy conditions and qualified assistance: applying efficient and responsible work strategies, punctuality, reliability and responsibility, based on principles, norms and professional ethics, – Acquaintance with roles and activities specific to team work and distributing tasks for subordinate levels, – Awareness of lifelong learning; efficient use of resources and learning techniques for personal and professional development

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

7.1 General objective	Development of competences regarding the foundations design and execution
7.2 Specific objectives	Assimilation of theoretical and practical knowledge regarding foundations for civil, agricultural and industrial buildings. Acquiring skills regarding foundations design for civil, agricultural and industrial buildings.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Foundation and foundation ground. The importance of correct foundation design. Definitions. Foundation classification. Foundation depth. Materials used for foundations.	Lecture, discussions, case studies etc.	Video-projector
2. Foundation ground design. Principles to design on ULS and SLS. Phenomenon taking place into the soil while loading. General principles for foundations design.		
3. General principles for infrastructure design. Definitions. Requirements for the infrastructure and foundations. Criteria to select foundation type. Loads computation on the infrastructure. Design assumptions for the infrastructure.		
4. Plain concrete continuous foundations. General requirements. Continuous foundations design. Eccentric foundations.		
5. Continuous foundations bearing on stiff supports. Foundations for non-structural walls. Foundations on compressible soils. Foundations on seismic areas.		
6. Special problems regarding the design of plain concrete continuous foundations. Foundations for structures with diaphragm walls.		
7. Stiff foundations. Utilization. Stiff foundations for columns. Determining plane surface. Design of plane concrete block. Design of reinforced concrete block. Reinforcement computation.		
8. Foundations for steel columns.		
9. Reinforced concrete foundations. General requirements. Reinforced concrete foundations design. Reinforcement computation. Reinforcement design. Eccentric reinforced concrete foundations, with small and large eccentricity.		
10. Reinforced concrete continuous foundations. Utilization. Design and reinforcement.		

11. Precast foundations. General requirements. Determining plane surface and cross section dimensions. Precast foundation reinforcement.		
12. Reinforced concrete foundations for framed structures. Utilization. General requirements. Foundations reinforcement.		
13. Foundation beams computation. Simplified methods. Design models for foundation beams. Design methods based on coefficient of subgrade reaction.		
14. Raft foundations. Design methods. Constructive requirements. Reinforcement design.		
References <ol style="list-style-type: none"> 1. A.Popa, N.Ilies - Fundații, Ed. Casa Cartii de Stiinta, 2013 2. V.Pop, A.Popa - Geotehnică și fundații, Lito IPCN, 1983, 3. M. Păunescu, V.Pop, T.Silion - Geotehnică și fundații, Ed. Didactică și Pedagogică, 1982, 4. A. Popa, F. Roman - Calculul structurilor de rezistență pe mediu elastic, 2000 5. Pop V., Popa A., etc - Proiectarea fundațiilor, lito UTCN, 1987. 6. A.Popa, etc.. - Fundații în condiții speciale de fundare, Lito IPCN 1992, 7. Manoliu I. - Fundații și procedee de fundare, Ed. Didactică și Pedagogică, București 1985 8. Normativ de proiectare a fundațiilor de suprafață NP-112-2014 9. N.Radulescu, H. Popa, A. Munteanu - Fundații. Îndrumător de proiectare. MatrixRom. 2001 10. SR EN 1997-1 : 2006 Eurocode 7: Proiectarea geotehnică. Partea 1: Reguli Generale. 11. Braja M. Das - Principles of Foundation Engineering, PC Boston, 1990, 12. M.J. Tomlinson - Proiectarea și executarea fundațiilor, Ed.Tehn.1985, 13. Lio Cheng – Soils and Foundations 14. Bowels J.E. – Foundation Analysis and Design 15. Teng W. C. – Foundation Design 16. Vladimir D. Dianu - Fundarea eficientă în cond. de teren dificile. Ed. Tehn. Buc. 1992, 17. F.Roman - Aplicatii de inginerie geotehnica, Ed. Papyrus Print, Cluj Napoca, 2011, 18. A.Popa, N.Ilies - Consolidarea fundatiilor, Ed. UT Press, Cluj Napoca, 2009, 		
8.2. Applications/Laboratory	Teaching methods	Notes
1. Retaining wall design	Lecture and numerical applications,	Computer, design software's: Mathcad, Microsoft office, Autodesk etc.
2. Retaining wall design		
3. Retaining wall design		
4. Retaining wall design		
5. Continuous foundations design.		
6. Continuous foundations design.		
7. Continuous foundations design.		
8. Foundations for columns design.		
9. Foundations for columns design.		
10. Foundations for columns design.		
11. Foundations for columns design.		
12. Raft foundation design.		
13. Raft foundation design.		
14. Evaluation of the project.		
References <ol style="list-style-type: none"> 1. Normativ de proiectare a fundațiilor de suprafață, indicativ NP-112-2014 2. SR EN 1997-1 : 2006 Eurocode 7: Geotechnical design. Part 1: General rules. 3. Popa, F. Roman - Calculul structurilor de rezistență pe mediu elastic, 2000 4. ROBERT W. DAY - Foundation engineering handbook, 2006 by The McGraw-Hill Companies, Inc. 5. GP 129-2014 Ghid privind proiectarea geotehnica 6. Pop V., Popa A., etc - Proiectarea fundațiilor, lito UTCN, 1987. 7. Other standards and norms Software: Autodesk, Mathcad, Microsoft Office: Word, Excel etc.		

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

Acquired competences are necessary for the civil engineers who activate both in design and execution companies.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	One numerical application and 3-4 theoretical questions	Written test – duration: 2-2.5 hours	70% (50% theoretical questions + 20% numerical application)
10.5 Applications	4 design projects according to the theme, completed during the semester according to the semester plan	Oral presentation – duration: 10-15min/ project	30%
10.6 Minimum standard of performance			
<ul style="list-style-type: none"> – Course: numerical application (min grade 5) and a correct answer for all the theoretical questions (for each theoretical question the student will receive a grade, the minimum grade for each question is 5) <ul style="list-style-type: none"> – <i>If the application grade is <5, the student is not eligible for the theoretical examination</i> – Application: If the projects grade is <5, the student is not eligible for the final examination. Attendance to the final Foundations exam is conditioned by attending all the laboratory classes and having a grade >5 to all the submitted projects 			

Date of filling in:		Title Surname Name	Signature
01.10.2019	Lecturer	Conf.dr.ing. Nicoleta Maria ILIEȘ	
	Applications	S.L.dr.ing. Olimpiu Cristian MUREȘAN S.L.dr.ing. Iulia Consuela PRODAN	

Date of approval in the Structures Department council _____	Head of Department of Structures, Conf.dr.ing. Attila PUSKAS
Date of approval in the Faculty Council _____	Dean, Conf.dr.ing. Nicolae CHIRA