

## SYLLABUS

### 1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Constructions
1.3	Department	Civil engineering and management
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	CE/Engineer
1.7	Form of education	Full time
1.8	Subject code	59.20

### 2. Data about the subject

2.1	Subject name				Agricultural Constructions						
2.2	Subject area				Engineering sciences						
2.3	Course responsible/lecturer				Şef lucr. Dr. ing. MSc Dârmon Ruxandra ruxandra.darmon@ccm.utcluj.ro						
2.4	Teachers in charge of seminars				Şef lucr. Dr. ing. MSc Dârmon Ruxandra ruxandra.darmon@ccm.utcluj.ro						
2.5	Year of study	4	2.6	Semester	2	2.7	Assessment	E	2.8	Subject category	DID/DOP

### 3. Estimated total time

3.1	Number of hours per week	3	3.2	of which, course:	2	3.3	applications:	1
3.4	Total hours in the curriculum	42	3.5	of which, course:	28	3.6	applications:	14
Individual study								hours
Manual, lecture material and notes, bibliography								28
Supplementary study in the library, online and in the field								2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								28
Tutoring								1
Exams and tests								3
Other activities								-
3.7	Total hours of individual study	62						
3.8	Total hours per semester	104						
3.9	Number of credit points	4						

### 4. Pre-requisites (where appropriate)

4.1	Curriculum	Reinforced and Prestressed Concrete, Steel Constructions, Timber Structures
4.2	Competence	-

### 5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

## 6. Specific competences

Professional competences	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> <li>To know the normal performance for designing general plans of farm buildings;</li> <li>To know the performance criteria for the design of agricultural buildings;</li> <li>To meet performance requirements standardized construction of livestock;</li> <li>To meet the performance requirements of standardized production plant construction;</li> <li>To know the types of structural systems of livestock buildings;</li> <li>To know the types of structural building systems for vegetable production;</li> <li>To know the specific performance requirements of the enclosure of livestock buildings;</li> </ul> <p>After completing the subject, students will be able to:</p> <ul style="list-style-type: none"> <li>- produce floor plans and cross sections correlated with technologies of livestock buildings and maintenance of bio factors;</li> <li>- determine the type of structure functions properly with the livestock building functionality and technology;</li> <li>- design closure elements correlated with the protection structure and the microclimate;</li> <li>- be calculated in terms of heat engineering closure elements of the building livestock;</li> <li>- able to calculate the energy balance of the building livestock;</li> <li>- prepare a greenhouse design;</li> <li>- decide on measures of corrosion protection of construction elements.</li> </ul>
Cross competences	<p>Presentation of a technical report incorporating the specifically bio-tech elements for agricultural buildings, structural elements and description of the resistance structure. Supporting an oral presentation of the designed construction.</p>

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

7.1	General objective	Developing abilities to identify, formulate and solve structural engineering problems
7.2	Specific objectives	Developing abilities to design or check structural and specifically members to fulfil strength, stiffness and stability requirements

## 8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Elements of design theory of agricultural construction: classification, performance criteria, performance targets and specific environmental factors	Lecture with discussions	
2. The design of general plan of livestock farms correlated with environmental requirements		
3. Constructions for zootechnical field: performance criteria, indoor and outdoor environmental factors, technologically and specifically functional elements		
4. Technological and functional elements for housing cattle and swine species		
5. Technological and functional elements for housing poultry and equine species		
6. Structural design of housing constructions: construction systems, schemes and static load calculation features, dimensioning the elements of resistance structure		
7. Structural systems with load-bearing walls		


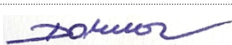
8. Structural framing systems with openings 9-15m		
9. Structural framing systems span 15- 24m		
10 Hygrothermal design of agricultural buildings: indoor comfort parameters, specific design problems		
11. The energetically design of the farms buildings. Constructive details of envelope elements.		
12. Aggressive environments. Corrosion protection. Basics elements to refurbish the agricultural building envelope.		
13. Functional elements, environmental factors and resistance structures for greenhouses.		
14. Functional elements, environmental factors and resistance structures for grains storage and fruit warehouse.		
Bibliography		
<ul style="list-style-type: none"><li>• Pantel, E., Ioani, A., Popa, A., Nedelcu, M., <i>Strength of Materials. Theory and Problems, Part II</i>, Edit. Napoca Star, 2009.</li><li>• Pantel, E., Ioani, A., Turda., D., Popa A., Lessons of Strength of Materials. Theory and Problems, Part II, Cluj-Napoca, 2004.</li><li>• Gere, J.M, Goodno, B.J., <i>Mechanics of Materials</i>, Eighth edition, Edit. CENGAGE Learning, 2012.</li><li>• Hibbeler, R.C., <i>Mechanics of materials</i>, Eighth edition, Pearson Prentice Hall, 2011.</li><li>• Beer, F. P., Johnston Jr., E.R., DeWolf, J.T., Mazurek, D.F., <i>Mechanics of materials</i>, Sixth edition, McGraw-Hill, 2012.</li><li>• Megson, T.G.H., <i>Structural and stress analysis</i>, Second Edition, Elsevier Butterworth-Heinemann, 2005.</li><li>• da Silva, V. D., <i>Mechanics and strength of materials</i>, Springer-Verlag, 2006.</li><li>• Boresi, A.P., Schmidt, R.J., Sidebottom, O.M., <i>Advanced mechanics of materials</i>, Fifth Edition, John Wiley &amp; Sons, Inc., 1993.</li></ul>		
8.2. Applications/Seminars	Teaching methods	Notes
Study location of farming - livestock and vegetables	Blackboard presentation	
Designing the floor plan and cross-section for a building within a Farm		
The study of structural resistance system for a livestock building - structural computation and dimensioning of resistance elements		
The energetically design of the building and envelope elements.		
Study location of farming - livestock and vegetables		
Designing the floor plan and cross-section for a building within a farming - livestock or vegetables		
Bibliography		
<ul style="list-style-type: none"><li>• Gere, J.M, Goodno, B.J., <i>Mechanics of Materials</i>, Eighth edition, Edit. CENGAGE Learning, 2012.</li><li>• Pantel, E., Ioani, A., Popa, A., Nedelcu, M., <i>Strength of Materials. Theory and Problems, Part II</i>, Edit. Napoca Star, 2009.</li><li>• Pantel, E., Ioani, A., Turda., D., Popa A., Lessons of Strength of Materials. Theory and Problems, Part II, Cluj-Napoca, 2004.</li><li>• Hibbeler, R.C., <i>Mechanics of materials</i>, Eighth edition, Pearson Prentice Hall, 2011.</li><li>• Beer, F. P., Johnston Jr., E.R., DeWolf, J.T., Mazurek, D.F., <i>Mechanics of materials</i>, Sixth edition, McGraw-Hill, 2012.</li><li>• Ye, J., <i>Structural and stress analysis. Theories, tutorials and examples</i>, Taylor &amp; Francis, 2008.</li><li>• Hartsuijker, C., Welleman, J.W., <i>Engineering mechanics. Volume 2: Stresses, Strains, Displacements</i>, Springer, 2007.</li></ul>		

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

Acquired skills will be needed for civil engineers who work in design and buildings firms, and are fundamental for those who will follow master and doctoral programmes in the field of Civil Engineering.

**11. Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	5 subjects or questions	Written examination	100%
10.5 Applications	Team project	Oral examination	Pass/Fail
10.6 Minimum standard of performance			
Grade 5			

Date of filling in: 11.X.2019		Title Surname Name	Signature
	Lecturer	Şef lucr. Dr. ing. MSc DĂRMON Ruxandra	
	Teachers in charge of application	Şef lucr. Dr. ing. MSc DĂRMON Ruxandra	

Date of approval in the department .....  <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/>   Date of approval in the faculty .....  <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/>	Head of department Conf.dr.ing. ACIU Claudiu    Dean Conf.dr.ing. CHIRA Nicolae
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