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	Structural Mechanics
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil Engineering (english) / Civil Engineer
1.7	Form of education	Full time
1.8	Subject code	26.00

2. Data about the subject

2.1	Subject name			Statics I			
2.2	Subject area			Civil Engineering			
2.3	Course responsible/lecturer			Assoc.prof. F.-Zsongor GOBESZ			
2.4	Teachers in charge of seminars			Assoc.prof. F.-Zsongor GOBESZ			
2.5 Year of study	II	2.6 Semester	2	2.7 Assessment	Exam	2.8 Subject category	DID 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	84	3.5 of which, course:	42	3.6 applications:	42
Individual study					hours
Manual, lecture material and notes, bibliography					33
Supplementary study in the library, online and in the field					–
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					33
Tutoring					–
Exams and tests					6
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	Mechanics I
4.2	Competence	none

5. Requirements (where appropriate)

5.1	For the course	Amphiteater with blackboard, videoprojector and screen
5.2	For the applications	Classroom with blackboard, pocket calculators

6. Specific competences

Professional competences	After completing the syllabus, the students will be able to: - schematize materials, actions, supports, structures for structural analysis; - apply the static equilibrium conditions for all categories of static determined structures; - draw the effort diagrams for all categories of static determined structures; - use the principle of virtual mechanical work in order to determine forces and influence lines for all categories of static determined structures; - assess maximum efforts from mobile loads on a simple supported beam; - analyse plane structures with perpendicular loads.
Cross competences	Knowledge and experience of employing efficient and responsible work strategies, punctuality, seriousness and liability based on the principles, norms and values of professional ethics. Applying efficient technics in team work. Better understanding of the laws of nature and of the relation between cause and effect.

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

7.1	General objective	Understanding and learning the basic concepts regarding the structural analysis of the main categories of bearing structures.
7.2	Specific objectives	Assimilation of theoretical and practical knowledge about the use of static calculation in the structural analysis of static determined structures.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Objectives of structural analysis. Schematics for structural materials, actions, bearing structures.	Oral and written presentation with examples and comments (stimulating interactivity)	Individual study topics will be announced a week before
2.	Main hypothesis of linear elastic structural analysis. Differential relations between loads and efforts. Drawing effort diagrams.		
3.	Straight beams. Cantilivered girders with hinges (Gerber beams).		
4.	Plane frame structures. The use of symmetry and anti-symmetry by plane frames.		
5.	Arches. Plane three-hinged arches. Arches with ties.		
6.	Plane trussess, solving methods.		
7.	Matrix formulation in case of plane trussess.		
8.	The use of virtual mechanical work for assessing reactions and efforts in case of plane structures.		
9.	Influence lines (definition, methods). Influence lines in case of simple supported beams and Gerber beams.		
10.	Influence lines in case of plane arches and plane frames.		
11.	Influence lines in case of common and complex trussess.		
12.	Maximum efforts resulting from mobile loads applied on simple supported beams.		
13.	Highest maximum bending moment and critical		

	section, resulting from mobile loads on a simple supported beam.		
14.	Plane structures loaded perpendicular to their plane.		
8.2. Applications/Seminars		Teaching methods	Notes
1.	Applying static equilibrium conditions. Computing of the reactions.	Short presentation followed by solving some exemplary applications with discussions. Each student has to solve the given home-works, which will be checked and assessed weekly by the teacher.	Students can work individually or in groups.
2.	Straight beam. Effort diagrams.		
3.	Girders with cantilevers and hinges. Effort diagrams.		
4.	Plane frames with static loads. Effort diagrams.		
5.	Use of structural symmetry and anti-symmetry by plane frames.		
6.	Solving plane arches. Sectional forces, effort diagrams.		
7.	Static calculus of simple plane trusses.		
8.	Static calculus of complex plane trusses.		
9.	Using the principle of virtual mechanical work in order to determine sectional efforts.		
10.	Influence lines by Gerber girders and plane frames.		
11.	Influence lines by arches.		
12.	Influence lines by plane trusses.		
13.	Assessing M(max) and T(max) by a simple supported beam.		
14.	Assessing M(max,max) by a simple supported beam.		

Bibliography

1. Lecture notes.
2. Catarig A. et alii: Statica constructiilor. Teorie si aplicatii – Structuri static determinate, vol. 1, Ed. UTPres, Cluj-Napoca, 2003.
3. Catarig A., Petrina M.: Statica constructiilor – Metode de calcul si aplicatii, Ed. Dacia, Cluj-Napoca, 1991.
4. Mazilu P.: Statica Constructiilot, vol.1 & 2, Ed. Tehnica, Bucuresti, 1955, 1959.
5. Kassimali A.: Structural Analysis, PWS-Kent Publishing Co., Boston, 1993.
6. West H. H.: Fundamental of Structural Analysis, John Wiley & Sons, NY, 1993.
7. White R. N., Gergely P, Sexsmith R. G.: Structural Engineering, vol. 1 & 2, John Wiley & Sons, NY, 1975.

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

Acquired skills will be needed by engineers working in building design and/or research (also in education).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Theory (2 subjects)	Written examinarion (30 minutes)	40%
Applications	Activity during the semester (portfolio with solved problems) + Solving 4 problems	Assessment of the home-works Written examinarion (2.5 hours)	20% 40%

10.4 Minimum standard of performance
Solving the home-works and handing over them before the weekly deadlines is mandatory in order to participate at the examination (see also ECTS rules). The final grade (F) is computed only if each component (T – theory, A – activity, P – problem solving) has an individual average value of 4.5 (four and 50%) at least, using the following formula: F = 40%T + 20%A + 40%P. The condition of promotion (acquiring the credit points): $F \geq 5$.

Date of filling in
18.07.2017

Teachers in charge of seminars
Assoc.Prof. F.-Zsongor GOBESZ

Date of approval in the department

Head of department
Prof. Cosmin G. CHIOREAN