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	Structural Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil Engineering/ Civil Engineer
1.7	Form of education	Full time
1.8	Subject code	

2. Data about the subject

2.1	Subject name			Computer Aided Design			
2.2	Subject area			Structural Engineering			
2.3	Course responsible/lecturer			PhD Civ. Eng. Petrina Tudor			
2.4	Teachers in charge of seminars			PhD Civ. Eng. Petrina Tudor			
2.5 Year of study	III	2.6 Semester	I	2.7 Assessment	C	2.8 Subject category	

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	1	3.3 applications:	3
3.4 Total hours in the curriculum	114	3.5 of which, course:	14	3.6 applications:	42
Individual study					hours
Manual, lecture material and notes, bibliography					12
Supplementary study in the library, online and in the field					12
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					12
Tutoring					12
Exams and tests					12
Other activities					8

3.7	Total hours of individual study	48
3.8	Total hours per semester	162
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	N/A
4.2	Competence	N/A

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	N/A

6. Specific competences

Professional competences	At the end of the course the student will be able to realize a full structural analysis of a steel, reinforced concrete or mixed steel- reinforced concrete real structure. The competence of the student will be on most types of structures: 2 dimensional structures (frames, trusses), 3-dimensional structures (3D buildings, 3D trusses), panels, silos, retaining walls a.s.o.. The student will be able to get the data needed to design each element of the structure (stresses, internal forces, displacements).
Cross competences	- computer use; - a set of software; - Romanian and European design codes prescriptions for structural design; - Analysis of structures by matrix formulation

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

7.1	General objective	The main goal of this discipline is to assure the student to be able to realise a complete structural analysis of a steel, reinforced concrete or mixed structure by using computer tools.
7.2	Specific objectives	- knowledge of the software to use; - modelling of the material, structure and supports; - modelling the actions and loads; - introduce combinations by design code; - find internal forces diagrams on all elements; - find moment maps on panels, diaphragms; - find displacements and deformations

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	The discipline main characteristics, goals and expectations	Power Point presentation, 2 way discussions, solved examples.	
2.	-		
3.	Modelling the material, structures, supports and loads. European materials and products databases presentation.		
4.	-		
5.	European Design Codes prescriptions guidance.		
6.	-		
7.	Wind action and Seismic action computer modelling.		
8.	-		
9.	Matrix Analysis of structures – Basic Elements.		
10.			
11.	Matrix Analysis of structures – Force Method.		
12.			
13.	Matrix Analysis of structures – Displacement Method.		
14.			

Bibliography: Autodesk Robot Structural Analysis User Guide, M. Petrina et al “Matrix analysis of structures”, U.T. Press 2007, ISBN 978-973-662-351-6

8.2. Applications/Seminars		Teaching methods	Notes
1.	Software general presentation (Autodesk Robot Structural Analysis)	Direct description of the work, solved example, individual and group explanations.	
2.	Material and cross sections European databases. European design codes software implementation. Supports modelling.		
3.	Structural analysis of 2 dimensional steel frames.		
4.	Structural analysis of 2 dimensional reinforced concrete frames.		
5.	Structural analysis of 2 dimensional steel trusses.		
6.	Structural analysis of 3 dimensional steel trusses.		
7.	Structural analysis of a plate and diaphragm.		
8.	Structural analysis of a real reinforced concrete structure with 3d frames, panels and diaphragms. Part 1: Modelling the material, structure and supports.		
9.	Structural analysis of a real reinforced concrete structure with 3d frames, panels and diaphragms. Part 2: Actions and loads on structure according design code prescriptions.		
10.	Structural analysis of a real reinforced concrete structure with 3d frames, panels and diaphragms. Part 3: Internal forces diagrams, moment maps on panels and diaphragms, displacements.		
11.	Structural analysis of a steel-reinforced concrete structure. Part 1: Modelling the material, structure and supports.		
12.	Structural analysis of a steel-reinforced concrete structure. Part 2: Actions and loads on structure according design code prescriptions.		
13.	Structural analysis of a steel-reinforced concrete structure. Part 3: Internal forces diagrams, moment maps on panels and diaphragms, displacements.		
14.	Final Test		
Bibliography Autodesk Robot Structural Analysis User Guide, SR EN 1990-1998			

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

The contents of the course and the objective of the discipline is to assure the Civil Engineer the possibility to work within structural engineer consultant companies in Romania and in the European Union. The employers in this field expect the junior civil engineer to be able to analyse a structure, design the structure and draw the execution details. This course assures the first mentioned ability.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Ability to talk about subjects presented during lectures	Interview	50%
Applications	Ability to analyse a real structure by computer aid	Computer test	50%
10.4 Minimum standard of performance			
- In order to pass the interview the student has to prove good knowledge of lectures contents; - In order to pass the computer test the student should realise at least the correct modelling of the structure and supports by computer aid.			

Date of filling in	Teachers in charge of lectures	Teachers in charge of seminars
11/03/2016	PhD Civ Eng Tudor Petrina	PhD Civ Eng Tudor Petrina

Date of approval in the department

Head of department
PhD Civ Eng Cosmin Gruia Chiorean