

## 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	CCIA English/Engineer
1.7	Form of education	Full time
1.8	Subject code	

### 2. Data about the subject

2.1	Subject name	Steel Structures I									
2.2	Subject area	Structural Engineering									
2.3	Course responsible/lecturer	Associated Professor Ioan Petran									
2.4	Teachers in charge of seminars	Lecturer Paul Pernes									
2.5	Year of study	III	2.6	Semester	VI	2.7	Assessment	Exam	2.8	Subject category	

### 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								5
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								18
Tutoring								2
Exams and tests								3
Other activities								
3.7	Total hours of individual study	48						
3.8	Total hours per semester	104						
3.9	Number of credit points	4						

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

4.1	Curriculum	
4.2	Competence	Loads evaluation and structural analysis

### 5. Requirements (where appropriate)

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

## 6. Specific competences

Professional competences	<ul style="list-style-type: none"> <li>Advantages and disadvantages of steel structures</li> <li>Standard tests on steel material</li> <li>Bolted connection types, characteristics, position</li> <li>Welded connections types and technology of welding</li> <li>Cross section types for steel elements</li> <li>Steel elements subjected to axial loads</li> </ul>
Cross competences	<ul style="list-style-type: none"> <li>Number and position of bolts in case of a bolted connection</li> <li>Type and characteristics of welded seams in case of a welded connections</li> <li>Sizing and checking for a steel element subjected to tension and centric compression force</li> </ul>

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

7.1	General objective	Developing ability to design steel connections
7.2	Specific objectives	Sizing and checking steel joints

## 8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1.Steel fabrication and steel products; Structure of carbon steel and alloy steels	Presentation	Video-projector
2.The influence of alloying on the mechanical characteristics of steel; Heat treatments		
3.Structural steel for buildings		
4.Corrosion behaviour of steel elements		
5.Calculation procedure for steel structures; Romanian standards (STAS) and Eurocode 3(EC 3)		
6.Mean of joinings and gripings; Romanian standards and EC 3		
7.Riveted connections; Details and calculation of riveted connections		
8.Ordinary bolted connections; Details and calculation of them		
9.High-strength bolted connections; Details and calculation of them		
10.Welded connections; Fillet welds; Butt welds		
11.Technology of welds; welding procedures; welding defects and control		
12.Design resistance of fillet welds; design resistance of butt welds		
13.Centric tensioned bars; centric compressed bars		
14.Centric compressed bars; buckling phenomena		

<p><b>Bibliography</b></p> <p>1.Ioan Petran, Roland Mihai Senila – Design of pitched roof steel portal frame structure, Ed. Mediamira, Cluj-Napoca, 2017</p> <p>2.SR EN 1993-1-8 Eurocode 3:Design of steel structures, 2006</p> <p>3.ECCS No 126, TC 10 Structural Connections, European Recommendations for de design of Structural connections according to Eurocode 3, 2003</p> <p>4.Arcelor profiles-Beams, channels and merchant bars, Arcelor Group, 2005</p>		
<b>8.2. Applications/Seminars</b>	<b>Teaching methods</b>	<b>Notes</b>
1.Steel qualities.Choice of steel for building elements.Range of laminates	Presentation, workshop, applications	Eurocode 3 part 1-8 Tables of laminates Arcelor profiles
2.Regular bolted connections.Constructive prescriptions, bolts presentation, calculation of bolted joints		
3.Paper no.1-Regular bolted connections.Theme launch. Problem 1:Calculation of articulated connection between a main and a secondary beams		
4.Explications to solve the problem and technical execution drawings		
5.Paper no.1-Problem 2:Gusset plate connection design -truss type.Calculation of joint		
6.Paper no.2-Design of beam-column rigid joint.Connection design		
7.Explications to solve the problem and execution technical drawings		
8. Paper no.3-Connections with pretensioned high-strength bolts.Design of beam splices, splice plate design		
9.Joint design.Technical execution drawings		
10.Welded joints.Constructive prescriptions, structure behavior		
11.Paper no.4:Connection of an angle section to a gusset plate		
12.Connection design, problems		
13.Technical execution drawings		
14.Recapitulation, applications		

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

Skills for the future engineers in a frame of design companies and building companies

**10. Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	5 question theory problems	Written exam – 2 hours	60%
10.5 Applications	Design problem solving	Written testing – 45 minutes	40%
10.6 Minimum standard of performance			
Every position must be $\geq 5$ mark, including course, application and papers no. 1-4			

Date of filling in: dd.mm.yyyy		Title Surname Name	Signature
	Lecturer	Associated Professor Ioan Petran, Phd	
	Teachers in charge of application	Lecturer Paul Pernes, Phd	

Date of approval in the department .....  _____	Head of department Conf.dr.ing Attila Puskas
Date of approval in the faculty .....  _____	Dean Conf.dr.ing Nicolae Chira