Course Syllabus: Timber Structure and Formwork

Course Basic Information	
Academic Unit:	**Faculty of Civil Engineering**
Course Name:	**Timber Structure and Formwork**
Level:	**Bachelor**
Course Status:	**Mandatory**
Year of Study:	**III– (third)**
Number of Hours per Week:	**2+2**
ECTS Credits:	**6**
Time /Venue:	**According to the Timetable**
Course Teacher:	**Prof. ass. Dr. Florim GRAJÇEVCI**
Contact Details:	florim.grajcevci@uni-pr.edu www.fn.uni-pr.edu
Course Description:	Historical knowledge of the use of wood material for the buildings. Knowledge of wood qualities in order to use straight of the structural wood elements. Computation of the element's assembly of structures for different cases of internal forces. Computation of connections, continuous connections of different structure elements. Basic knowledge about the stability of frame structures systems. Basic knowledge of scaffold formation.
Course Goals:	A theoretical module that enables the student to recognize the structural wood material, the design of solid wooden structures, the design of the scaffolding structures.
Expected Learning Outcomes:	- Explains the different botanical of wood types, the variety of structural wood products and structural wood qualities. - Design of the structural solid wood elements for the different internal force cases and design of the assembled structural elements. - Accounts the different of connecting types devices, explains and design the specific types of connecting devices. - Design of the roof structures. - Design of the structural scaffolding formworks structures.

Student Workload (Consistent with the Learning Outcomes)			
Activity	**Activity**	**Activity**	**Activity**
Lectures	2	15	30
Theory/ Lab Work/Exercises	2	15	30
Practical Work	0	0	0
Consultations with the teaher	2	2	4
Field Work	0	0	0

Test, seminar paper	2	3	6
Homework	1	15	15
Self-study (library or home)	1	15	15
Preparation for final exam	4	5	20
Assessment time (test, quiz, final exam)	2	3	6
Projects, presentations, etc.	1	4	4
Site Visits of the Buildings	2	2	4
Student Workload	8	2	16
Total			**150**
Teaching Methods:	- *Lectures with presentation and practical demonstrations of elements, materials for Structures.* - *Numerical exercises* - *Semester Seminar concrete examples.* - *intercommunication during lections.* - *Exercises on Group.*		
Assessment Methods:	*During the semester is organize three colloquiums with below assignments:* - *colloquium I 10%,* - *colloquium II 10%* - *colloquium I 10%* - *presence 5%* - *home work 5%* - *design work 20%* - *Final exam 40%*		
Literature			
Primary Literature:	*Lectures from the classrooms*		
Additional Literature:	- *Werner, Zimmer., "Holzbau 1", Dach- und Hallentragwerke nach DIN und Eurocode, Berlin Aufl.-1996* - *Werner, Zimmer., "Holzbau 2", Dach- und Hallentragwerke nach DIN und Eurocode, Berlin Aufl.-1999* - *J. Porteous, A. Kemrani., "Structural Timber Design to Eurocode 5", 2007* - *Final draft, prEN 1995-1-1, Eurocode 5, "Design for Timber Structure" Part 1-1General Common rules and rules for Buildings, December 2003* - *D. Breyer, K. Fridley, K. Cobeen., "Design of Wood Structure ASD", fourth edition, McGraw-Hill,* - *"Dissemination of information for training", En 1995, Eurocode 5: Design of timber structures, workshop 18-2o February 2008, Brussels* - *Leonardo da Vinci Pilot Project (CZ/06/B/F/PP/168007), Educational Material for Designing and Testing of Timber Structures – TEMITIS, "HANDBOOK 2 – According to Ec 5", Prague, October 2008* - *Ranta-Maunus, M. Fonselius, J. Kurkela, T. Toratti., "Reliability analysis of timber structures", Technical Research Centre of Finland, Espoo 2001* - *R. Boddenberg, Baustik und Holzbau, "Vorlesung Holzbau I", Wintersemester 2009/2010 Le Bois "L'architecture d'aujournad'hui", Paris*		

	- *Georg Droge "Grundzuge des Holzebaues" Underwood & M. Hiuini "Structural deisgn", USA 1998*

Design and Teaching plan:	
Week	**Title of the Lecture**
Week 1:	***Introduction*** •*Historical development of the applied of structural wood.* •*Wood material for wood structures.* •*structural wood comparison to the different structural materials.* ***Wood technology*** •*Wood as organic material.* •*Wood anisotropy ad heterogeneity.* • *Wood types and its structural products.*
Week 2:	***Solid wood properties*** •*Esthetic properties.* •*Physic properties.* •*Physic -chemical properties.* • *mechanical properties– woods strengthening, stress and strain.*
***Week 3*:**	***Wood structural elements stability*** •*Design theory - limit state.* • *Actions on structures according to the Eurocode 1.* • *action combinations, design structural situations in accordance to the EC 1.* • *General Eurocodes base Requests for the Structure.* • *Los stability of the structural element.* • *Safety partial coefficients.* • *Numerical Examples of action combination.*
Week 4:	***Stability of the wood Structural members*** • *Axial Tension.* • *Axial Pressure.* • *Slenderness on Axial pressure elements.* • *slenderness effective lengths.* •*Numerical Examples of the structural elements.*
Week 5:	***Structural stability*** • *Bending.* •*Slope Bending.* • *Numerical Examples.*
***Week 6*:**	***Structural stability.*** •*Eccentric Pressure.* •*Eccentric tension.* • *Numerical Examples.*
Week 7:	***Connectors and Fasteners for wood structures*** • *Types of Connectors and fasteners.* •*connectors groups and its functionality.* •*Design methodologies according to the DIN and EC standards for connectors and fasteners.* • *Chopstick fasteners.* •*Bolds connectors on wood structures.*
Week 8:	***Connectors and Fasteners for wood structures*** • *Numerical Examples - Bolds.*

	• *dowels connectors.* • *Nails connectors.*
Week 9:	***Connectors and Fasteners – joints connectors*** • *Shape joints, types and its functionality.* • *Prismatic wood joints.* • *"Tuchscherer" joints.* • *Numerical Examples.*
Week 10:	***Pressure structural elements connections- "Birdmouth"-joint .*** • *Types of "Birdmouth" Joints.* • *Simple Birdmouth joint, design.* •*Symmetrical Birdmouth joint, design.* • *Bi simple Birdmouth joint, design.*
***Week 11*:**	***Roof Structures.*** •*Roof covering types (tiles etc).* •*Covering roof structure.* • *General concepts of the terms for the classic roof structures.*
***Week 12*:**	***Spatial stability of the wood Structural Frames Systems.*** • *Spatial Stability Concepts.* •*Bracing Shapes for the wooden frames on structural systems.* • *Technical Design rules for Bracing systems.*
***Week 13*:**	***Classic roof Structures.*** • *Simple roofs.* •*Classic roof structures.* • *Different cases of classic roof structures.*
***Week 14*:**	***Roof structural Design*** •*Actions on roof structures.* •*Design of roof structures.* •*Design and computation of the cover structural elements (Battens, ribs and rafters).* •*Main Design of wood trusses.* •*Desin of roof structure, details.*
***Week 15*:**	***Scaffolding and formworks.*** •*General terms of scaffoldings and formworks.* • *Construction way of scaffolding and formworks.* • *Design methodology of scaffolding and formworks.*

Academic Policies and Rules of Civility:
We start and finish class on time. *Tools used during class must be cleaned and stored away at the end of class.* *Mobile/smart phones, and other electronic devices (e.g. iPods) must be turned off (or on vibrate) and hidden from view during class time.* *Laptop and tablet computers are allowed for quiet use only; other activities such as checking personal e-mail or browsing the Internet are prohibited.*