UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
ARCH-212	Structural Mechanics- Statics II	4
Prerequisites	**Department**	**Semester**
ARCH-211	Architecture	Spring
Type of Course	**Field**	**Language of Instruction**
Required	Architecture	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr. Tonia Sophocleous Lemonari	2nd
Mode of Delivery	**Work Placement**	**Corequisites**
Face to Face	N/A	-

Course Objectives:

The main objectives of the course are to:

1. Introduce the principles of beam types.
2. Illustrate principles of connections such as hinged, fixed at one or both ends and continuous beams.
3. Analyse principles of Axial Resistance, Joinery and Lateral Stability.
4. Introduce the principles of floor and roof framing structures
5. Introduce the principles of multi-bay and multi-story frames
6. Analyse case studies showcasing the architectural implications of structure
7. Implement complex systems combining 3dimensional arrangements of members in both tension and compression.
8. Apply structural analysis methods (i.e. analytical, graphical) to solve structural models
9. Use computer modelling for structural analysis, SAP2000 software

Learning Outcomes:

After completion of the course students are expected to be able to:
1. Interpret building structural systems and their behavior under various types of load action.
2. Illustrate structural typologies.
3. Interpret modeling results of the professional software SAP2000
4. Compare building structure systems and their structural behavior.

5.   Analyse structural systems of realised buildings.
6.   Examine beam systems following a qualitative analytical process of hands on observation
7.   Illustrate concepts of structural types.
8.   Employ elementary mathematics to structural systems.
9.   Apply rules of thumb to predict structural behavior.
10.   Asses the computer software results.
11.   Evaluate structural elements using simple equilibrium checks.
12.   Judge structural member sizing towards optimization.
13.   Compare and evaluate structure schemes through case study analysis.
14.   Aquire structural intuition and engineering judgement.

Course Content:

1.   Structures. Structure systems. Form. Forces. Building Loads
2.   Basic Structure Concepts. Statics. Flexural Systems. Internal Forces. Preliminary structural design of beams.
3.   Beam Types. Simple, cantilever, overhanging. Hinge-connected cantilever beams, Beams fixed at one or both ends, continuous beams.
4.   The effect of support conditions.
5.   Floor and Roof framing structures (steel, concrete).Beam Grids.
6.   Columns. Elastic Buckling of columns.
7.   Floor and Roof framing structures. Design of steel floor framing. Design of concrete floor framing.
8.   Frames. Single-bay frames. Three hinged frames. Intermediate. Frames. Cantilever, braced, pitched frames. Multi-bay, multi-storey frames. Vierendeel trusses.
9. Actual Building Cases.

Learning Activities and Teaching Methods:

The teaching method in this course consists of Lecture, Individual and group work, Case studies, Tutorials. Presentations. Pin-ups.

Assessment Methods:

Project presentation, Poster, Pin-up, Weekly assignments, Final Exam

Required Textbooks / **Readings:**

Title	Author(s)	Publisher	Year	ISBN
Building Support Structures Analysis and Design using SAP2000 software	Wolfgang Schueller	Computers and Structures, Inc. Berkley, California	2008	978-0-923907-75-4

Recommended Textbooks / **Readings:**

Title	Author(s)	Publisher	Year	ISBN
Structures and Architecture: ICSA 2013: New concepts, applications and challenges; Innovative architectural and structural design; ; "Hybrid Structures: A case of a pedestrian	T.Sophocleous; M.C.Phocas and A.Michael;	Paulo J. da Sousa Cruz		
"Design of Structures in Architecture. Architectural Vision towards Structural Innovation", Architectural Design and Construction Education. Experimentation towards Integration	Phocas, M.C., Sophocleous, T.,	ENHSA-EAAE Architectural Design Teachers' and Construction Teachers' Networks.		