# General Information:

**Curriculum:** Architecture Msc, Architecture OTM

**Name of Course:** **Advanced Architectural Constructions**

**Course Code:** EPM114ANEM

**Semester:** 1/7

**Number of Credits:** 3

**Allotment of Hours per Week:** 0/0/2

**Evaluation:** mid-term grade

**Prerequisites:**

Course director: Dr. Adam KATONA, assistant professor

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## General Course Description

In this course, students will learn about the possibilities of understanding building structures using different computer software. Within two major fields, they will learn about the possibilities of designing non-traditional structures using CAD software and the possibilities of understanding the processes within materials, structures and buildings using simulation software. In addition to basic software skills, the aim is to familiarize students with the tools available to support architectural design and to enable them to respond to the complex challenges of the design process with a broader range of opportunities.

## Learning Outcomes

The aim of the semester is to introduce students to new software that responds to today's diverse requirements in the construction industry. In the first half of the semester, students will be introduced to the Grasshoppers plug-in for parametric design in the Rhinoceros CAD software and its capabilities. The practical lessons will be aligned with the tasks of the Complex Building Structures course and will help students to model non-traditional structural solutions and design them beyond conceptual designs in a quantifiable way. In the second half, students will be introduced to modern simulation software and its capabilities. The main task will introduce dynamic thermal simulations and their application, but also, tangentially, aerodynamic, LCA, thermal bridge and vapour simulation software.

## Subject content

During the labs, students will learn to use the following software

* Rhinoceros - Grasshopper parametric modelling CAD software
* ArchiCAD Energystar/IDA ICE thermal dynamic simulation software

Other simulation software will also be introduced as additional knowledge.

In the labs, students work alone. During the semester, they will be gradually introduced to the use of different software and their capabilities, and will then use what they have learned to prepare a simple design documentation and building physics characterization during a simple design exercise.

The assignments and requirements will be issued according to the topic and will be uploaded to the Microsoft Office 365 Teams interface of the course, together with the lecture materials and help files. Information related to the subject will also be available on this interface.

**Examination and evaluation system**

*In all cases. Annex 5 of the Statutes of the University of Pécs, the* ***Code of Studies and Examinations (CSE)******of the University of Pécs*** *shall prevail*

[*https://international.pte.hu/sites/international.pte.hu/files/doc/TVSZ%202022\_06\_23\_ENG.pdf*](https://international.pte.hu/sites/international.pte.hu/files/doc/TVSZ%202022_06_23_ENG.pdf)

The assignments must be presented in the weeks indicated in the schedule. The course director will mark the assignment and record the result on the date indicated.

The digital version (PDF.) of each assignment must be uploaded to the Microsoft Office 365 Teams folder of the course.

**Attendance**

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Verified attendance at the practical sessions is based on the presentation of the current work part as set out in the topic! Practitioner leaders will keep attendance sheets, with attendance and completion, as well as no-shows and no-completions. All drawing assignments issued must be presented at the practical sessions, the absence of any drawing assignment will constitute a non-completed entry.

**Mid-term assessments, performance evaluation and their ratio in the final grade** (The samples in the table to be deleted.)

|  |  |  |
| --- | --- | --- |
| **Type** | **Assessment** | **Ratio in the final grade** |
| *Home assignment* | *100 points* | *100%* |

**Opportunity and procedure for re-takes (PTE TVSz 47§(4))**

Anyone who has not presented their assignment on the date set in the timetable can make up the assignment in the next teaching week.

Assignments missed during the semester may be made up once during the first week of the examination period at a time announced by the course director.

**Requirements for the end-of-semester signature**

**13th week**

“Denied” (not correctable)

- If the student receives a 'fail' mark for more than 30% of the sessions (5 or more out of 14).

“Failed” (correctable/resubmittable)

- If the student did not submitted the home assignment on time

“Signature”

- If the student attended minimum 70% of the lectures

- submitted the home assignment on time

**14th week**

- The home assignment can be resubmitted

**End of 15th week**

“Denied” (not correctable)

- The student missed the opportunity to resubmit the home assigments or it is not on an acceptable level

“Signature”

- submitted the home assignment on time and with at least 40% grade

***Re-takes for the end-of-semester signature*** *(PTE TVSz 50§(2))*

*The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.*

**Grade calculation as a percentage**

based on the aggregate performance according to the following table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grade: | 5 | 4 | 3 | 2 | 1 |
|  | A, jeles | B, jó | C, közepes | D, elégséges | F, elégtelen |
| Performance in % | 85%-100% | 70%-84% | 55%-69% | 40%-55% | 0-39% |

## Readings and Reference Materials

In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature))

Required:

1. Andrew Payne - The Grasshopper Primer, Second Edition
2. EQUA – IDA ICE Getting started
3. ArchiCAD User Guide

Recommended:

1. Scientific journals (e.g. Building Simulations, Energy etc.)
2. Architecture websites (e.g. archdaily.com, dezeen.com etc.)
3. ALGORITHMS-AIDED DESIGN PARAMETRIC STRATEGIES USING GRASSHOPPER® Foreword

## Methodology

The course is based on continuous communication between teachers and students.

Method:

1. active participation in class
2. continuous consultation in accordance with the syllabus announced in the detailed course program
3. independent work according to the semester timetable announced in the detailed syllabus
4. independent work at home

The course is based on the theoretical knowledge and practical application of the building construction solutions studied during the semester. The aim of the semester is to enable the student to independently apply the software learned during the semester, to have a basic knowledge of its possibilities and limitations.

* joint discussion - presentation and discussion of work done at home, raising of problems that have not been identified, analysis of possible answers to the problems identified
* independent further planning of the task
* joint discussion - presenting and discussing the work done in class, raising any problems that have not yet been identified, analyzing possible answers to the problems identified

## Students with Special Needs

Students with a disability and need to request special accommodation, please, notify the Dean’s Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

*Detailed requirements and schedule of the Course*

**Practical hours requirement**

In the consultation exercise, students are allowed to ask questions about their assigned task. During the exercise, students can also listen to each other's consultations. Students are required to be present and on task throughout the practicum so they can receive a "completed" grade for the practicum date. Failure to complete the current assignment will result “not accepted attendance”.

Students are required to attend the practical and complete their assignment and will receive a "completed" entry for the practical date.

**Assignments and their requirements**

**Formal requirements:**

Semester assignments are documented in PDF format AND in the native format of the software used. All plan sheets will be framed (5 mm from the edge of the sheet) with a drawing stamp in the bottom right-hand corner.

Drawing stamp content:

* Subject name
* Name, Neptun code
* Name of drawing and name of the part of the work on the sheet
* Scale of the sheet
* Number of the plan sheet
* Date of preparation

**Tasks to be submitted**

Mid-term assignment: design of a simple functional pavilion on the campus of PTE MIK, incorporating a structural solution (rotational hyperboloid, birefringent plane, etc.) studied in the complex structures course.

The pavilion must include the following features:

* 3x50m2 Classroom/exhibition area
* Water facilities
* Storage room
* Internal atrium
* (the number of levels is at individual discretion)

Drawings to be submitted:

* site plan
* floor plans
* sections
* facades
* details/sketches of structural details
* building physics documentation

The scale of the working parts depends on the size of the structure. The scale of the submittals should be agreed during the consultations.

**Schedule**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Practice/Laboratory Practice | | | | |
| week | **Topic** | **Compulsory reading; page number**  **(from … to …)** | **Required tasks (assignments, tests, etc.)** | **Completion date, due date** |
| 1. | Description of the requirements for the semester |  |  |  |
| 2. | Parametric modelling |  |  |  |
| 3. | Parametric modelling |  |  |  |
| 4. | Parametric modelling |  |  |  |
| 5. | Parametric modelling |  |  |  |
| 6. | Parametric modelling |  |  |  |
| 7. | Simulation software,  starting the design task |  | Choice of specific structure, design concept |  |
| 8. | Simulation software & design task consultation |  | Consultation about modelling |  |
| 9. | Autumn break |  |  |  |
| 10. | Simulation software & design task consultation |  | Consultation about modelling |  |
| 11. | Simulation software & design task consultation |  | Consultation about building simulations |  |
| 12. | Simulation software & design task consultation |  | Consultation about building simulations |  |
| 13. | Hoem assignment presentation |  | Submission |  |
| 14. | Home assignment resubmission |  |  |  |

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course director

Pécs,26.08.2024