ZERO ENERGY BUILDING DESIGN 2022/23. 1. SEMESTER

ALAPADATOK			
COURSE NAME	**ZÉRÓ ENERGIAIGÉNYŰ ÉPÜLETEK TERVEZÉSE**		**ZERO ENERGY BUILDING DESIGN**
COURSE CODE(S)	YAVZEÉTMNF		
DEPARTMENT	Óbuda University Ybl Miklós Faculty of Architecture, Institute of Architecture		
PROGRAMME, TRAINING	Architecture BSc		full time
COURSE INSTRUCTOR (Instructor managing the course)	Dr. Attila Talamon PhD, Associate Professor	talamon.attila@ybl.uni-obuda.hu	Consultations: according to the institute's website
PRE-REQUIREMENT	-		
HOURS OF LECTURES (WEEKLY)	2 hours		
HOURS OF CLASSROOM TRAINING/ LABORATORY TRAINING (WEEKLY)	1 hour		
FIELD WORK AND TRAINING (WEEKLY)	0 hours		
ASSIGNMENT	end-of-semester dissertation, exam		
CREDITS	4 credits		
AIM OF THE COURSE, BRIEF DESCRIPTION	Zero energy building definitions. Technologies and best practises. Environmentally friendly building materials and building structures. Possibilities of using renewable energy sources in construction. Structures and energy systems of low energy buildings (software). Presentation and analysis of realized examples.		
RECOMMENDED LITERATURE	Andy Walker - Solar Energy: Technologies and Project Delivery for Buildings Passive Design Toolkit https://vancouver.ca/files/cov/passive-design-large-buildings.pdf National Building Energy Performance Strategy https://ec.europa.eu/energy/sites/ener/files/documents/2014_article4_hungary_en%20translation.pdf		
REQUIRED TECHNICAL APPLIANCES/ SOFTWARE	A scientific calculator with a single line display can be used. The use of mobile phones is not allowed.		

SCHEDULE OF THE SEMESTER

WEEK	LECTURE	LECTURER	FORM OF TRAINING	PROGRAM OF TRAINING
1	Introduction. Causes and effects of global climate change. Environmental indicators. The concept and main trends of energy- and environment-conscious architecture. Environmental factors determining the energy balance of buildings. Zero energy building definitions.	TA	ON-SITE / ONLINE	Scheduling the semester requirements, semester project.
2	Characteristics and types of environment-friendly building materials and building structures. Use of natural and recycled building materials in energy-conscious structural systems	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
3	Hungarian building energy regulation/building codes (Decree 7/2006 (V.24) TNM.)-I. Energy certificate.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
4	Calculation of the energy characteristics of the building (Building services, renewable energy sources)	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
5	Architectural utilization of solar energy. Passive heating and cooling, shading. (Software)	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
6	Design principles, basic structural systems and development directions of facade glass walls.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
7	Active solar systems. Solar collectors. Photovoltaic recovery.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
8	Types of heat pump systems, technical conditions of their application.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
9	Use of biomass for energy purposes. Environmentally friendly wastewater treatment methods.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
10	Methods and possibilities of complex architectural and building engineering design of zero energy buildings I.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
11	Methods and possibilities of complex architectural and building engineering design of zero energy buildings II.	TA	ON-SITE / ONLINE	Presentation and analysis of best practises.
12	**Written examination**			**Submission of the semester project**
13	**Late written examination**			**Late submission of the semester project**
14				

REQUIREMENTS FOR THE COMPLETION OF THE SEMESTER		
MID-SEMESTER TASKS AND TESTS		
Requirement	**Description**	**Value** (point, %, grade)
PARTICIPATION AT LESSONS	The practice lessons can be missed up to three times (see § 46 ETVSZ)	-
IN CASE OF ABSENCE FROM LESSONS AND EXAMINATIONS	Absence is considered to be justified with a medical certificate presented.	-
Short description of the Semester Project	The building energy calculations of selected family house or smaller appartement house. Existing status analysis: - Selection of an existing family house (60 m2 minimum) or smaller appartement house. - Analysis of the floorplan from energy efficiency point of view. (architectural features, windows, wall layers, solar orientation, et) - Description and analysis of the the existing active energy systems (heating, cooling, domestic hot water, lighting, connection points to the grid) - Analysis of the existing annual energy consumptions in monthly trends (electricity, natural gas, wood, coal, pellet, water, etc) Future possibilites status analysis: - Analysis of the passive architectural possibilities (solar, thermal insulation, changing windows, shading, sun-tempered, direct-gain, sunspace, and thermal storage (Trombe) wall.) - active energy possibilities (boiler changes, solar collector, photovoltaic cells, heat pump, etc). Output: - 1 presentation in pdf format (maximum 40 slides) o 1 site plan (site, connection points to the grid) o 1 solar orientation analysis (windows, shadows, shading, etc.) o 1 existing floorplan (each floor) of the existing status (heating, cooling, domestic hot water, lighting, ets) o Existing status analysis (see above) o Future possibilites status analysis (see above) o 1 “future possibilities” floorplan (each floor) of the existing status (heating, cooling, domestic hot water, lighting, ets)	50 points
END-OF-SEMESTER DISSERTATION	End-of-semester dissertation from the topics/fields of the semester presentations. END-OF-SEMESTER DISSERTATION max. 50 points, (min. 30 points).	50 points
LATE END-OF-SEMESTER DISSERTATION	There is 1 possibility of replacement.	
TOTAL		100 points

<table>
<tr><th colspan="6">SEMESTER CLOSING REQUIREMENTS</th></tr>
<tr><td>CONDITIONS FOR OBTAINING A SIGNATURE</td><td colspan="5">Accepted Semester Project and End-of-semester dissertation.</td></tr>
<tr><td rowspan="2">CONDITIONS FOR OBTAINING AN OFFERED GRADE</td><td colspan="5">The successful conclusion of the semester is the following:
- the semester project is accepted and the total value is at least 35 points
- the end-of-semester dissertation (possibly its replacement) at least 35 points.</td></tr>
<tr><td>0-60 point
1 - FAIL</td><td>61-70 point
2 - PASS</td><td>71-80 point
3 - SATISFACTORY</td><td>81-90 point
4 - GOOD</td><td>91-100 point
5 - EXCELLENT</td></tr>
<tr><td>CONDITIONS FOR ADMISSION TO THE EXAM</td><td colspan="5">Conditions for admission to the exam: Accepted Semester Project and End-of-semester dissertation. (Signature)

The successful offered grade conclusion of the semester is the following:
- the semester project is accepted and the total value is at least 35 points
- the end-of-semester dissertation (possibly its replacement) at least 35 points.</td></tr>
<tr><td rowspan="3">EXAM GRADE</td><td colspan="5">Conditions for admission to the exam: Accepted Semester Project and End-of-semester dissertation. (Signature)</td></tr>
<tr><td>0-60 point</td><td>61-70 point</td><td>71-80 point</td><td>81-90 point</td><td>91-100 point</td></tr>
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