

# HVAC

# 2022/23. 2. SEMESTER

BASIC INFORMATION		
COURSE NAME	HVAC - Heating, ventilation, and air conditioning	Épületgépészet
COURSE CODE(S)	YARÉPGCBNF	
DEPARTMENT	Óbuda University Ybl Miklós Faculty of Architecture, Institute of Architecture	
PROGRAMME, TRAINING	BSc in Civil Engineering	Erasmus
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	none	
HOURS OF LECTURES (WEEKLY)	2 hours	
HOURS OF CLASSROOM PRACTICE/ LAB EXERCISE (WEEKLY)	0 hour	
FIELD AND TRAINING (WEEKLY)	0 hours	
ASSIGNMENT	end-of-semester dissertation and semester project	
CREDITS	6 credits	
AIM OF THE COURSE, BRIEF DESCRIPTION	<p>The subject aims tasks and systems of building engineering. Water supply, sewerage, natural gas supply and heat supply of buildings. Connecting to external networks, public utilities. Aspects of network design.</p> <p>Principles of heating, ventilation and air conditioning. Highly energy efficient buildings and their mechanical systems</p> <p><b>Aim:</b> Presentation of the complex building engineering systems inside the building.</p>	
RECOMMENDED LITERATURE	<p>Andy Walker - Solar Energy: Technologies and Project Delivery for Buildings Passive Design Toolkit <a href="https://vancouver.ca/files/cov/passive-design-large-buildings.pdf">https://vancouver.ca/files/cov/passive-design-large-buildings.pdf</a> National Building Energy Performance Strategy <a href="https://ec.europa.eu/energy/sites/ener/files/documents/2014_article4_hungary_en%20translation.pdf">https://ec.europa.eu/energy/sites/ener/files/documents/2014_article4_hungary_en%20translation.pdf</a></p>	
REQUIRED TECHNICAL APPLIANCES/ SOFTWARE	<p>The use of mobile phones and other aids during the exams is prohibited! In the case of online education: Contact: Neptun, E-learning and E-mail. Education materials: According to E-learning Lessons: On-site or E-learning, Zoom</p>	

SCHEDULE OF THE SEMESTER				
WEEK	LECTURE	LECTURER	FORM OF TRAINING	PROGRAM OF TRAINING
1	<b>Introduction: requirements of the semester</b>	TA	ON-SITE / ONLINE	Practical application e-mail, Neptun or e-learning, lecture material will be uploaded
2	<b>GIS mapping of the micro- regional energy saving and renewable energy utilization potential of the Hungarian building stock</b>	TA	ON-SITE / ONLINE	Practical application e-mail, Neptun or e-learning, lecture material will be uploaded
3	<b>Energy policy - Building energy - HVAC</b> - Trends - Short, medium and long- term energy policy - Buildings and HVAC systems	TA	ON-SITE / ONLINE	Practical application e-mail, Neptun or e-learning, lecture material will be uploaded
4	<b>Water supply</b> - Plumbing <b>Sewerage</b> - Rainwater, rainwater storage;	TA	ON-SITE / ONLINE	Practical application e-mail, Neptun or e-learning, lecture material will be uploaded
5	<b>Gas supply</b> - Definition - Indicators - Outdoor and indoor opportunities and specifications <b>Comfort parameters</b> - Overview - heat demand calculation; - Outdoor and indoor opportunities and specifications - Standards	TA	ON-SITE / ONLINE	Practical application e-mail, Neptun or e-learning, lecture material will be uploaded
6	<b>Heating technology, heating systems</b> - Types of heating systems; - Oxygen diffusion and electron affinity; - Heat emitter - Heat generator.	TA	ON-SITE / ONLINE	Practical application e-mail, Neptun or e-learning, lecture material will be uploaded
7	<b>SEMESTER PROJECT SUBMISSION AND CONSULTATION</b>	TA		

8	<b>Heat pumps</b> <ul style="list-style-type: none"> <li>- Difference between heat exchangers and heat pumps</li> <li>- Horizontal, vertical geothermal heat pump;</li> <li>- Types of water source heat pumps;</li> <li>- Types of air source heat pumps (outdoor, indoor);</li> </ul> Waste energy source heat pumps	TA	ON-SITE / ONLINE	Practical application  e-mail, Neptun or e-learning, lecture material will be uploaded
9	<b>Ventilation systems</b> <ul style="list-style-type: none"> <li>- Determination of the amount of ventilated air;</li> <li>- Heat and moisture content of the air;</li> </ul> <b>Recuperators</b> Installation and necessity of active and passive recuperators	TA	ON-SITE / ONLINE	Practical application  e-mail, Neptun or e-learning, lecture material will be uploaded
10	<b>Nearly zero energy buildings and HVAC systems</b> <ul style="list-style-type: none"> <li>- Passive house</li> <li>- Active house</li> <li>- nZEB</li> <li>- ZEB</li> </ul>	TA	ON-SITE / ONLINE	Practical application  e-mail, Neptun or e-learning, lecture material will be uploaded
11	<b>Utilization of solar energy</b> <ul style="list-style-type: none"> <li>- Types of solar collectors;</li> <li>- Hot water production with solar collector;</li> <li>- Electricity generation with solar panels.</li> </ul> <b>Utilization of wind energy</b> <ul style="list-style-type: none"> <li>- Horizontal</li> <li>- Vertical</li> </ul> <b>Utilization of biomass</b> <ul style="list-style-type: none"> <li>- heating</li> <li>- domestic hot water</li> </ul> District heating	TA	ON-SITE / ONLINE	Practical application  e-mail, Neptun or e-learning, lecture material will be uploaded
12	<b>END-OF-SEMESTER DISSERTATION</b>	TA	ON-SITE / ONLINE	
13	<b>LATE END-OF-SEMESTER DISSERTATION</b>			

## REQUIREMENTS FOR THE COMPLETION OF THE SEMESTER

### MID-SEMESTER TASKS AND TESTS

Requirement	Description	Value (point, %, grade)
<b>PARTICIPATION AT LESSONS</b>	The practice lessons can be missed up to three times (see § 46 ETVSZ)	-
<b>IN CASE OF ABSENCE FROM LESSONS AND EXAMINATIONS</b>	Absence is considered to be justified with a medical certificate presented.	-

ÓU YBL MIKLÓS FACULTY OF ARCHITECTURE AND CIVIL ENGINEERING - COURSE SCHEDULE

<b>END-OF-SEMESTER DISSERTATION</b>	Topics of the end-of-semester dissertation: Questions issued at the beginning of the semester  The end-of-semester dissertation submission can only be done electronically.	50 points
<b>Short description of the Semester Project</b>	Semester project: Building engineering - energy survey of a family house. Water, Sewerage, Gas supply, District heating, Electricity, Heating, DHW, Cooling	
	Survey plans  Per level: 1 piece: 1:200 floor plan: building engineering - energy floor plan  Per building: 1 piece site plan, public utilities	25 points
	Documentation Per building 1 piece of technical description / survey documentation (Water, Sewerage, Gas supply, District heating, Electricity, Heating, DHW, Cooling)	25 points
	The final submission of the semester project can only be done electronically.	total of the project: 50 points
<b>TOTAL</b>		100 points

SEMESTER CLOSING REQUIREMENTS					
PRACTICAL GRADE	0-60 points	61-70	71-80	81-90	91-100
	1 - FAIL	2 - PASS	3 - SATISFACTORY	4 - GOOD	5 - EXCELLENT
DOCUMENTATION OF THE SEMESTER	CONTENT			FORMAT / MODE	
	-			-	
	Exam paper storage			Stapled in an A4 file holder/Electronically	