General Informations:

Curriculum:	Architecture Bsc, Architecture OTM
Name of Course:	ENERGY SYSTEMS 1.
Course Code:	MSE086AN
Semester:	Semester 4
Number of Credits:	3
Allotment of Hours per Week:	1 Lecture, 1 Practical Lesson /Week
Evaluation:	Examination grade
Prerequisites:	

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General Course Description

Purpose of this course is to introduce students to the optimal, energy-efficient operation of building systems and their design. Internal partitioning and planning of the building from the point of view of building engineering systems, space requirements, breakthroughs, grouping of functions. Minimum required and optimum size of mechanical space. Utility connections. Modern equipment, systems utilizing renewable energy and rainwater.

Learning Outcomes

Neptun: Instruction/Subjects/Subject Details/Syllabus
Goals, student learning outcome.
Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction

Subject content

Introduction. Traditional and modern buildings vs local climate conditions, weather. Ventilation systems: types of ventilation, dimensional basics, fans, air handling units, air ducts, air inlets, diffusers. Air conditioning systems: working principals of air conditioning systems, types of system layout. Sanitary systems: sanitary equipment, typical layout, pipeline materials and dimensions. Drainage: typical layout, pipeline materials and dimensions. Heating systems: dimensional basics, heat sources, heat distribution systems, heat emitters.

LECTURE:

1. Ventilation systems
2. Heating systems
3. Sanitary systems
4. Electricity system

PRACTICE:

1. Ventilation systems - calculation of the dimensions of the ducts
2. Heating systems - calculation of the heat losses of a building
3. Sanitary systems - calculation of the dimensions of the pipes
4. Electricity system

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

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..

Method for monitoring attendance : attendance sheet

Assessment

Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam

Type	Assessment	Ratio in the final grade
Test 1.	*max 7.5 points*	*7.5 %*
Test 2	*max 7.5 points*	*7.5 %*
1. assignment	*max 8 points*	*8 %*
2. assignment	*max 8 points*	*8 %*
3. assignment	*max 8 points*	*8 %*

Requirements for the end-of-semester signature

mid-term assessment of 40%

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.

Type of examination :written

The exam is successful if the result is minimum 40%. (The minimum cannot exceed 40%.)

Calculation of the grade (TVSz 47§ (3))
The mid-term performance accounts for 39 %, the performance at the exam accounts for 61 % in the calculation of the final grade.

Calculation of the final grade based on aggregate performance in percentage

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%-54%	0-39%

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

Required:
[1.] Joseph B. Wujek, Frank R. Dagostino - Mechanical and Electrical Systems In Architecture, Engineering, and Construction
[2.] Standard EN-15251
[3.] Standard ISO/FDIS 13790:2006
[4.] Standard EN 12056-2:2000
Recommended:
[5.] Walter T. Grondzik, Alison G. Kwok, Benjamin Stein, John S. Reynolds – Mechanical and Electrical Equipment for Buildings
[6.] W. Larsen Angel, P.E., LEED AP-HVAC Design Sourcebook
[7.] Alan C. Twort, Don D. Ratnayaka, Malcolm J. Brandt- WATER SUPPLY
[8.] Robert McDowall - Fundamentals of HVAC Systems

Methodology

The lectures based on ppt presentation and discussion about problems regarding the actual topic.
1.Independent work during the scheduled time according to the semester course announced in the detailed subject program
2. Independent homework

Students with Special Needs
Students with a disability and needs to request special accommodations, please, notify the Deans 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

Tasks and minimum requirements

Minimum requirements of the 1st assignment:

Individual design of a small house or flat with floor plan.
Conceptional arrangements of the ventilation ducts.
Conceptional arrangement of the ventilation inlets and outlets.

Calculation of the dimension of the ventilation ducts.

Minimum requirements of the 2st assignment:

Calculation of the heat losses and heat gains of the same small house.
Selection of the radiators for every room.
Presentation in the floor plan.

Minimum requirements of the 3st assignment:

Calculation of the dimension of the waste water canalization.
Conceptional arrangement of the waste water pipes.
Presentation in the floor plan.

Schedule

(Neptunban: Oktatás/Tárgyak/Tárgy adatok/Tárgytematika/Tantárgy tartalma rovat)

LECTURE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Introduction to building engineering	[1.] Page 6-9	…	…
2.	Specialists in building engineering and their relationship with buildings. Sustainable Building Engineering.	[1.] Page 6-9		
3.	Installation of ventilation ducts and equipment, controlled ventilation solutions.	[1.] Page 213-225		
4.	Modular Air Handling Unit	[1.] Page 188-191		
5.	Principles of space air diffusion	[1.] Page 253-262		
6.	National holiday	[1.] Page 253-262		
7.	Modern heating systems	[1.] Page 171-210		
8.	Heat distribution systems	[1.] Page 315-335		
9.	Spring break			
10.	Gas boilers, heat pumps, oil boilers	[1.] Page 173-183		
11.	Radiators, floor heating, fan coils	[1.] Page 227-230		
12.	Sewage drainage	[1.] Page 393-439		
13.	Water supply Domestic hot water supply.	[1.] Page 441-499		
14.	Rainwater drainage for buildings. Internal fire water supply.	[1.] Page 553		

PRACTICE, LABORATORY PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.				
2.	Duct diameter calculation	EN-15251		
3.	Duct diameter calculation	EN-15251		
4.	1. Assignment			7. week
5.	Duct diameter calculation	EN-15251		
6.	National holiday			
7.	1. Assignment submission, 1. Test Calculations of heat loss through walls	ISO/FDIS 13790:2006		
8.	2. Assignment			11. week
9.	Spring break			
10.	Calculations of heat loss through walls	ISO/FDIS 13790:2006		
11.	2. Assignment submission, 2. Test			
12.	Diameter calculation of the sewage system	BS EN 12056-2:2000		
13.	3. Assignment			15. week
14.	Diameter calculation of the sewage system, 3. Assignment submission	BS EN 12056-2:2000		

Dr. Nyers Árpád
course director

Pécs,02.02.2025