

**COURSE SYLLABUS AND COURSE REQUIREMENTS****ACADEMIC YEAR 2022/2023 SPRING**

|                                     |  |
|-------------------------------------|--|
| <i>Course title</i>                 | <b><i>Building Service Engineering</i></b>                             |
| <i>Course Code</i>                  | <b><i>MSB091AN</i></b>   |
| <i>Hours/Week: le/pr/lab</i>        | <b><i>2 Lecture</i></b>  |
| <i>Credits</i>                      | <b><i>2</i></b>  |
| <i>Degree Programme</i>             | <b><i>Civil Engineering BSc</i></b>                                    |
| <i>Study Mode/Training schedule</i> | <b><i>Full-time schedule</i></b>                                       |
| <i>Requirements</i>                 | <b><i>Mid Semester Grade</i></b>                                       |
| <i>Teaching Period</i>              | <b><i>Semester 6</i></b>   |
| <i>Prerequisites</i>                | <b><i>-</i></b>  |
| <i>Department(s)</i>                | <b><i>Department of Building Services and Building Engineering</i></b> |
| <i>Course Director</i>              | <b><i>Eördöghné Dr. Miklós Mária</i></b>                               |
| <i>Teaching Staff</i>               | <b><i>Nyers Árpád dr.</i></b>  |
| <i>Hours/Week: le/pr/lab</i>        |  |

**COURSE DESCRIPTION***A short description of the course (max. 10 sentences).**Neptun: Instruction/Subjects/Subject Details/Basic data/Subject 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.

**SYLLABUS***Neptun: Instruction/Subjects/Subject Details/Syllabus***1. GOALS AND OBJECTIVES**

The goal of the course is to transfer the most important information on building services engineering especially on requirements to fit the equipment into the building.

**2. COURSE 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.

**TOPICS****LECTURE**

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

**PRACTICE  
LABORATORY  
PRACTICE**

# DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

## LECTURE

| week | Topic  | Compulsory reading;<br>page number<br>(from ... to ...) | Required tasks<br>(assignments,<br>tests, etc.) | Completion date,<br>due date |
|------|--|---|---|------------------------------|
| 1.   | Introduction to building engineering   | [1.] Page 6-9   | ...   | ...                          |
| 2.   | Specialists in building engineering and their relationship with buildings. Sustainable Building Engineering. Duct diameter calculation | [1.] Page 6-9<br>[2.]                                   |   |                              |
| 3.   | Installation of ventilation ducts and equipment, controlled ventilation solutions. Duct diameter calculation                           | [1.] Page 213-225<br>[2.]                               |   |                              |
| 4.   | Modular Air Handling Unit.   | [1.] Page 188-191<br>[2.]                               | 1. Assignment                                   | 6. week                      |
| 5.   | Principles of space air diffusion. Duct diameter calculation   | [1.] Page 253-262<br>[2.]                               |   |                              |
| 6.   | Nacional holiday   |   |   |                              |
| 7.   | Modern heating systems. Calculations of heat loss through walls  | [1.] Page 171-210<br>[3.]                               | 1. Assignment submission, 1. Test               |                              |
| 8.   | Heat distribution systems. Calculations of heat loss through walls   | [1.] Page 315-335<br>[3.]                               | 2. Assignment                                   | 11. week                     |
| 9.   | Spring break   |   |   |                              |
| 10.  | Gas boilers, heat pumps, oil boilers. Calculations of heat loss through walls  | [1.] Page 173-183<br>[3.]                               |   |                              |
| 11.  | Radiators, floor heating, fan coils.   | [1.] Page 227-230<br>[3.]                               | 2. Assignment submission, 2. Test               |                              |
| 12.  | Sewage drainage. Diameter calculation of the sewage system   | [1.] Page 393-439<br>[4.]                               |   |                              |
| 13.  | Water supply Domestic hot water supply.  | [1.] Page 441-499<br>[4.]                               | 3. Assignment                                   | 15. week                     |
| 14.  | Rainwater drainage for buildings. Internal fire water supply. Diameter calculation of the sewage system                                | [1.] Page 553<br>[4.]                                   |   |                              |
| 15.  | Electricity systems  | [1.] Page 643<br>[4.]                                   | 3. Assignment submission. Final test            |                              |

## 3. ASSESSMENT AND EVALUATION

(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)

### 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** (e.g.: attendance sheet / online test/ register, etc.)

Attendance sheet

### ASSESSMENT

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Course resulting in mid-term grade (PTE TVSz 40§(3))

### **Mid-term assessments, performance evaluation and their ratio in the final grade**

| 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 %                      |
| Final test    | Max 61 points  | 61 %                     |

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

*All tests and assessment tasks can be repeated/improved at least once every semester, and the final tests can be repeated every week of the examination period.*

### **Grade calculation as a percentage**

*based on the aggregate performance according to the following table*

| Course grade     | Performance in % |
|------------------|------------------|
| excellent (5)    | 85 % ...         |
| good (4)         | 70 % ... 85 %    |
| satisfactory (3) | 55 % ... 70 %    |
| pass (2)         | 40 % ... 55 %    |
| fail (1)         | below 40 %       |

The lower limit given at each grade belongs to that grade.

## **4. SPECIFIED LITERATURE**

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

### **COMPULSORY READING AND AVAILABILITY**

- [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 LITERATURE AND AVAILABILITY**

- [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