

# BUILDING PHYSICS AND ENERGETICS

## 2021/22. 2. SEMESTER

| BASIC INFORMATION                                  |  |  |
|--|--|--|
| COURSE NAME  | Building Physics and Energetics  | Épületfizika és energetika                             |
| COURSE CODE(S)                                     | YARÉPENBNF   |  |
| DEPARTMENT   | Óbuda University Ybl Miklós Faculty of Architecture, Institute of Architecture   |  |
| PROGRAMME, TRAINING                                | Architect BSc  | full time  |
| COURSE INSTRUCTOR (Instructor managing the course) | Dr. Attila Talamon PhD, Associate Professor<br>talamon.attila@ybl.uni-obuda.hu   | Consultations:<br>according to the institute's website |
| PRE-REQUIREMENT                                    | none   |  |
| HOURS OF LECTURES (WEEKLY)                         | 2 h lecture  |  |
| HOURS OF CLASSROOM PRACTICE/ LAB EXERCISE (WEEKLY) | 1 h practice   |  |
| FIELD AND TRAINING (WEEKLY)                        | 0 hours  |  |
| ASSIGNMENT   | end-of-semester written exam, semester project - term mark   |  |
| CREDITS  | 6 credits  |  |
| AIM OF THE COURSE, BRIEF DESCRIPTION               | <b>AIM OF THE COURSE</b> <ul style="list-style-type: none"> <li>• Introduction to Building Physics and Energetic, the basic concepts of building energy, building energy calculations Basic concepts of building acoustics.</li> <li>• The effect of acoustic properties of building structures.</li> <li>• Introduction to the system of fire protection regulations.</li> <li>• Basics of fire protection planning.</li> </ul>   |  |
| RECOMMENDED LITERATURE                             | Andy Walker - Solar Energy: Technologies and Project Delivery for Buildings<br>Passive Design Toolkit<br><a href="https://vancouver.ca/files/cov/passive-design-large-buildings.pdf">https://vancouver.ca/files/cov/passive-design-large-buildings.pdf</a><br>National Building Energy Performance Strategy<br><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> |  |
| REQUIRED TECHNICAL APPLIANCES/ SOFTWARE            | The use of mobile phones and other aids during the exams is prohibited! In the case of online education:<br>Contact: Neptun, E-learning and E-mail.<br>Education materials: According to E-learning<br>Lessons: E-learning, Zoom   |  |

| SCHEDULE OF THE SEMESTER |   |          |                  |  |
|--------------------------|---|----------|------------------|--|
| WEEK                     | LECTURE   | LECTURER | FORM OF TRAINING | PROGRAM OF TRAINING  |
| 1                        | 1.1. Lecture: Introduction to building physics.   | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
|                          | 1.2. Lecture: Heat transmission through solid building boundary structures in stacioner condition |          |                  |  |
| 2                        | 2. Lecture: Basic concepts of fire protection, fire exposure tests for construction products      | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 3                        | 3.1. Lecture: Forms of moisture transmission in building boundary structures. Vapor diffusion.    | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 4                        | 4.1. Lecture: Thermal bridges   | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 5                        | 5.1. Lecture: Heat transport with solar radiation. Glazed structures                              | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
|                          | 5.2. Lecture: Possibilities of architectural utilization of solar energy                          |          |                  |  |
| 6                        | 6.1. Lecture: Heat transfer in instacioner conditions   | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 7                        | 7.1. Lecture: Levels of building energy regulation  | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 8                        | 8. Lecture: Energy certification of buildings   | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 9                        | 9.1. Lecture: Architectural utilization of passive and active solar energy. Shade structures      | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 10                       | 10. Lecture: Architectural utilization of passive and active solar energy. Shade structures       | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |
| 11                       | 11 Lecture: Air circulation, natural ventilation.   | TA       | ON-SITE / ONLINE | Practical application<br>e-mail, Neptun or e-learning, lecture material will be uploaded |

|    |   |    |                     |   |
|----|---|----|---------------------|---|
| 12 | 12. Lecture: Thermal comfort                          | TA | ON-SITE /<br>ONLINE | Practical application<br>e-mail, Neptun or e-learning,<br>lecture material will be uploaded |
| 13 | Written exam<br>Semester project submission           |    | ON-SITE /<br>ONLINE |   |
| 14 | Late written exam<br>Late semester project submission |    | ON-SITE /<br>ONLINE |   |

| REQUIREMENTS FOR THE COMPLETION OF THE SEMESTER         |   |                                   |
|---|---|-----------------------------------|
| MID-SEMESTER TASKS AND TESTS                            |   |                                   |
| Requirement   | Description   | Value<br>(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.   | -                                 |
| <b>Short description of the Semester Project</b>        | <p><b>Building physics calculations for building energy regulation</b></p> <p>Method for calculating the energy performance of a selected building.<br/>Existing status analysis:</p> <ul style="list-style-type: none"> <li>- Selection of an existing family house (60 m<sup>2</sup> minimum) or smaller appartement house.</li> <li>-Analysis of the building from energy efficiency point of view. (architectural features, windows, wall layers, solar orientation, et ) U-value calculation (compliance, non-compliance)</li> <li>-Description and analysis of the the existing active energy systems (heating, cooling, domestic hot water, lighting, connection points to the grid) Labeling the certificate.</li> </ul> <p>The final submission and consultation of the semester assignments can only be done electronically at the e-mail address provided by the instructors above: <a href="mailto:talamon.attila@ybl.uni-obuda.hu">talamon.attila@ybl.uni-obuda.hu</a></p> | max. 50 points                    |
| <b>END-OF-SEMESTER WRITTEN EXAM</b>                     | End-of-semester dissertation from the topics/fields of the semester presentations.<br>END-OF-SEMESTER DISSERTATION max. 50 points, (min. 30 points).  | max. 50 points<br>(min.30 points) |
| <b>LATE END-OF-SEMESTER WRITTEN EXAM</b>                | Replacement of the written exam is possible at the end of the semester.   |                                   |
| <b>TOTAL</b>  |   | 100 points                        |

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