Tárgytematika / Course Description

Energy-Conscious Building Design

EKNM_EETA014

Tárgyfelelős neve / Teacher's name: Dr. Horváth Tamás
Félév / Semester: 2022/23/2
Beszámolási forma / Assesment: Vizsga
Tárgy heti óraszáma / Teaching hours(week): 2/2/0
Tárgy féléves óraszáma / Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

The aim of the subject is to develop a kind of well-balanced, responsible thinking about the natural environment and its protection, to make the students acquainted with issues of sustainability and sustainable development, to give them an overview about energy consumption in connection with the built environment throughout the whole life cycle.
They will gain theoretical knowledge enabling them to develop energy-conscious architectural concepts, design low-energy, renewable energy using buildings, building complexes and settlements efficiently co-operating with the relevant consultant designers.
Students gain practical experiences with energy-conscious designing beginning from concept making to planning of the building details in team work. The results are presented within the frame of a professional debate where the active, convincing, arguing and analysing, critical participation of students is expected.
This subject consists of lectures and practical training, weekly 2 hours each. By means of the lectures the paper knowledge is shown according to the schedule. During the trainings the students solve a design task from concept making to the building drawings in teams by means of information and consultation. Connecting to their design the students make energetic calculations as well. They have also personal tasks in which they have to do researches.

TANTÁRGY TARTALMA / DESCRIPTION

Schedule of lectures

WEEK TASK POINT
1 Provoking thoughts: Ecological and economical architectural concepts 2
2 Energetics: Global energy management 2
3 Energetics: Environmental impacts, energy policies 2
4 Passive house: The concept 2
5 Passive house: Structural design, examples 2
6 Autonomous house: The concept 2
7 Autonomous house: Examples 2
8 Building services: Heat recovering ventilation equipments 2
9 Solar house: Sun exposure test, examples 2
10 Building services: SZE solar power plant 2
11 Biohouse: Building with natural materials 2
12 Building services: Heat generators, heat pumps 2

13 Qualified house 2
Exams: theoretical classroom test 74

Schedule of practices

WEEK TASK POINT
1 Task release
2 Consultation
3 Situation plan and concept presentation (team) 10
4 Consultation
5 Student presentations on a research topic (individual) 10
6 Consultation
7 Presentation of 1:200 draft plans (team+ind.) 10
8 Consultation
9 Presentation of 1:100 licensing plans (individual) 10
10 Atelier Consultation
11 Presentation of building service plans and energy calculation (ind.) 10
12 Consultation
13 Final presentation and submission of semester work (team+ind.) 50
+3 Replacement of the final presentation and submission (agreed time)

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Evaluation methods
Lectures: Students must provide evidence of the acquisition and understanding of the knowledge given in lectures by writing a theoretical classroom exam at the end of the semester. The paper will include questions of 6 definitions, 6 briefly explanations and 2 essay explanations selected from the list of questions released during the semester.
Practice: Students solve team and individual tasks in energy-conscious building design within a major design task, according to the schedule. The plans must be presented in printed form to the class, and a picture presentation must be prepared on the research topic. Details of the tasks will be progressively defined during the consultation according to the nature of the design task. Tasks can be replaced when the next part of the task is presented. Each task can only be replaced once, on the next time after the original presentation.
Rating of the semester work: During the semester, students can earn 100+100 points in theoretical and practical lessons by meeting the requirements. On this basis (up to 200 points) at the end of the semester, a five-stage rating (0- 1, 120- 2, 140- 3, 160- 4, 180- 5) will be awarded at the end of the semester. Points that can be earned on each occasion are included in the schedule.

Conditions for the signature of the subject
Only students who meet all of the following conditions can receive a semester signature.
(1) Participation in at least half of the theoretical lessons.
(2) Ongoing consultation on the practical task.
(3) Fulfilment of all practical tasks, at least to a sufficient level.
(4) Submission of the final task at the end of the semester with all the work parts listed in the schedule

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Mandatory literature
• Knowledge transfered at the lectures, picture presentation
Recommended literature
• [HUN] Zöld András, Szalay Zsuzsa, Csoknyai Tamás: Energiatudatos építészet 2.0. Terc Kiadó, Budapest, 2016. 309 p.
• [HUN] Ertsey Attila, Medgyasszay Péter: Fenntartható építészet. Terc Kiadó, Budapest, 2017. 188 p.
• [ENG] Francis D. K. Ching, Ian M. Shapiro: Green Building Illustrated. John Wiley & Sons, Hoboken, New

Jersey, 2014. 279 p.
• [ENG] Kuppaswamy Iyengar: Sustainable Architectural Design – An Overview. Routledge, New York, 2015. 274 p.
• [ENG] Richard Hyde (ed.): Bioclimatic Housing – Innovative Designs for Warm Climates. Earthscan, London, 2008. 440 p.
• [ENG] Sue Roaf, Manuel Fuentes, Stephanie Thomas: Ecohouse: A Design Guide. Elsevier, Oxford, 2007. 479 p.
• [ENG] Steve Goodhew: Sustainable Construction Processes. A Resource Text. Wiley Blackwell, 2016. 342 p.
• [ENG] Norbert Lechner: Heating, Cooling, Lighting – Sustainable Methods for Architects. Wiley, Hoboken, New Jersey, 2015. 702 p.
• [HUN] Munkácsy Béla: Energiaföldrajz és energiatervezés. ELTE-TTK, Budapest, 2019. 135 p.
• [HUN] David Jc MacKay: Fenntartható energia mellébeszélés nélkül. Typotex Elektronikus Kiadó Kft., Budapest, 2011. 414 p.
• [ENG] David Jc MacKay: Sustainable energy – without the hot air. UIT, Cambridge, 2009. 383 p.
• [HUN] [szerzői kollektíva]: Eco Green Village építés MILD HOME alapon. SZE, Épülettervezési Tanszék, Győr, 2015. 170 p.
• [ENG] [editorial board]: How to build an Eco Green Village based on MILD HOME. Unioncamere del Veneto, Venice, 2014. 168 p.
• [HUN] Horváth Tamás (szerk.): MILD HOME és Eco Green Village Tatabányán. SZE, Épülettervezési Tanszék, Győr, 2015. 208 p.
• [HUN] Adolf-W. Sommer: Passzívházak – tervezés, szerkezet, csomópontok, példák. Passzívházak Mindenkinek Kft, Budapest, 2010. 307 p.
• [GER] Adolf-W. Sommer: Passivhäuser Planung-Konstruktion-Details-Beispiele. Verlag Rudolf Müller GmbH, Cologne, 2008. 307 p.
• [HUN] Anton Graf: Passzívházak – 24 megépült ház Németországban, Ausztriában, Svájcban. Terc Kiadó, Budapest, 2008. 129 p.
• [GER] Anton Graf: Neue Passivhäuser: 25 Beispiele für den Energiestandard der Zukunft: Deutschland, Österreich, Schweiz. Verlag Georg D. W. Callwey GmbH, Munich, 2003. 129 p.
• [GER/ENG] Walter Pokorny, Thomas Zelger, Karl Torghele: Passivhaus-Bauteilkatalog / Details for Passive Houses – Ökologisch bewertete Konstruktionen / A Catalogue of Ecologically Rated Constructions. Springer Verlag, Wien, 2006. 337 p.
• [HUN] Ertsey Attila: Az autonóm ház. IN: Medgyasszay Péter, Osztroluczky Miklós, Ertsey Attila: Energiagazdálkodás az épített környezetben. Jegyzet. SZIE, Ybl Miklós Műszaki Főiskolai Kar, Épített Környezet Tanszék, Budapest 2001. pp. 70-96.
• [HUN] Medgyasszay Péter, Novák Ágnes: Föld- és szalmaépítészet. Terc Kiadó, Budapest, 2006. 178 p.
• [HUN] Bitó János: Lakóházak tervezése. B+V Medical+Technical Kiadó, 2003. 350 p.
• [ENG] ETH Zürich (ed.): New Monte Rosa Hut SAC – Self-sufficient Building in the High Alp. 2011. 224 p.
• [ENG] Andrea Deplazes (ed.): Constructing Architecture – Marerials, Processes, Structures – a Handbook. Birkhauser, 2018. 587 p.
• [HUN] Ernst Neufert: Építés- és tervezéstan. Dialóg Campus, Pécs, 2014. 572 p.
• [ENG] Ernst Neufert: Architects' Data. Wiley Blackwell, 2019. 602 p.
• [HUN] Martin Mittag: Épületszerkezettan. Dialóg Campus, Pécs, 2004. 582 p.
• [GER] Martin Mittag: Baukonstruktionslehre. Springer Verlag, Wien, 2000. 582 p.