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Report from conducted courses for EQF level 3-5

Deliverable 5.3

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Report from the implemented training programmes for professional high schools and colleges

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Executive Summary

1. Introduction

The goal of this report is to provide an overall concept for quality assurance and monitoring of training programs for professional high schools and colleges, therefore, setting a common framework between the different training institutions for quality assurance. The training programs have been conducted in three countries Bulgaria, Italy and Romania, in the following institutions: Professional High School of Architecture and Construction – Pazardzhik (PGSA), Varese technical Institute (ITS) and “Ioan N. Socolescu” College of Architecture and Public Works (Socolescu).

Good quality practices of professional high schools and colleges is based on the pillars:

- clear definitions of learning outcomes,
- design and structure of the programme course,
- evaluation and monitoring of the learning outcomes.

To ensure a good quality of the courses for professional high schools and colleges, the following criteria were evaluated and monitored:

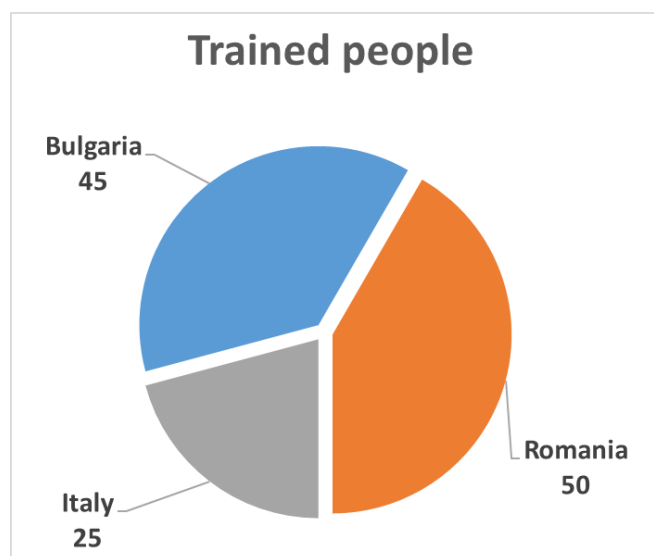
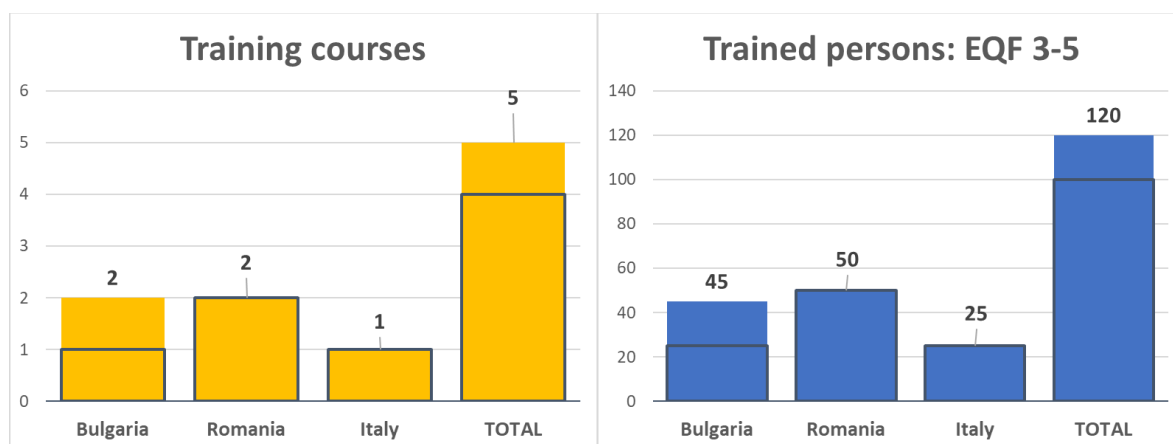
- **lecture’s content and learning materials:** the training programmes should meet the learning outcomes objectives through a clear and precise communication. For this, the learning content, how is presented (layout, presentation and others) was evaluated;
- **learning outcomes:** the effectiveness of the learning procedures, and therefore achievement of the expected learning outcomes. For this, the obtained knowledge and its future applicability was evaluated.

To collect the necessary information, different questionnaires were applied in the participating training pilots. Their purpose was both to collect general information about the course, its content and structure (as evaluated by the lecturer or administration person at the beginning of the course) and to receive participant’s opinion about the course (filled by the participants at the end of course).

The main goal of this report is to document the performed trainings and to provide information for future activities, based on the experience during the project. Therefore, this report presents the learning outcomes set for the pilot courses, a report of the conducted courses and the evaluation of the courses, and finally some recommendations for follow up monitoring activities, also enabling experience exchange between the different training institutions. To collect the necessary information, firstly, questionnaires were developed and filled by the institutions (before the conducted courses) and by the students (before the conducted courses). To set a common framework between the different training institutions for quality assurance, the present report will present the results from the evaluation of the conducted courses, and finally, present identified possible improvements as part of a monitoring strategy.

In terms of implemented training programs, a total of 5 courses were implemented in the targeted countries for EQF 3-5, with a participation of 120 students from professional high schools / technical colleges.

The distribution of completed training courses and trainees is represented in the following graphs against the initial targets per country and in total.



1.1. Institutions of training

Bulgaria

Professional High School of Architecture and Construction – Pazardzhik (www.pgsa-paz.com)

The strategy for the development of PGSA- Pazardzhik is associated with adaptation of existing educational programs in relation to the dynamically changing construction technologies, covering European and world standards for development and modernization of vocational education and training of professionals in construction specialties and professions. PGSA- Pazardzhik has gained significant experience in implementing projects in national and international programs in the past several years, incl. projects on Intelligent Energy Europe, Erasmus+, Operational Programme "Human Resources Development" and the "Life-long Learning Programme". A priority for the management team is the development of projects in national and international programs of social and economic importance, leading to improved quality of education and training in PGSA.

PGSA develops partnerships with various construction companies, branch associations and other interested stakeholders, which support the educational activities, especially as regards practical training. Based on the active cooperation with EnEffect, the school was a direct partner in the BUILD UP Skills EnerPro project and has benefited from other EU project activities, mainly in the areas of training of trainers, practical demonstrations and exercises for students, and development of new educational curricula and training aids.

Based on its experience in EU projects and wide collaborative network, the school has initiated the recent changes in the State Educational Standards for professions in professional direction Architectures and Construction regarding the introduction of units on learning outcomes related to energy efficiency, RES in buildings and sustainable architecture and construction. Based on that, an entirely new discipline was included in the curricula for profession Construction Technician – “Energy Efficient and Environmentally Friendly Construction”. Currently, the school offers qualification in several professions: Construction Technician, Interior Designer, Real Estate Broker and Geodesist, all coupled with intensive foreign language courses.

Italy

ITS – Varese

Varese technical Institute (ITS)

ITS – Varese professional high schools is an institute organized like a small polytechnic characterized by a wide training offer specialised in the building sector, with a high percentage of internship in companies from the sector. ITS students become “super experts” of sustainability and energy efficiency in the building sector.

Romania

“Ioan N. Socolescu” College of Architecture and Public Works is a century-old school with a long and important tradition in offering tuition to students interested in the area of architecture and construction. It was first established as The School of Arts and Crafts in 1874 at the initiative of Ioan N. Socolescu, a famous architect of the time, and it has grown and developed to its present status. The college is located in the centre of Bucharest, the capital of Romania, 10 minutes’ walk from Victoria Palace (the Government of Romania) and roughly the same distance from Gara de Nord (the most important train station in the country).

The College consists of around 46 teachers and there are almost 550 students who focus on three different fields of study: architecture (vocational), mathematics-information technology (theoretical) and construction and public works (technical). The College’s students range from the age of 14 to the age of 18.

The vision by which both the teachers and the students carry out the process of learning is that of the need to adjust to the demands of the post-high school and university environment, as well as to those of the working environment, and to build life-long learning abilities. One shall also understand, assume and promote the values of European democracy and take the responsibility of building positive attitudes towards ourselves and the others.

The College develops partnerships with various economic agents. One of them is ALLBIM NET S.R.L. through which the students benefit from courses in soft design for architecture and construction obtaining international certification in the field and another one is Cluster Pro-nZEB in cooperation with which the local development curriculum for nearly zero energy buildings is set.

In the past years the College has become a partner of different European Projects such as KA2 – Erasmus+ “The impact of children on consumption and sustainable consumption training”, KA1 – VET “Top competences in media” and “Career Rocket”. Through the participation in all these European projects together with the activities at the European level in that the College has taken part have led to obtaining the title of “European School” in 2018.

2. Learning outcomes and training programme

Both learning outcomes and training programme were explored and defined in details in previous project activities. Therefore, in this chapter a summary of the main information is presented, as detailed information can be found in the respective Deliverables.

The training courses followed the same structure as the TTT programme, which was defined in details in the deliverable D5.1 “*Training programme for EQF level 3-5*” (Table 1) and was in line with the Deliverable 2.3 “*Catalogue of Learning Outcomes*”.

Table 1 *Training programme for EQF level 3-5*

Module No.	Module Name	PGSA – Pazardzhik	ITS – Varese	Socolescu (Technological)	Socolescu (Vocational)
1	Basics of building physics	x	x	XI	XI
2	Optimal solar gains	x	x	XI	XI
3	Building Envelope	x	x	XI	XI
4	NZEB Neighbourhoods		x	XII	XII
5	Airtightness, vapour and moisture movement, windtightness	x	x	XI	XI
6	Building Services	x	x	XII	XII
7	Conservation of historic building fabric		x	XII	XII
8	RES in building renovation	x	x	XII	XII
9	Cost effectiveness		x	XI	XI
10	Planning and design instruments		x	XII	XII
11	Comfort, health and safety requirements in buildings, incl. indoor air quality	x	x	XI	XI
12	Step-by-step retrofit plans	x	x	XI	XI
13	Energy efficiency and building renovation policies	x	x		
14	Achieving measurable results		x		
15	Stakeholders' engagement		x	XII	XII
16	Project management	x	x	XII	XII
17	Ecology and Sustainability	x	x	XI	XI

(x – included in the course, XI – included for the XI grade, XII – included for the XII grade)

3. Conducted courses

3.1 Bulgaria

Based on the Memorandum of Understanding signed between PGSA-Pazardzhik and EnEffect, the course contents were introduced in the curriculum of the professional direction "Construction and architecture", profession "Construction technician". The training materials developed under the Fit-to-nZEB project were translated into Bulgarian and were used during training. The teachers have attended the national TTT courses organised within the BUS EnerPro and Train-to-NZEB projects.

The theoretical course units were used with 9th, 10th and 11th graders, and practical training, which was the basis for evaluation of the applicability of learning units, was focused on 10th and 11th graders who already have some knowledge and basic understanding of the building design and construction process and building physics and materials. A total of 45 students participated in both theoretical lectures and the practical training courses, with total of 16 hours theoretical and 24 hours of practical training for XI grade and 24 hours of practical training for X grade (supported by short introductory presentations)

The available learning units were distributed among several disciplines, in order to cover maximum amount of topics, without at the same time compromising the completion of the national educational plan for the respective qualification. These disciplines are:

- Construction of buildings – IX grade
- Construction materials – IX grade
- Technology of construction processes - XI grade

Practical training in:

- Construction of buildings - X grade
- Building materials - X grade
- Execution of construction and assembly works - XI grade

Following the recent changes in the State Educational Standards promoted by PGSA-Pazardzhik, from the 2019-2020 academic year, most of the Fit-to-NZEB materials will be used in the new "Ecological and energy efficient construction" discipline (XI grade). Based on the current success, from the next year, additional actions for change on the State Educational Standards and the educational plans will be undertaken to introduce a specific discipline "Deep energy retrofit" in the curricula.

During the pilot educational course, the students were evaluated orally and practically and at the end of each semester passed an evaluation test as per the regular school procedures.

Several images from the EQF 3-5 training course conducted by PGSA-Pazardzhik can be found below.



3.2 Italy

The training materials developed under the Fit-to-nZEB project were translated into Italian language and were used during training.

The course is divided in four major parts:

- 1) Preliminary Phase: students are involved in the construction phase of the building model (8 hours)
- 2) Part I – Envelope: Principles of building physics and passive house principles; Airtightness and vapor permeability; Thermal insulation of the opaque envelope; Free thermal bridges design; Windproof and external coating; Installation of efficient windows; Step – by – step retrofit and standard EnerPHit. (24 hours)
- 3) Part II: Building Systems: ventilation, heating, cooling, renewables; retrofit; Economic sustainability. (8 hours)

4) Part III – Design tools: PHPP e design PH.
(16 hours)

The model is designed and built considering a reuse concept. Every component can be installed and uninstalled several times without any damage to the structure. In this way the building model will be reused for several courses.

Several images from the EQF 3-5 training course conducted by ZEPHIR – Passivhaus Italia can be found bellow.



3.3 Romania

The course was introduced in the curriculum of the Construction and Architecture High School for two modules, under the Local Development Curriculum procedure. The training materials developed under the Fit-to-nZEB project were translated into Romanian language and were used during training. The teachers attended the international and national TTT courses organised within the Fit-to-NZEB project.

The course is addressed to pupils/students from:

- Constructions, Installation and Public Works field, professional qualification “Designer technician in constructions, installation and public works”, EQF level 4 – local development curriculum; the module has a total of 66 hours / year, 22 students;
- Vocational field, professional qualification “Designer technician in architecture”, EQF level 4 – curriculum at the school’s decision; the module has a total of 34 hours / year, 28 students;

The course/module is focused on 11th graders who already have some knowledge and basic understanding of the building design and construction process and building physics and materials;

The local development curriculum is developed in a partnership between the school and economic actors, so that the programmes can be adapted to the training needs of the labour market.

The design process is structured using the basic principles of Passive House concept applied to the renovation of existing buildings, resulting in the achievement of different levels of energy efficiency. The course is divided in four major parts:

- 1) general knowledge of building physics, requirements in terms of health, comfort and safety in buildings and general retrofit approach including notions about ecology and sustainability;
- 2) the building envelope: particular attention to the design and construction of building components;
- 3) the building services: ventilation, heating and cooling, DHW and RES in retrofitting;
- 4) the project management and planning and design instruments as well as to the assurance of high quality building design and construction.

The learning contents have been correlated with the learning outcomes (knowledge, skills, autonomy & responsibility).

During the pilot educational course, the students were evaluated orally and at the end of each semester passed an evaluation test (printed test in January and June 2019).

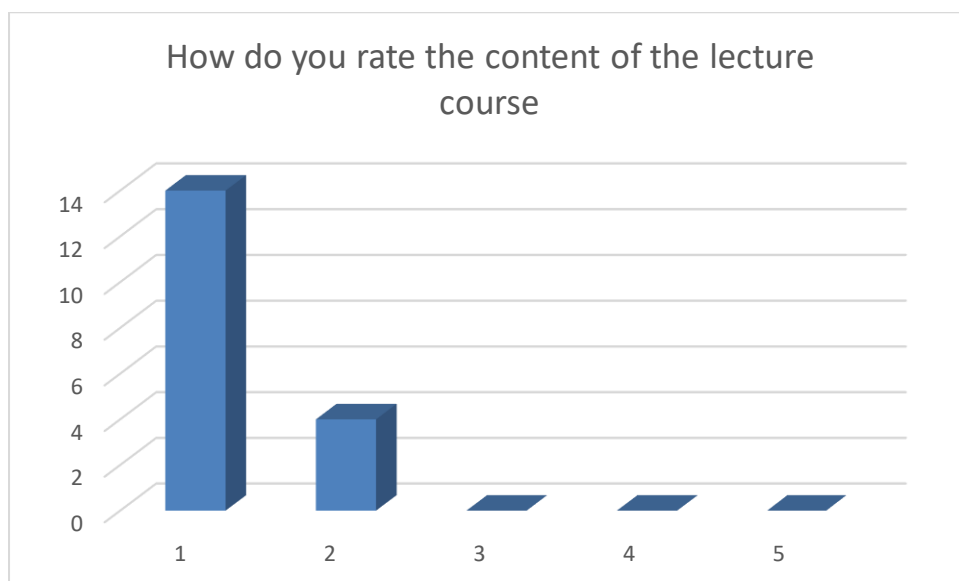
Several images from the EQF 3-5 training course conducted by Socolescu College can be found below.



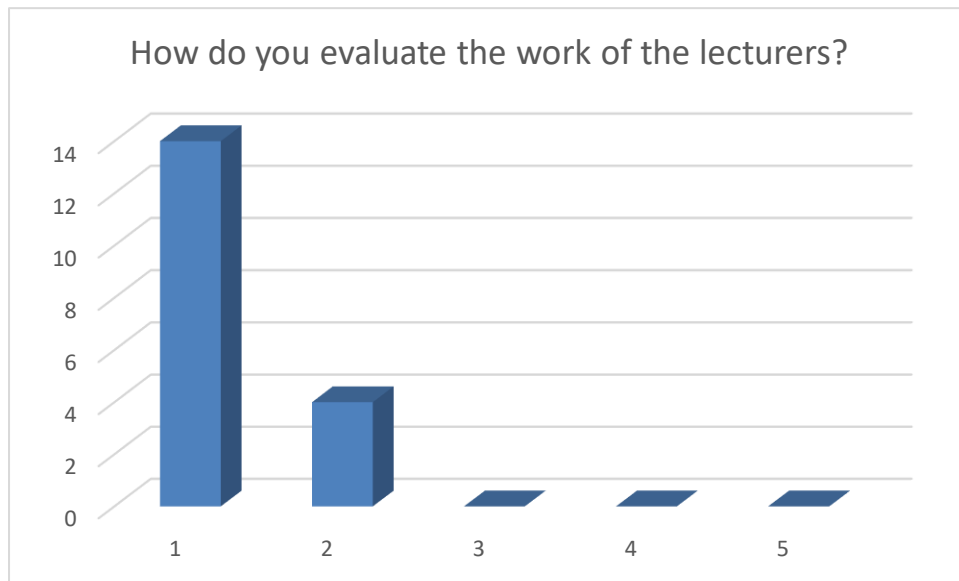
4. Evaluation of conducted courses

4.1 Bulgaria

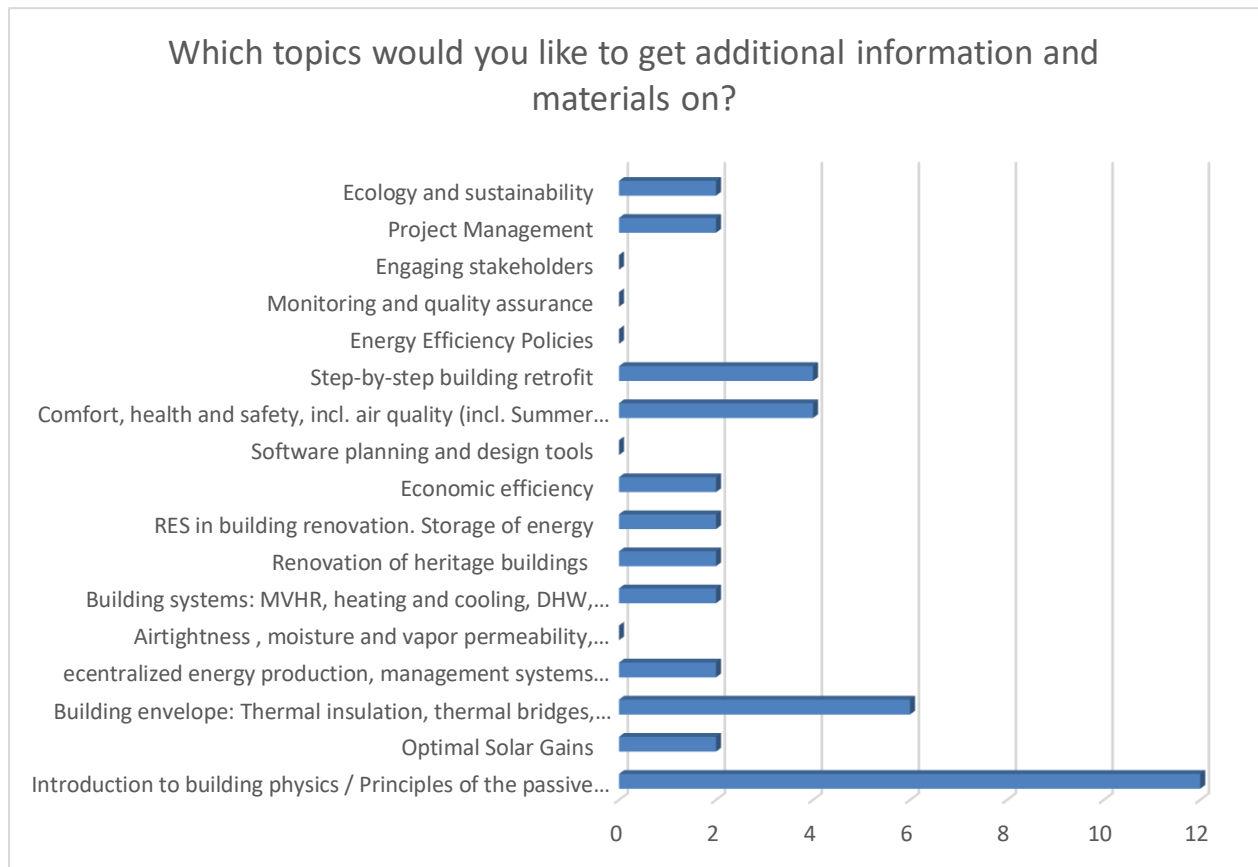
The results from the survey in Bulgaria demonstrate overall positive appreciation of the courses, the quality of lecturers and the applicability of the acquired competences. However, willingness of the participant to engage in additional training on specific topics, is considered average, which is to some extent based on the expectations of many of the students that they will pursue higher level of qualification, and in some cases – in different professional areas. Out of 18 received questionnaires, the responses are as follows:



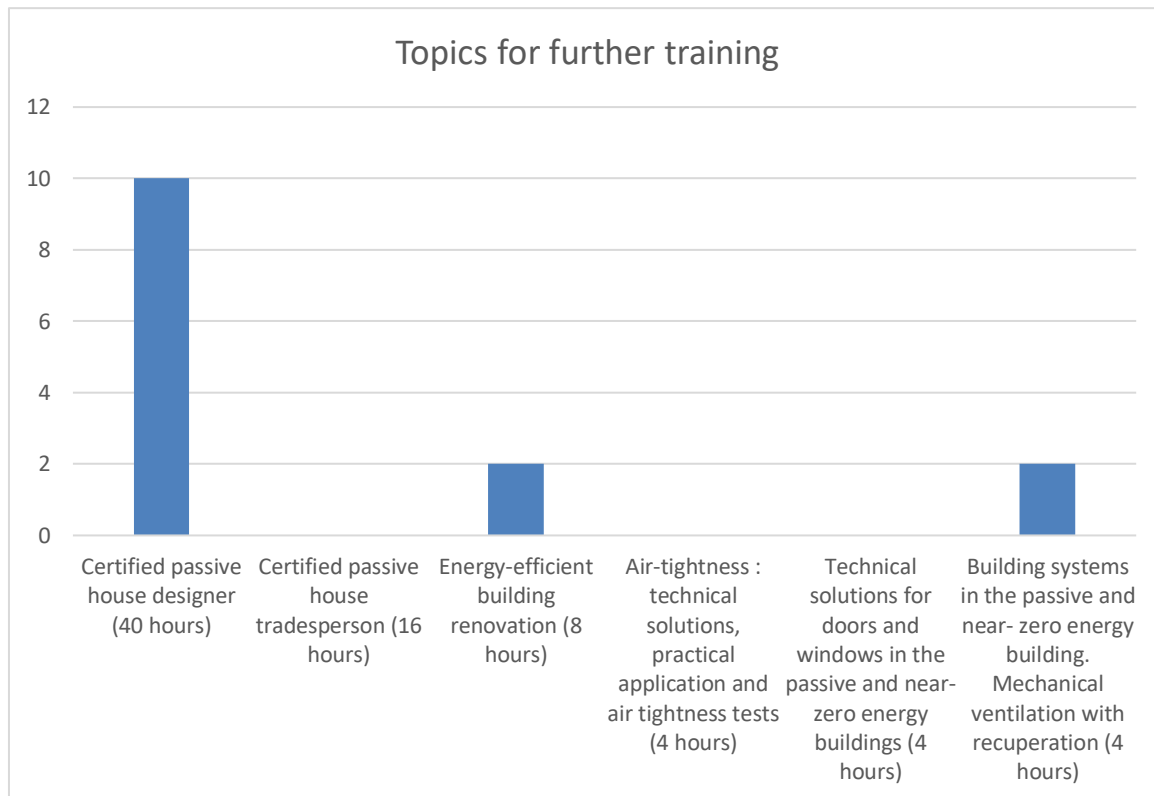
The lecturers are evaluated as well prepared, although, as always, some improvement should be targeted, especially in practical exercises. For guest lecturers, it is important to align the content of their presentations to the educational level of the students, which should be achieved through preliminary discussions with the regular teachers.



In general, the self-evaluation of the effect of the applied learning units was quite positive, although the direct observation of the guest lecturers would not confirm such statements. However, it is recognized that the newly installed training equipment and facilities are a very strong confidence-builder, as the direct interaction with specific nZEB design solutions and application of innovative materials in practice develops the personal appreciation of the acquired skill and knowledge.



While it was expected that the learning units will actually stimulate the interest towards different topics, it was evidenced that actually innovative products, materials and international brands stimulate curiosity at this level and age. The interest towards internationally recognized building standards is quite noticeable, being backed up by continued interest in the most popular envelope components and materials. On the other hand, interest in airtightness is virtually non-existent, which is explained by the lack of such normative requirements and construction practice in the country. In general, the responses provide a solid general guidance for the structure of future courses, as well as for the gaps in the learning process, where the integrated design principles and interdependency between the different building components and installations should be better emphasized.



Confirming the conclusions above, the question regarding interest to additional learning opportunities demonstrates strong interest to internationally recognized certification for higher educational level, while training targeting upskilling or qualification at EQF 3-4 is not deemed attractive, presumably as it coincides with the current level of qualification acquired by the pupils. However, the responses could be explained also by the fact that due to lack of experience, they are not able to connect the offered training products with the requirement of the labour market.

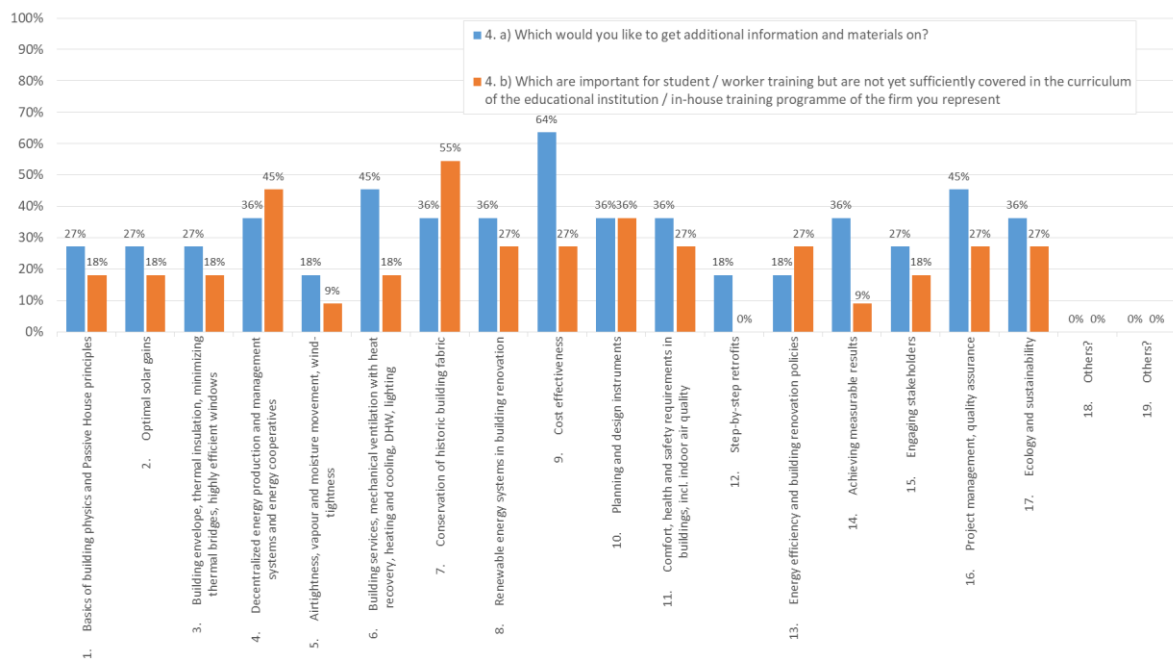
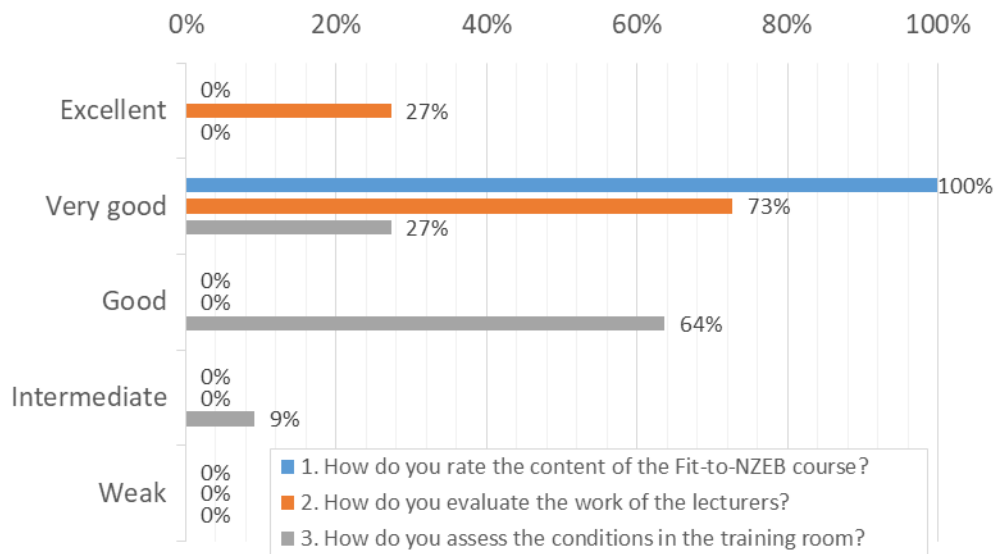
These observations were confirmed by open discussions, which evidenced that only a small portion of the pupils consider performing on-site construction activities as their future career development; while at the same time, many of them don't have actual experience at a construction site. This is why a number of options for improvement of the educational process were suggested, as professional career orientation, more practical approaches, site visits, visits to factories, test facilities and laboratories, more time for systematic delivery of the content.

4.2 Italy

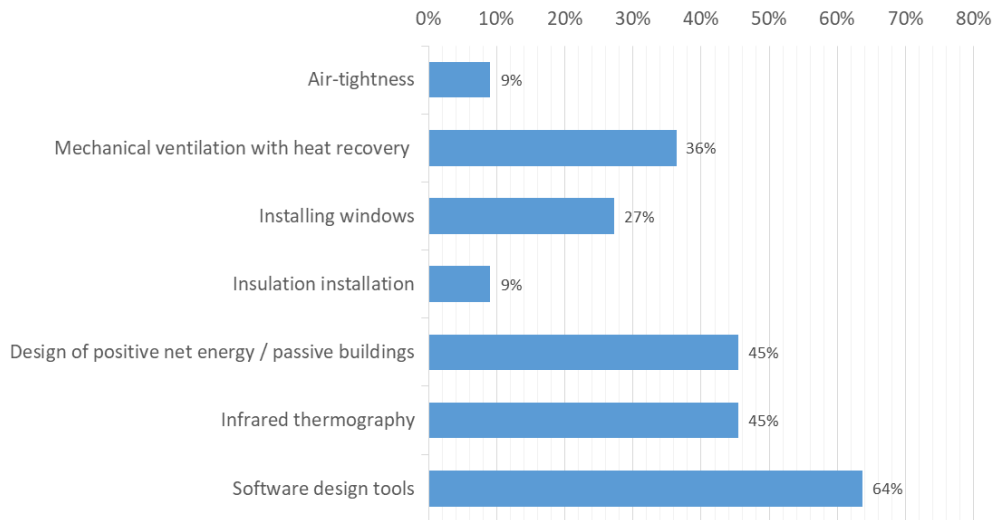
The training given by ZEPHIR has been very fruitful and enhanced the competences of Fit-2-nZEB Course attendants. This was confirmed also by a final questionnaire used to survey ITS Varese attendees at the end of the training section. The questionnaire was used to assess the satisfaction level of attendees and to verify the capacity enhancement.

Questionnaire results are shown in the following graphs.

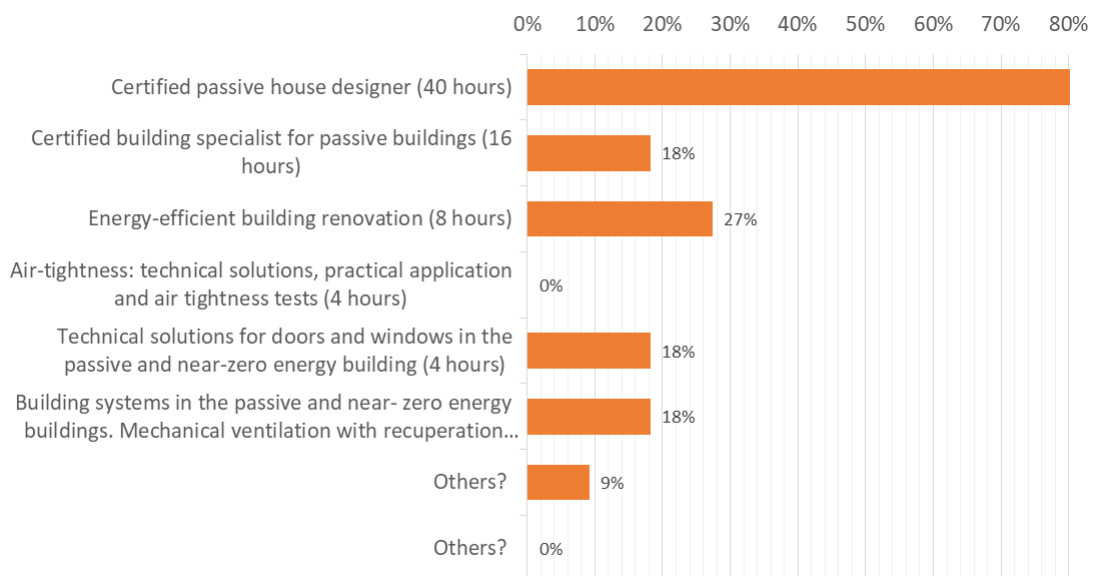
In particular some attendants would like to get additional information on "PHPP&DesignPH".



5. Which topics do you need further practical training to improve the quality of student / co-worker training in your educational institution / contracting firm?



6 . Which of the following courses do you think would be of interest to students / co-workers in your educational institution / contracting firm?

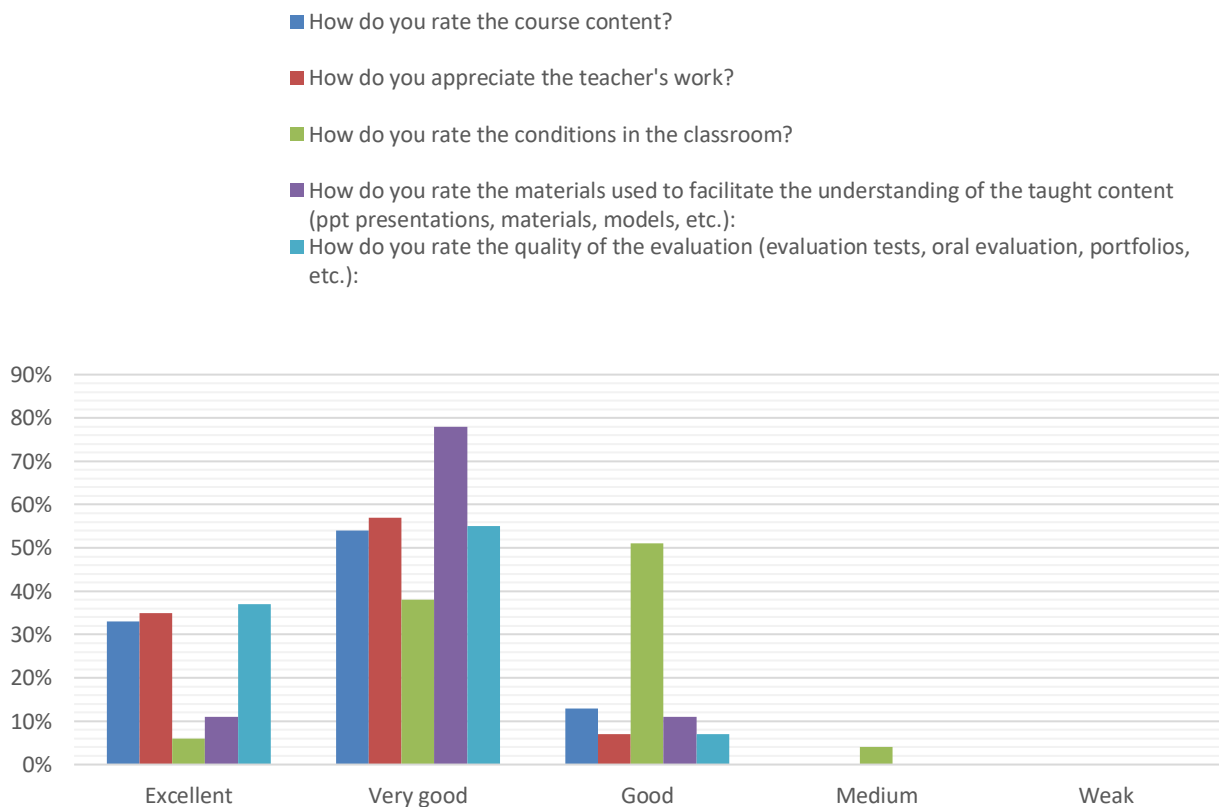


4.3 Romania

As concerns the students' feedback, they have been receptive to the new school subjects and have acquired the desired knowledge.

A feedback survey was conducted among the students after the entire training programme finished. The majority (45 of 50) of the trained students from Socolescu College gave their feedback about the pilot course in June 2019.

Error! Reference source not found. shows that most of the students attending Fit-to-nZEB pilot course held by Socolescu College rated the course content as excellent (33 %) and very good (54%). The teacher's activity within the course was appreciated as excellent (35%) and very good (57%). It was also found that 89% of students appreciated the conditions in the classroom as very good (38%) and good (51%). The structure of the learning materials (ppt presentations, building materials, demo models) was appreciated as very good (78%). Moreover, 92 % of students think that the quality of evaluation is excellent (37%) and very good (55%).



Regarding the open questions, the students mentioned some aspects of teaching that helped to understand the knowledge: ppt presentations, demo models, computer use in teaching, the interactive explanations of the teacher, exercises.

In order to improve teaching, students agree that they could learn much from the practical work and practical exercises. Most of the students suggested some steps to be implemented in the future in order to improve the existing course, such as:

- More practical approaches;
- Site visits. Contact with natural materials. Examination of sample air systems;
- Practical work and visits to factories, test facilities and laboratories;
- More discipline in approaching studying on behalf of their peers;
- Involvement in projects that are connected to this field of study;
- More time for the actual course.

As a result, we have decided to continue the course in the next academic year. We have also noticed that the contents are too many for two hours per week and therefore we will separate the topics in two parts which will be studied through two academic years, for 11th and 12th graders.

5. Conclusions and suggested monitoring activities - relation with LOs D2.3

6.1 Bulgaria

In general, the effectiveness of the learning process was evaluated by both the students and the teaching staff as very high. However, there are still obstacles that need to be considered:

- Systematic delivery of the course programme. While in the current project this could not be achieved as the official curricula cannot be changed without changes in the state educational standards and plans, the spreading of content related to nZEB and deep energy retrofit meant that there are tangible knowledge gaps in the different groups of pupils. While this approach should be maintained (knowledge about nZEB should be integrated and pursued in each discipline), the concentration of the learning units in one or several disciplines would be very helpful. This is expected to be a fact next year, with the new discipline “Ecological and energy efficient construction”. However, a specific discipline on Deep energy retrofit should also be pursued, either as elective or as obligatory one;
- Training of trainers is a never-ending process, and many school teachers need constant upgrade of the practical training skills, as they are often detached from the actual construction practice. On the other side, inclusion of different market actors for the practical training is valued and regarded as extremely positive, but they have to design the content of their presentations and their approach to the level of the pupils;
- There is still a lack of adequate training facilities and training aids. Based on the outcomes of the pilot activities, PGSA-Pazardzhik has applied and won a contest by the Ministry of Science and Education (for appr. 40000 Euro) for further improvement of the facilities and buying additional equipment as blower-door test equipment, infrared camera and the related software. Additionally, a new guidebook on energy efficient construction is planned to be published;
- One of the issues implicitly recognized by both teachers and pupils is the negative public image of the construction profession. This reflects in both decline of numbers of pupils and low interest and discipline during the educational process. It is envisioned that energy efficiency and RES in buildings, as well as BIM-facilitated teaching methods, can be a forceful mechanism to improve the situation. However, more effort is needed in this direction, both in increasing market demand for nZEBs based on appreciation of its benefits, and in engagement of large circle of stakeholders through public events and marketing campaigns.

6.2 Italy

Overall, there was a high interest from the students, with very good acceptance and active participation during the construction of the mockup. High satisfaction about learning progress. Possible improvements: making the course obligatory.

6.3 Romania

Overall, it was a very good acceptance and high interest from the students.

1) Lectures' content and learning materials:

- Layout, content of learning materials and the practicality of training course – high satisfaction;

2) Learning outcomes: the effectiveness of the learning procedures>

- Students' opinion about learning progress and application of obtained knowledge – high satisfaction;
- Good acceptance of the course from the students, however with some remarks regarding the need of more practice;
- Possible improvements: increasing the number of hours, transforming the course from elective into obligatory with a bigger number of teaching hours.

Appendices

Questionnaires and other monitoring instruments used:

Bulgaria

АНКЕТА

Към дисциплина „

„Почти нулево-енергийни сгради: дългобо енергийно обновяване“, проект Fit-to-NZEB, Пазарджик, 13.06.2019 г.

Име, фамилия (по желание)

1. Доволни ли сте от съдържанието на лекциите?

- ☐ Отлично ☐ Много добро ☐ Добро ☐ Посредствено ☐ Слабо

2. Как оценявате работата на преподавателите?

- ☐ Отлично ☐ Много добро ☐ Добро ☐ Посредствено ☐ Слабо

3. Колко подготвени се чувствате по обсъжданите в дисциплината теми?

- ☐ Отлично ☐ Много добро ☐ Добро ☐ Посредствено ☐ Слабо

4. По кои от темите бихте искали да получите допълнителна информация и материали?

- | | | | | | |
|---|--|--|--|--|---|
| <input type="checkbox"/> Тема 1: Въведение в строителната физика / Принципи на пасивната и почти нулевоенергийната сграда | <input type="checkbox"/> Тема 2: Оптимални слънчеви печалби | <input type="checkbox"/> Тема 3: Сградна обвивка: Топлоизолация, топлинни мостове, Високоэффективни прозорци | <input type="checkbox"/> 4. Децентрализирани системи за производство и управление на енергията и енергийни кооперативи | <input type="checkbox"/> Тема 5: Въздухоплътност, влаго- и паропреминаване, ветроустойчивост | <input type="checkbox"/> Тема 6: Сградни системи: Вентилация с рекуперация, отопление и охлаждане, БГВ, автоматизация, осветление |
| <input type="checkbox"/> Тема 7: Обновяване на сгради – паметници на културата | <input type="checkbox"/> Тема 8: ВЕИ при сградното обновяване. Съхранение на енергия | <input type="checkbox"/> Тема 9: Икономическа ефективност | <input type="checkbox"/> Тема 10: Софтуерни инструменти за планиране и проектиране | <input type="checkbox"/> Тема 11: Комфорт, здраве и безопасност, вкл. качество на въздуха
<input type="checkbox"/> 11.1 Летен комфорт
<input type="checkbox"/> 11.2 Противопожарна безопасност | <input type="checkbox"/> Тема 12: Поетапно сградно обновяване (стъпка по стъпка) |

- | | | | | | |
|---|---|---|---|--|--------------------------|
| <input type="checkbox"/> Тема 13: Политики за енергийна ефективност | <input type="checkbox"/> Тема 14: Мониторинг и контрол на резултатите | <input type="checkbox"/> Тема 15: Ангажиране на заинтересованите страни | <input type="checkbox"/> Тема 16: Управление на проекти | <input type="checkbox"/> Тема 17: Екология и устойчивост | <i>/Предложете тема/</i> |
|---|---|---|---|--|--------------------------|

5. Кои от темите смятате, че ще Ви бъдат полезни за бъдещото Ви професионално развитие?

- | | | | | | |
|---|--|--|--|--|---|
| <input type="checkbox"/> Тема 1: Въведение в строителната физика / Принципи на пасивната и почти нулевоенергийната сграда | <input type="checkbox"/> Тема 2: Оптимални слънчеви печалби | <input type="checkbox"/> Тема 3: Сградна обвивка: Топлоизолация, топлинни мостове, Високоэффективни прозорци | <input type="checkbox"/> 4. Децентрализирани системи за производство и управление на енергията и енергийни кооперативи | <input type="checkbox"/> Тема 5: Въздухоплътност, влаго- и паропреминаване, ветроустойчивост | <input type="checkbox"/> Тема 6: Сградни системи: Вентилация с рекуперация, отопление и охлаждане, БГВ, автоматизация, осветление |
| <input type="checkbox"/> Тема 7: Обновяване на сгради – паметници на културата | <input type="checkbox"/> Тема 8: ВЕИ при сградното обновяване. Съхранение на енергия | <input type="checkbox"/> Тема 9: Икономическа ефективност | <input type="checkbox"/> Тема 10: Софтуерни инструменти за планиране и проектиране | <input type="checkbox"/> Тема 11: Комфорт, здраве и безопасност, вкл. качество на въздуха
<input type="checkbox"/> 11.1 Летен комфорт
<input type="checkbox"/> 11.2 Противопожарна безопасност | <input type="checkbox"/> Тема 12: Поетапно сградно обновяване (стъпка по стъпка) |
| <input type="checkbox"/> Тема 13: Политики за енергийна ефективност | <input type="checkbox"/> Тема 14: Мониторинг и контрол на резултатите | <input type="checkbox"/> Тема 15: Ангажиране на заинтересованите страни | <input type="checkbox"/> Тема 16: Управление на проекти | <input type="checkbox"/> Тема 17: Екология и устойчивост | <i>/Предложете тема/</i> |

6. Кои от следните курсове биха представлявали интерес за Вас?

- ☐ Сертифициран проектант на пасивни сгради (40 часа)
- ☐ Сертифициран строителен специалист за пасивни сгради (16 часа)
- ☐ Енергийно ефективно сградно обновяване (8 часа)
- ☐ Въздухоплътност: технически решения, практическо приложение и тестове за въздухоплътност (4 часа)
- ☐ Технически решения за врати и прозорци в пасивната и почти нулевоенергийната сграда (4 часа)
- ☐ Сградни системи в пасивната и почти нулевоенергийната сграда. Механична вентилация с рекуперация (4 часа)
- ☐ */Предложете тема/*

Italy



Questionario di gradimento

Nome, cognome, istituto (opzionale)

1. Come valuta il contenuto del corso Fit-to-NZEB?

- ☐ Eccellente ☐ Molto buono ☐ Buono ☐ Mediocre ☐ Scarso

2. Come valuta il lavoro dei docenti?

- ☐ Eccellente ☐ Molto buono ☐ Buono ☐ Mediocre ☐ Scarso

3. Come valuta le condizioni dell'aula in cui si è svolto il corso?

- ☐ Eccellente ☐ Molto buono ☐ Buono ☐ Mediocre ☐ Scarso

4. Considerando gli argomenti sotto riportati, indichi le sue preferenze:

(a) Su quali argomenti vorrebbe ricevere delle informazioni aggiuntive?

(b) Quali argomenti non sono stati trattati sufficientemente?

- | (a) | (b) | |
|-----------------------|-----------------------|---|
| <input type="radio"/> | <input type="radio"/> | 1. Basi di fisica edile e principi Passivhaus |
| <input type="radio"/> | <input type="radio"/> | 2. Apporti solari ottimali |
| <input type="radio"/> | <input type="radio"/> | 3. Involucro dell'edificio, coibentazione termica, minimizzazione dei ponti termici, serramenti a maggiore efficienza |
| <input type="radio"/> | <input type="radio"/> | 4. Sistemi decentralizzati di produzione dell'energia e sistemi di gestione |
| <input type="radio"/> | <input type="radio"/> | 5. Tenuta all'aria, diffusione del vapore, umidità, tenuta al vento |
| <input type="radio"/> | <input type="radio"/> | 6. Impianti, ventilazione meccanica con recupero di calore, riscaldamento e raffrescamento, ACS, illuminazione |
| <input type="radio"/> | <input type="radio"/> | 7. Conservazione e recupero degli edifici storici |
| <input type="radio"/> | <input type="radio"/> | 8. Sistemi di energia rinnovabile nelle ristrutturazioni |
| <input type="radio"/> | <input type="radio"/> | 9. Cost optimum |
| <input type="radio"/> | <input type="radio"/> | 10. Strumenti di progettazione |

- ☐ ☐ 11. Comfort, salubrità e sicurezza negli edifici, compresa la qualità dell'aria interna
- ☐ ☐ 12. Retrofit step-by-step
- ☐ ☐ 13. Efficienza energetica e politiche di ristrutturazione
- ☐ ☐ 14. Ottenimento di risultati calcolabili
- ☐ ☐ 15. Coinvolgimento di stakeholders
- ☐ ☐ 16. Gestione del progetto, garanzia di qualità
- ☐ ☐ 17. Ecologia e sostenibilità
- ☐ ☐ 18. Altro? _____
- ☐ ☐ 19. Altro? _____

5 . Per quali argomenti ha bisogno di ulteriori esercizi pratici al fine di migliorare la qualità della sua preparazione?

- ☐ Tenuta all'aria
- ☐ Ventilazione meccanica con recupero di calore
- ☐ Installazione di serramenti
- ☐ Installazione della coibentazione
- ☐ Progettazione di edifici a bilancio energetico positivo/edifici passivi
- ☐ Termografica ad infrarossi
- ☐ Software di progettazione

6 . Quale dei seguenti corsi pensa che potrebbero essere di suo interesse?

- ☐ Progettista certificato Passivhaus (40 ore)
- ☐ Specialista certificate Passivhaus (16 ore)
- ☐ Ristrutturazioni di edifici ad efficienza energetica (8 ore)
- ☐ Tenuta all'aria: soluzioni tecniche, applicazione pratica e test di tenuta all'aria (4 ore)
- ☐ Soluzioni tecniche per serramenti in edifici Passivhaus o Nzeb (4 ore)
- ☐ Sistemi costruttivi in edifici Passivhaus e Nzeb. Ventilazione meccanica con recupero di calore (4 ore)
- ☐ Altro? _____
- ☐ Altro? _____

Module evaluation questionnaire

“Passive House –Basic principles for transition to nZEB House”

Please fill out this questionnaire that evaluates different aspects of the course.

Surname and first name (optional), school and class

1. How do you rate the course content?

- ☐ Excellent ☐ Very good ☐ Good ☐ Medium ☐ Weak

2. How do you appreciate the teacher's work?

- ☐ Excellent ☐ Very good ☐ Good ☐ Medium ☐ Weak

3. How do you rate the conditions in the classroom?

- ☐ Excellent ☐ Very good ☐ Good ☐ Medium ☐ Weak

4. How do you rate the materials used to facilitate the understanding of the taught content (ppt presentations, materials, models etc.):

- ☐ Excellent ☐ Very good ☐ Good ☐ Medium ☐ Weak

5. How do you rate the quality of the evaluation (evaluation tests, oral evaluation, portfolios etc.):

- ☐ Excellent ☐ Very good ☐ Good ☐ Medium ☐ Weak

Please answer the following questions in a more constructive manner as your suggestions will be used by the teacher to improve their teaching activity. You do not have to answer all the questions.

- What were the aspects of teaching that helped most in understanding and assimilating knowledge?

- What were the aspects of teaching that created difficulties in understanding and assimilation of knowledge?

- What suggestions do you have for improving the course delivery for this discipline?

- Additional comments are welcome. Please write them down below.