

WB Institution: State University of Novi Pazar

Date: May 2016.

Study on the needs, constrains and possibilities for the development of postgraduate study programme *Sustainable and resilient environments*

1. General description

There were 3 cycles of academic studies organized on Study Program of Architecture on SUNP after BAS:

- one year MAS “Energy Efficiency in Building Design” in school year 2010/2011
- two year of Specialist Studies “Energy Efficiency, Renewable Energy Sources and Environment Impacts” ENERESE in 2012/13 and 2013/14.

Since abovementioned studies educated experts for energy efficiency and renewable sources of energy in buildings, with the impact on environment, there is need for wider consideration of the problematic of energy efficiency regarding both quality and quantity and on wider urban level.

2. Purpose

What does that mean to improve energy efficiency of one building in the city? Shall the application of the most recent technologies on one building significantly improve the ecological conditions? What are the procedures and the promptitude for preparing energy passports for all buildings in the city?

Studying phenomena on wider examples, urban settlements and cities, is possible to get many effective results in related area.

We believe that the conditions are mature for forming the new cycle of the specialist/master studies that will accent on energy efficiency and the sustainable development of the urban areas with they impact on natural an built environment in the sense of strategies and procedures for application in the wider contexts of: the streets, the settlements, and whole cities.

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In that sense, along with the already established courses of energy efficiency in the building design, it is necessary to direct actions and practices towards improvement of the energy efficiency of the parts of the cities, as follow:

- Improvement of thermal characteristics of mid-rise apartments built from 50-ies to the 90-ies through their reconstruction of the facades and through redefinition of the heating systems
- consideration of the strategies of the improvement of the same characteristics in the individual (single) housing with the accent on hoses (areas) built in different periods
- considering of the improvement of the traffic, and reduction of harmful emanations through of measurements of the enhancement in the organization of the system itself
- considering of waste management, from the way of the collection of the waste, to the possibility of its separation and recycling

3. Structure of the new study program

Cycle of the specialist/master studies on the working title “Urban Energy Efficiency” is formed to be followed by engineers of architecture and civil engineering that are completed or 4-year of the BAS (240 ETCS).

The first proposal of subjects and their timetable is:

1. Energy efficiency of buildings and urban complexes
2. Aspect of energy of urban systems
3. Aspect of energy of traffic in the cities
4. Waste management and recycling
5. New renewable and adaptable sources of energy

6. Energy efficient and environment friendly building materials and technologies
7. Social aspect of energy efficiency – from end user to municipal services.

The master studies should last one academic year: 2 semesters, 60 ETC, and we propose that successful candidates get a title:

Master of urban energy efficiency.

Regarding compatibility of national regulations in the condition of higher education, this specialization will be fully compatible and adapted to the existing legal regulations in the related area.

In addition, experts from these qualifications should be to bridge the relationship between individuals - citizens and owners of residential premises and national strategies so as to be closer to the national strategy for the formation of individual strategies at different urban levels within the local (self) government.

We believe that SUNP, especially study programs of Architecture and Civil Engineering have enough capacity for the development of these specialized studies as part of their teaching staff, and through the involvement of eminent experts in the given field. Also, the base for attending such a defined master studies exist on the SUNP within SP of Architecture and SP of Civil Engineering, as well as the necessary space and related facilities of laboratories and libraries.

Classes would be held in the Serbian language with the use of available domestic and foreign literature in the given field.

There are the ongoing BAS on SUNP, both on SP of Architecture and SP of Civil Engineering. These are 4 - year programs, and we stood up survey among students of 3rd and 4th year, with general issues related to the knowledge of the subject areas and initial knowledge of the basic principles of energy efficiency and sustainability.

The survey is done during May 2016, with participation of students of SP of Architecture: 32 students of 3-rd year and 26 students on 4-th year, and students of the SP of Civil Engineering: 25 student 3-rd year and 18 students on 4-th year. The students of MAS on Civil engineering participated, 5 of them that makes total of 106 students questioned.

The results of the general enquiry are as follows:

1. 85 % would like to continue their MAS immediately after BAS.
2. 63 % are interested in close fields of energy efficiency in buildings.
3. 100% agree that waste management in our city and region are not satisfactory.
4. Only 12% of students think that they can influence improvement of traffic in the area.
5. Only 3 % of buildings where students are living have energy passports.
In fact, 26% of students don't know if their house has energy passport.
6. Not at all 9 %, partially 25 %, mostly 47%, 19% fully – this is what students think about the tenants in residential buildings as well as condominium owners can solve the problems of energy sustainability individually.
7. About the impact on communal level versus collection of individual impact, students are thinking as follow: none 3%, a little 24%, a lot 46% and completely 27%.
8. Most students (72%) believe that there are not specific and clearly defined strategies on the urban level that are transparent in practice.
9. 85% of questioned students believe that they can find job easier with this specialization
10. They (92%) are sure that this kind of specialization is needed for our city and region.

From the all above mentioned, and positive attitude of students towards studies in the related field, we believe that this specialization is very useful in the application of national strategies at the local level with the aim of better organization and management of the desired processes and the dissemination to the end user with an aim to implementations of specific objectives.

Master study is the basis for future doctoral studies in this area that would include all relevant issues in the above-mentioned urban level, with emphasis on the optimal functioning of urban systems: energy efficiency, flexibility, urban recycling, functioning

of urban systems and application of materials and procedures that are friendly to the environment.

Increasing awareness of climate change and the impact of man and his practice to the nature and environment in many ways can influence the change of previous aggressive and negative behavior of man to the nature. Management of urban systems, energy, waste and traffic adequately supported by modern technologies gives the ability to reduce the imbalance between nature and man and city in an optimal way. Another special area that deserves special attention and should be considered in future study of doctoral studies is definitely urban marketing that would be supported by the positive processes, methods and strategies of urban development in general.

This initial scheme is developed in the next proposal for Master studies:

STATE UNIVERSITY NOVI PAZAR

DEPARTMENT OF TECHNICAL SCIENCES:

STUDY PROGRAM OF ARCHITECTURE

STUDY PROGRAM OF CIVIL ENGINEERING

MASTER STUDIES

URBAN ENERGY EFFICIENCY

| I semester | | | | |
|------------|--|--------------|------|------|
| | Course | hours l+e | type | ECTS |
| 1 | Energy efficiency in buildings and urban complexes | up to 3 | ob | 5 |
| 2 | Energy efficiency of urban systems | up to 3 | ob | 5 |
| 3 | Energy efficiency of transport in cities | up to 3 | ob | 5 |

| | | | | |
|--------------|---|----------|----|----|
| 4 | Management of urban waste an recyclig | up to 3 | ob | 5 |
| 5 | New renewable and adaptive sources of energy | up to 3 | b | 5 |
| 6a | Energy efficient and environment friendly building materials and procedures | up to 3 | el | 5 |
| 6b | Energy efficiency and municipal services | | el | |
| 6c | Energy efficiency and EU legisalative and sources of finances | | e | |
| Total | | up to 18 | | 30 |

ob – obligatory,

e – elective

| <i>II semester</i> | | | | |
|--------------------|---|----------|----------|-------------|
| | Course | L | E | ECTS |
| 1 | Preparation and defense of master thesis – energy efficiency in contemporary materials sector | 20 | el | 30 |
| 2 | Preparation and defense of master thesis – energy efficiency in urban systems | 20 | el | 30 |
| 3 | Preparation and defense of master thesis – municipal management of energy efficiency | 20 | el | 30 |
| Total | | 20 | | 30 |