	Subject name:	ENERGY IN ARCHITECTURE		
Subject code	**Case status**	**Semester**	**Number of ECTS credits**	**Lesson fund (Sunday)**
PL2EA1	**Required**	**IX**	**7**	**2P + 2V**

Study programs organized for: Faculty of Polytechnic

Prerequisites for other subjects: None.

The idea of studying the subject: Improving the understanding of the concept of sustainable, ecologically aware and climate-responsible urban development and construction of buildings. In the light of modern aspirations towards the reduction of pollution that occurs in the building sector, the use of renewable and clean energy sources, the use of ecological materials and the creation of a healthy and clean environment for living and working, architecture and its form follow - energy.
A new paradigm in architecture is the motto of a contemporary movement that strives to adapt to the effects of climate change and ultimately to stop it. Energy efficiency and sustainable construction, the two most important topics in contemporary construction, are the backbone of progress not only in the construction industry, but also in society as a whole.
Thematic areas in the teaching of this subject refer to the architectural design of modern buildings conceived on the basis of integrative planning and
design, the use of modern technologies in construction, construction and design, as well as the ubiquitous concern for environmental protection and
consequence of climate change.

Objectives of the course: The aim of the theoretical teaching is to acquaint students with the causes and characteristics of contemporary architectural and urban practice in the context of considering the problems of energy, ecology and sustainability in general and to present and explain the basic mechanisms and strategies by which these problems can and must be overcome.

Learning outcomes: A student who successfully completes this course will be able to:
1. Understands the impact and contribution of the building sector and the construction industry to climate change and environmental pollution;
2. Understands the basic postulates of sustainable urban planning;
3. Understands and applies the basic concepts of climate neutral design;
4. Understands the concept of energy-efficient buildings and applies modern technological and design solutions in the early design phase;
5. Understands the concept of BEM (Building energy modeling).

Name and surname of teachers and associates: *Assoc. Dr. Nikola Marković ;* Milica Mitrić, B.Sc.Arch.

Method of teaching and mastering the material: lectures, preliminary presentation and preparation of a seminar paper, oral defense of the presentation.

WORK PLAN

Sunday:		*Name of methodological units for lectures (P), exercises (V) and other teaching content (O); Planned form of knowledge test (Pz)*
Preparation week		Getting to know, preparing and enrolling in the semester.
And Sunday	***P***	ENERGY IN ARCHITECTURE: INTRODUCTORY NOTES
II	***P***	GLOBAL GOALS / CLIMATE CHANGES / ENERGY CONSUMPTION IN BUILDINGS
III	***P***	INTEGRATIVE PLANNING AND DESIGN
IV	***P***	BIOCLIMATIC PLANNING AND DESIGN / PASSIVE STRATEGIES
V	***P***	PASSIVE HOUSE CONCEPT / nZEB / PLUS ENERGY BUILDINGS / ENERGY CERTIFICATION OF BUILDINGS
VI	***P***	ADAPTIVE ARCHITECTURE / CLIMATE ADAPTIVE BUILDING SHELLS / MODERN FACADE SYSTEMS
VII	***P***	CONCEPT OF URBAN RECYCLING / ADAPTIVE REUSE
VIII	***P***	TRADITIONAL AND INNOVATIVE MATERIALS IN CONSTRUCTION
IX	***P***	THERMAL / VISUAL / ACOUSTIC COMFORT
X	***P***	BIM + BUILDING ENERGY MODELING / OPENSTUDIO, ENERGYPLUS
XI	***P***	PARAMETRICISM IN ARCHITECTURE
XII	***P***	"SMART" CITIES / E-MOBILITY
XIII	***P***	ENERGY EFFICIENCY IN MONTENEGRO / LEGAL FRAMEWORK / RES / MEEC SOFTWARE
XIV	***Pz***	**Colloquium - preliminary presentation of the seminar paper.**
XV	***P***	Recapitulation of the material.
XVI	***Pz***	**Final exam.**
XVII		*Semester verification and grade entry*
XVIII		***Make-up exam deadline***

Obligations of the student during classes: lectures, discussions, preparation of a seminar paper and exam.

Consultations by e-mail: YES

Student workload

Sunday	in the semester
7 credits x 40/30 = 9 hours 20 minutes Structure: – 2 hours of lectures – 2 hours of exercise 5 hours 20 minutes of independent work, including consultations.	Total workload for the subject 7x30 = 210h Structure: **Classes** and final exam: 9h20min x 16 weeks = 149h20min **Necessary preparations** before the beginning of the semester (administration, registration, certification): 10h40minx2=21h20min **Additional work** for preparing and passing the exam in the remedial period: 0-48 hours

Literature:

McLennan, K. and Jason, F. (2004). The Philosophy of Sustainable Design. Ecotone

LLC, Kansas City. Sayigh, Ali (2013). Sustainability, Energy and Architecture, Academic

Press.

Mumovic, D., & Santamouris, M. (Eds.). (2018). A Handbook of Sustainable Building Design and Engineering: An Integrated Approach to Energy, Health and Operational Performance (2nd ed.). Routledge.

Isaac, S., Meir, I., & Pignatta, G. (Eds.). (2023). Net-Zero and Positive Energy Communities: Best Practice Guidance Based on the ZERO-PLUS Project Experience (1st ed.). Routledge.

Gerring, D. (2022). Renewable Energy Systems for Building Designers: Fundamentals of Net Zero and High Performance

Design (1st ed.). Routledge. Jacobs, J. (1961). The Death and Life of Great American Cities. New York: Random House.

Kazić, N., Vuksanović, D. (Eds.). (2011). Energy efficiency of buildings: methodology of energy review and calculation of EE indicators, Faculty of Mechanical Engineering

University of Montenegro

Forms of knowledge testing and assessment:

Preparation and submission of the preliminary version of the seminar paper 10%, preparation and submission of the final seminar paper 60%, oral defense of the paper 30%.

Rating	***A***	***B***	***C***	***D***	***E***
Number of points	***90-100***	***80-89***	***70-79***	***60-69***	***50-59***