

## Erasmus + KA107 International Credit Mobility

### WORKSHOP “SURVEY OF THE ARCHITECTURAL HERITAGE” Podgorica, 5-10 May, 2022

#### Case Study: The palace complex Kruševac, Podgorica

**Workshop coordinator:** Assoc Prof. Slavica Stamatović Vučković, Vice-dean for International Cooperation  
**Assistants:** PhD Irena Rajković, Msc Marija Čačić, Nemanja Miličević spec. arch.

**Professors from Polytechnic of Bari:** prof. Francesco Defilippis, prof. Valentina Castagnolo, prof. Massimo Leserri, prof. Cristiana Maiorano, prof. Domenico Pastore, prof. Gabriele Rossi

The activities expected for the Erasmus + KA107 International Credit Mobility Program are organized according to a seminar training model that promotes the skills and experiences exchange between *Department of Civil Engineering and Architecture, Polytechnic of Bari (DICAR)* and *Faculty of Architecture - University of Montenegro*, and expands the training offer for students with the introduction of Italian learning models.

The aim of the Workshop is to draw up, with the collaboration of the students from The Faculty of Architecture in Podgorica, the survey of an architectural object from the significant architectural heritage of Montenegro. *The palace complex Kruševac* (CSUCG - Center for Contemporary Art of Montenegro) was chosen for that purpose, which is one of the most historically significant buildings in the territory of Podgorica, built in the late nineteenth century.

#### Program of the activities

DAY	DATE	M/A	ACTIVITIES
	4/5/2022 Wednesday	<i>Afternoon</i>	- Arrival in Podgorica
1°	5/5/2022 Thursday	<i>Morning</i>	- 10.00 -12.00 AM: Inspection of the site to be surveyed - The palace complex Kruševac (Professors from Bari, professors and assistants from Montenegro, meeting in Center for Contemporary Art of Montenegro)  - 12.30 -13.00 PM: Visit of the Center for Energy Efficiency and 3D Technologies at the Faculty of Architecture (Prof. Ilija Lalošević, Phd Irena Rajković)  - 13.00 - 14.00 AM: Meeting with Prof. Svetlana Perović (Dean of the Faculty of Architecture), Prof. Slavica Stamatović Vučković (Vice dean), Asst. Prof. Vladimir Bojković (Vice dean) and Prof. Ilija Lalošević
		<i>Afternoon</i>	- 15.00 – 17.00 PM: Start of the survey activities – students meeting and organizing of working groups, room 102, The Faculty of Architecture (The palace complex Kruševac)
2°	6/5/2022 Friday	<i>Morning</i>	- 8.30 – 10. 00 AM: <b>Lecture on survey techniques and methods</b> (within the subject Digital Methods in Architecture, I study year) - open lecture by teachers of the Polytechnic University of Bari, room 002 - 11.00 AM – 13.00 PM: Survey activities, The palace complex Kruševac
		<i>Afternoon</i>	- 15.00 – 17.00 PM: Data processing, The Faculty of Architecture, room 102
3°	7/5/2022 Saturday	<i>Morning</i>	- 10.00 AM – 13.00 PM: Survey activities, The palace complex Kruševac
		<i>Afternoon</i>	- 15.00 – 17.00 PM: Data processing, The Faculty of Architecture, room 102
4°	8/5/2022 Sunday		Free day
5°	9/5/2022 Monday	<i>Morning</i>	- 10.00 AM – 13.00 PM: Survey activities, The palace complex Kruševac
		<i>Afternoon</i>	- 15.00 – 17.00 PM: Data processing, The Faculty of Architecture, room 102

			- 18.00 PM: <b>Lecture on an Italian or International case study</b> (by teachers of the Polytechnic University of Bari), The Faculty of Architecture, room 102
6°	10/5/2022 Tuesday	<i>Morning</i>	- 10.00 AM – 13.00 PM: Data processing and drawing, The Faculty of Architecture, room 102
		<i>Afternoon</i>	- 15.00 – 17.00 PM: Data processing, drawing and printing, The Faculty of Architecture, room 102 - 17.00 – 18.00 PM: Communication of the activity outcomes, The Faculty of Architecture, room 102
	11/5/2022 Wednesday	<i>Morning</i>	Departure

### Tools and methods

In the last decade, the ICAR/17 research group (Drawing and Surveying) of the Politecnico of Bari University has actively participated in the management and realisation of scientific events such as international seminars and workshops with the aim of discussing the themes of **architectural surveying**, precisely because of the importance that this discipline holds within the field of representation intended for the **documentation of the architectural heritage**.

With the activity for the Erasmus + KA107 International Credit Mobility Programme, the Politecnico di Bari lecturers intend to create a comparison of the experiences developed during the scientific events carried out in Italy and abroad and to experiment in the field, with the Montenegrin partners, the most innovative methodologies for the acquisition of metric data for the knowledge and documentation of the proposed case studies.

Together with direct surveying, which is a constant learning experience for architects, teachers and students will be able to experiment with **three-dimensional surveying techniques**. Therefore, the idea is to divide the teaching activities using range-based and image-based techniques.

In recent years, technologies using passive sensors have made it possible to spread photogrammetry in territorial, architectural and archaeological surveys. In particular, the technique that will be adopted, as an evolution of photogrammetry, is the photogrammetric modelling through automatism based on SfM (Structure from Motion) algorithms. Through the use of SIFT (Scale Invariant Feature Transform) matching and CMVS (Clustering Views for Multi-View Stereo) densification algorithms, they make it possible to reconstruct the photographed scene three-dimensionally.

**The second technology, based on active sensors**, that will be provided in the seminar in Montenegro is represented by the **TLS (Terrestrial Laser Scanner)**. During the activities an electro-optical-mechanical device will be used, which by orienting an EDM (Electronic Distance Meter) will allow the acquisition of the spatial coordinates of the scene in which they are placed. All the raw data acquired in the field will then be processed **using special software**, to present the information processing workflow and allow a critical comparison between the techniques used to reflect on the potential of integrated or instrumental surveying. Both the results obtained through direct survey and those with digital techniques will allow the participants to grasp the potential of the processed results as they are preparatory to the final phase of graphic restitution.



The palace complex Kruševac, Podgorica

**Application requirements and benefits:**

The workshop is open to students of all years of study.

Students can apply to the email address: [cacic.marija@yahoo.com](mailto:cacic.marija@yahoo.com), until Tuesday (May 3, 2022) no later than 19 PM.

3D scanning is a modern method used in various spheres of architecture, from the protection of architectural heritage, design and reconstruction projects, museum and stage exhibitions, etc. This means that through such a workshop new and useful skills and knowledge are acquired, which can be of great use in future work.

Students, that will be participating in the workshop, will receive 5 points. which can be used as "additional points" in the subjects: *Protection and revitalization of architectural heritage* (7th semester) and *Adaptation and reconstruction of buildings* (9th semester), in agreement with prof. Ilija Lalošević and assistants.

Also, students will receive a certificate of participation in this extracurricular activity, which they can enclose when applying for ERASMUS + student mobility.

Students - participants will be freed from teaching during the workshop.