



Date: 25-26 April 2017

Place: University of Aalborg

Knowledge FOR Resilient soCiEty

REPORT ON EU TRENDS IN DRM&FSE PHD

Ss. Cyril and Methodius University

Faculty of Civil Engineering

***Institute for Earthquake Engineering and Engineering
Seismology***

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained



Prof. PhD Violeta Mircevska Velkovska

Co-funded by the
Erasmus+ Programme
of the European Union





68 years of tradition, recognized values and quality



Co-funded by the
Erasmus+ Programme
of the European Union





The Ss. Cyril and Methodius University in Skopje is founded in 1949, initially with three faculties:

- Faculty of Philosophy,
- Faculty of Medicine,
- Faculty of Agriculture and Forestry.

At the moment, the University represents a functional community of:

- **24 faculties,**
- **5 research institutes,**
- **11 accompanying members.**





Cyril and Methodius are two brothers born in Solun- Macedonia (in present-day Thessalonica Greece) as sons of a prominent Christian family. (Cyril in about 827–828 and Methodius about 815–820)

They are **Byzantine Christian** theologians and missionaries who created and spread the Glagolitic Alphabet (**the first Slavic alphabet**) among the Slovs population. Their work they influenced the cultural development of all Slovs.

The Pope John Paul II declared them co-patron saints of Europe.





The essential missions of UKIM :

- **Production of highly educated human resources at the level of undergraduate, postgraduate and doctoral studies;**
- **Performing scientific and research work;**
- **Constant collaboration with the organizations , companies, firms.**





Doctoral study at UKIM :

- **Organized by the School of Doctoral Study;**
- **Coordinated by the Doctoral Studies Univ. Board;**
- **Regulated by the Univ. Statute and acts of its establishment.**





The Ss. Cyril and Methodius University develops PhD study programme in all scientific fields :

- natural sciences and mathematics,
- technical and technological sciences,
- medical sciences and health,
- biotechnical sciences,
- social sciences,
- humanities and arts;
- Doctoral studies will also be organized as multidisciplinary studies in various fields.





The objectives of the doctoral studies are:

- **Improvement of the scientific and research work, artistic work and professional work;**
- **Transfer of knowledge to the new generation;**
- **Qualification of staff capable of conducting original scientific research work, developing new technologies, as well as art projects.**





The PhD study programme last 3 years and corresponds to 180 ECTS credits . It comprises the following :

- **Training for research work**
⇒ **corresponding to 30 ECTS credits**

- **Teaching : includes subjects of the field, research area and the specific research area**
⇒ **corresponding to 30 ECTS credits**

- **Application, preparation and defense**
⇒ **corresponding to 120 ECTS credits**





Training for research work, comprises:

- **Three subjects for gaining generic knowledge and skills for research work ⇒ 3*4 ECTS=12 ECTS**

- 1. Compulsory subject: Scientific-research ethics**

- 2. One subject belongs to the group of subjects in Methodology of research work**

- 3. One subject belongs to the provided list of other subjects in training for research work**





Activities connected to the research work :

- Second Semester: research for preparation of topic for the doctoral dissertation, valued with 14 ECTS credits;
- Third Semester: research for preparation and submission of the application of the PhD thesis, valued with 28 ECTS credits;
- Forth Semester: research and publishing of results, valued with 25 ECTS credits;
- Fifth Semester: research and publishing of results, valued with 28 ECTS credits;
- Sixth Semester: research and writing of the thesis, valued with 25 ECTS credits.



120 ECTS





Research and the publishing of results, comprise:

- Each public presentation at a seminar \Rightarrow 2 ECTS credits;
- Each public presentation at an annual conference \Rightarrow 2 ECTS credits;
- Each public presentation at a workshop \Rightarrow 3 ECTS credits;

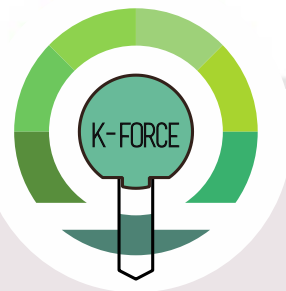




Application, preparation and defense of the doctoral thesis comprise:

- The candidate's original research work;
- An application for doctoral dissertation theme;
- Publishing of papers i. e. performance of artistic works;
- Writing of the dissertation;
- Submitting of the prepared dissertation;
- A public defense of the dissertation.

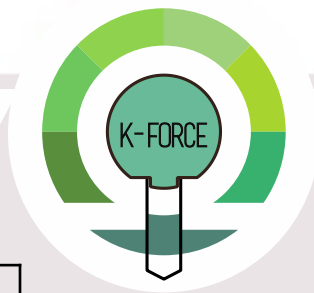




I YEAR		
I semester		
15 September	1. subjects for gaining generic knowledge 2.subjects from the field of research	Maximum (1.+2.) = 30 ECTS.
October		
November		
December		
January	examinations	
II semester		
February and	1. subjects for gaining generic knowledge 2.subjects from the field of research	Maximum (1.+2.) = 12 ECTS
March		
April	Doctoral seminar with presentation (<i>first week of March</i>)	2 ECTS
May	Research (preparation of the topic of the doctoral thesis)	14 ECTS
15 May-15 June	examinations	
First week of September	Annual conference and presentation of the report	2 ECTS

II YEAR		
III semester		
15 September	Preparation and application of the PhD dissertation and research	28 ECTS
October		
November		
December		
January	Examinations, Doctoral seminar with presentation of the results	2 ECTS
IV semester		
February	Workshop for research practice	3 ECTS
March	Research and publishing the results	25 ECTS
April		
May		
15 May-15 June	examinations	
First week of September	Annual conference with presentation of the report	2 ECTS





III YEAR		
V semester		
15 September	Research and publishing results	28 ECTS
October		
November		
December		
January	Doctoral seminar with presentation of the report	2 ECTS
VI semester		
February	workshop for research practice	3 ECTS
March	Research and writing of the thesis	25 ECTS
April		
May		
First week of September	Annual conference with presentation of the results	2 ECTS





Right to enroll in doctoral studies:

- **Completed second cycle of studies harmonized with the European Credit Transfer System (hereinafter: ECTS credits);**
- **Completed postgraduate studies according to study programmes before introducing the ECTS, to whom 60 credits of training for research and education are recognized;**
- **At least 8,00 obtained average grade of all subjects in higher education;**
- **Knowledge in one of the world languages.**





***RESEARCH TOPICS IN THE
DRM/FSE FIELD ARE :***

**DAMAGE DETECTION OF BUILDING STRUCTURES THROUGH
EXPERIMENTAL IDENTIFICATION OF ONE MODAL EIGENPAIR**
specific research area: Structural Health Monitoring

**EXPERIMENTAL AND NUMERICAL RESEARCH OF DYNAMIC RESPONSE
OF WOODEN STRUCTURES ASSEMBLED FROM CROSS LAMINATED
WOODEN PANELS**
specific research area: wooden structures, structural seismic resistance

**OPTIMAL PLACEMENT OF PRESTRESSED DAMPING DEVICES IN STEEL
FRAME STRUCTURES**
specific research area: Structural Control



**RESEARCH TOPICS IN THE
DRM/FSE FIELD ARE :**



**METODOLOGY FOR PROBABILISTIC PERFORMANCE BASED SEISMIC
SLOPE STABILITY IN REGIONS WITH MODERATE SEISMICITY**

**specific research area: : Geotechnical Engineering, Dynamics of Soils ;
Seismic Hazard Assessment**

**DYNAMIC BEHAVIOR OF SATURATED COHESIONLESS SOILS BASED ON
ELEMENT AND 1-G EXPERIMENTS**

**specific research area: geotechnical engineering, dynamics of soils and
foundation**



Co-funded by the
Erasmus+ Programme
of the European Union



**RESEARCH TOPICS IN THE
DRM/FSE FIELD ARE :**



3D SEISMOGEOLOGICAL MODELING OF SKOPJE BASIN

specific research area: Geophysics; Geology , Engineering Seismology;

**ADVANCED APPROACH TO SEISMIC HAZARD ASSESMENT OF
MACEDONIA**

**specific research area: Engineering Seismology; Seismic Hazard
Assessment**

**SEISMIC FRAGILITY CURVES FOR TYPICAL REINFORCED CONCRETE
BRIDGE STRUCTURES IN REPUBLIC OF MACEDONIA**

specific research area: risk assessment, vulnerability



LABOTATORIES : Faculty of Civil Engineering



Laboratory for Sanitary Hydrotechnic



LABORATORIES : Faculty of Civil Engineering



Laboratory for Geotechnics



Co-funded by the
Erasmus+ Programme
of the European Union



LABORATORIES : Faculty of Civil Engineering



Laboratory for Energy Efficiency of Buildings



Co-funded by the
Erasmus+ Programme
of the European Union



LABOTATORIES :
Faculty of Civil Engineering



Laboratory for Testing of Concrete and RC structural elements



LABOTATORIES :
Faculty of Civil Engineering



Laboratory for Hydraulic Engineering



IZIIS Departments



- Natural and Technological Hazards & Ecology
- Building Structures and Materials: Design, Analysis & Testing
- Engineering Structures and Software
- Risk, Disaster Management and Strategic Planning
- Geotechnics and Special Structures
- Dynamics Testing Laboratory and Informatics

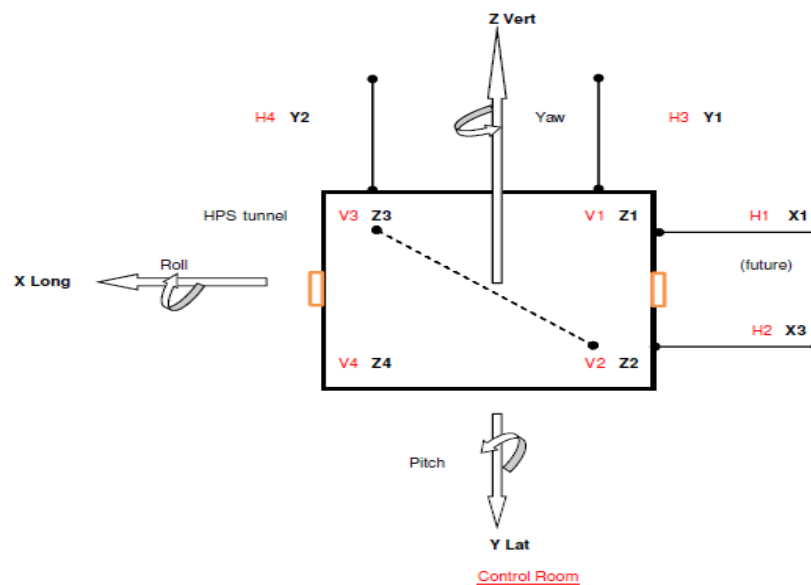


Isolator in action

Co-funded by the
Erasmus+ Programme
of the European Union



Dynamics Testing Laboratory IZIIS



Co-funded by the
Erasmus+ Programme
of the European Union

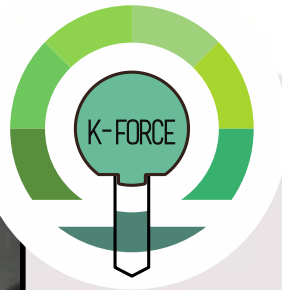




Size	5.0 x 5.0 m
Mass	330 kN
Natural Frequency	48 Hz for maximum loading mass placed in the center of the table
Material	Pre-stressed Concrete
Actuators	Vertical: 4 x 222 kN Horizontal: 2 x 500 kN
Maximum Model Mass	400 kN with a height of 6.0 m
Maximum Acceleration	Vertical: 1.5 g Horizontal: 3 g
Maximum Displacement	Vertical: ± 0.060 m Horizontal: ± 0.125 m
Maximum Overturning Moment	0.5 - 80Hz 460 kNm
Digital Control MTS 469D	Servo Controlling Closed System



Shaking Table Testing of Model



Steel structure and Isolators



Base isolated model



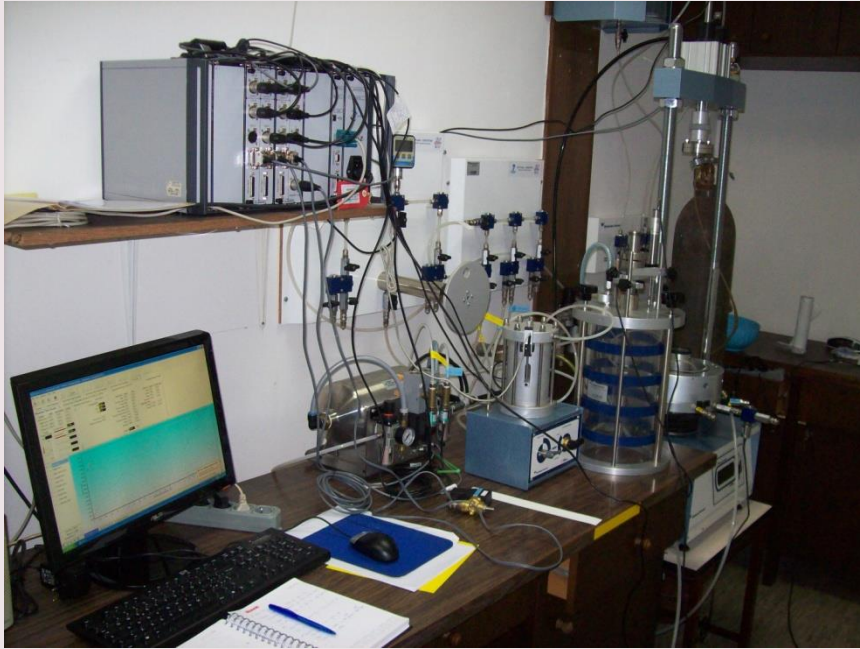
Isolator in action



Co-funded by the Erasmus+ Programme of the European Union



Soil Dynamic Laboratory IZIIS



AVAILABLE TESTS:

- Standard triaxial tests (UU, CU, CD) including saturation, isotropic and anisotropic consolidation with pore pressure and volume change measurements
- Stress and strain path control tests, including K_0 consolidation
- Cyclic loading
- Dynamic shear strength and deformation
- Liquefaction potential
- Shear modulus and damping ratio
- Resilient modulus

The system can work with different models of triaxial cells for specimen sizes of 50, 70, 100 and 150 mm.

WH7050 Triaxial system for static and dynamic testing of soils



Isolator in action

Co-funded by the
Erasmus+ Programme
of the European Union





CYCLIC SIMPLE SHEAR APPARATUS – DSSA

Manufacturer: Dames Moore (Dames & Moore, London), UK



- Measurement of dynamic properties
- Any soil type can be tested.



Isolator in action

Co-funded by the
Erasmus+ Programme
of the European Union



Soil Dynamic Laboratory
IZIIS



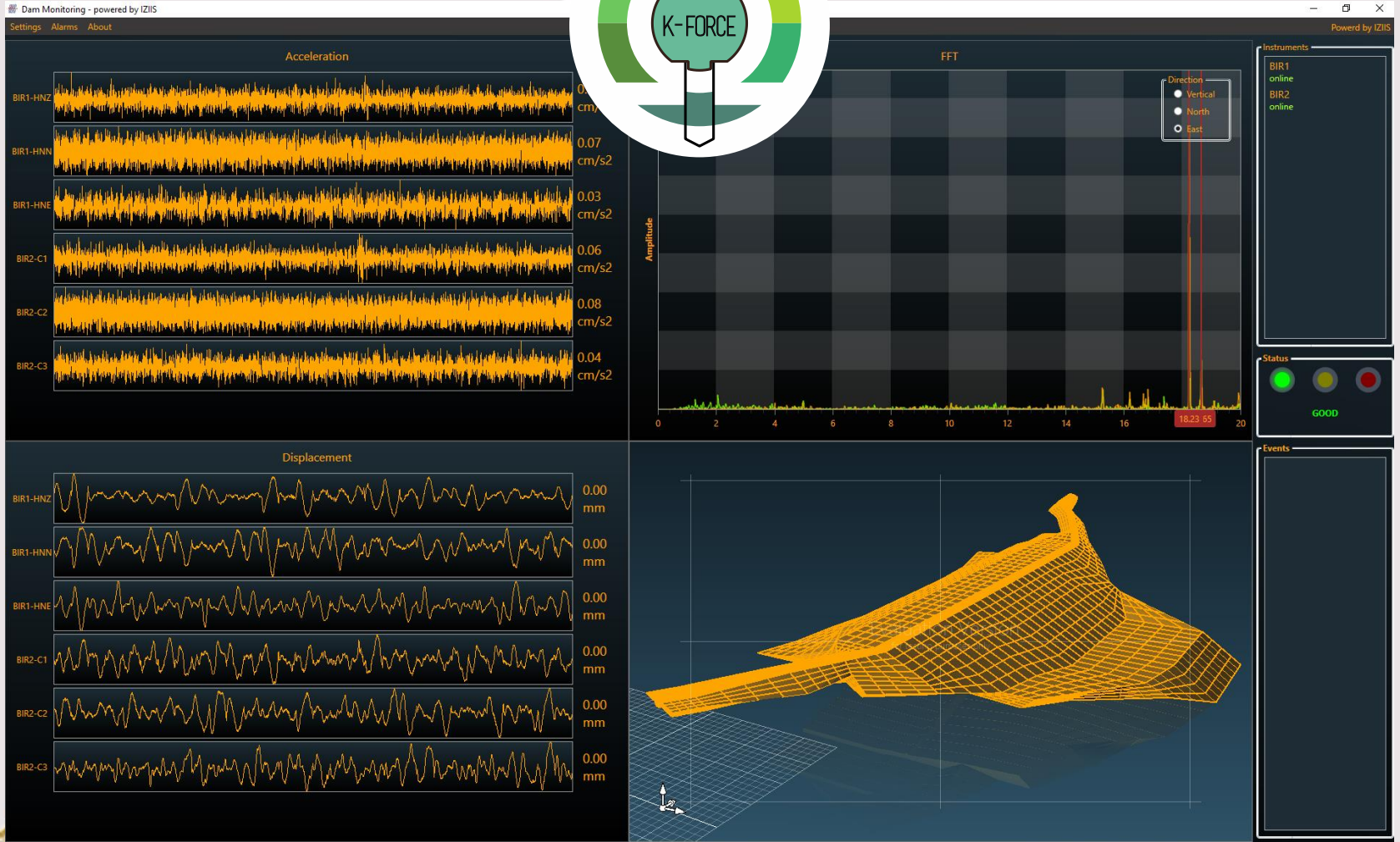
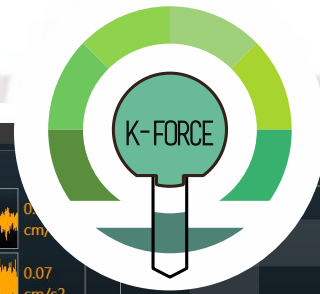
LAMINAR BOX FOR SHAKING TABLE TESTING ON GEO-STRUCTURES



IZIIS

Co-funded by the
Erasmus+ Programme
of the European Union





Strong Motion Laboratory
IZiIS

Co-funded by the
Erasmus+ Programme
of the European Union





Seismic Methods
Seismic Refraction

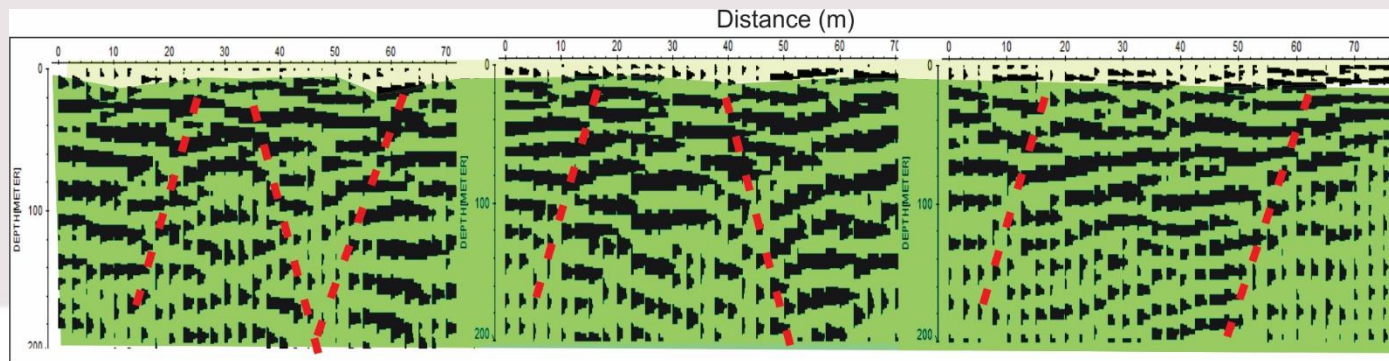
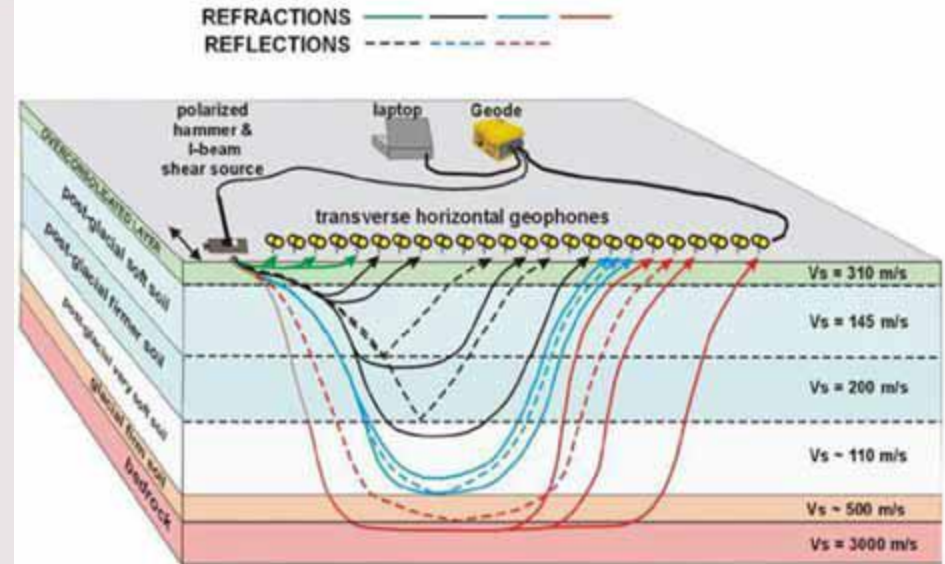
✓ Seismic Refraction Tomography

Seismic Reflection

✓ Common Depth Point (CDP)
Technique

Active and Passive Surface Wave
Methods

✓ MASW, ReMi, SASW, etc





Elective subjects in Third Cycle Studies

- **Seismic designing of structures**
- **Protection old constructions from earthquakes**
- **Fire resistance of reinforced concrete structures**
- **Seismic vulnerability of structures**
- **Wind in constructive engineering**





IZIIS

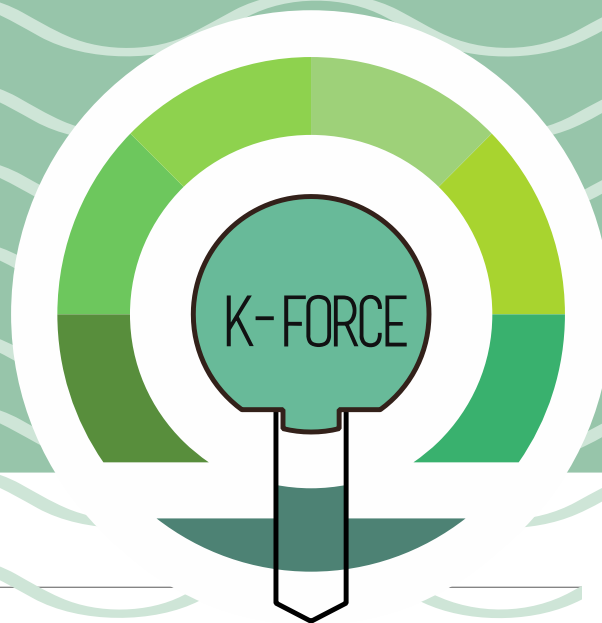
Elective subjects in Third Cycle Studies

- **Management of Urban Disasters and Strategic Planning**
- **Seismic Hazard, Vulnerability and Risk**
- **Geographic Information System (GIS) and Its Application in Earthquake Engineering**



Co-funded by the
Erasmus+ Programme
of the European Union





Co-funded by the
Erasmus+ Programme
of the European Union



Thank you
for your attention

*IZIIS and GF – UKIM Skopje , Macedonia:
violeta@pluto.iziis.ukim.edu.mk*

Knowledge FOR Resilient soCiEty