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Erasmus+ Programme
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PROJECT TITLE: **Mathematics of the Future: Understanding and Application of Mathematics with the help of Technology, FutureMath**

Programme: Erasmus+
Key Action: Cooperation for innovation and the exchange of good practices
Action Type: Strategic Partnerships for higher education
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Intellectual Output 4: Piloting and testing

Prepared by UNS

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The implementation of Piloting lessons and testing were conducted in the auspice of output (O4), based on the development of representative lessons in (O3) and the results in IO1 and IO2, in the spring semester in 2022 at all partner universities, at UNS, BMU, UPT and GDU. Using the new STEAM methodology developed in this project, selected topics for Calculus courses were prepared and conducted.
The new evaluation method (tests) was also part of the spring course. Knowledge of each presented topic and overall knowledge at the end of the course were tested.
In conducted lectures for Calculus topics in STEAM methodology and technology are integrated as: collaborative learning, project and problem based learning, mathematical modeling process in the computer environment. The software GeoGebra, Mathemtica, Java and Sage math.

There were 26 piloting lectures:
8 piloting lectures by UNS, 7 piloting lectures by BMU, 5 piloting lectures by UPT and 6 piloting lectures by GDU. The lessons were

1. Directional derivatives
2. Gradient vector and applications of directional derivatives,
3. Complex Functions and SageMath
4. Solving equations in SageMath,
5. Combinatorics: Splitting the numbers into sum, variations with repetitions, permutations,
6. Combinatorics: Variations without repetitions, combinations with and without repetitions
7. Partial derivatives,
8. Applications of the derivatives, Max-min problems,

Belgrade Metropolitan University

9. Big O Notation, in Belgrade
10. Big O Notation, in Nis
11. Classification in machine learning, in Belgrade
12. Definite integrals solving in Java, in Belgrade
13. Definite integrals solving in Java in Nis
14. Elliptic curve cryptography, in Belgrade
15. Recurrenece relations, in Belgrade

Timisora,UPT

16. Integrale improprii (Improper integral), in Romanian, on line
17. Integrale duble (Double Integral), in Romanian), on line
18. Integrale curbilinii (Line Integral), in Romanian, on line
19. Numerical Solutions for Differential Equations (in English), face to face
20. Solutii numerice pentru ecuatii diferentiale (in Romanian),), face to face

GDU

21. Mean value theorem
22. Optimization problems
23. Application in Busines
24. Derivatives-Apple trees
25. Minimal distance
26. Minimazing material

There were about 500 STEAM students and 24 future teachers students, and 15 university teachers, included in this activities.

Reports, photos, participants, evaluations, lessons, work Plans, are presented on platform.

The results of IO4 are acieved:
4.1 Implemented Calculus courses enriched with new STEAM topics;
4.2 Implemented of course evaluations.

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