Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

Report on the modernised courses in Serbia an Albania

October 2022

Modernised courses published on the LearningKey platform

The courses and subjects provided to the LearningKey platform are those whose structure and themes are not changed, but the methodology of teaching and learning is modernised in accordance to new knowledge acquired during the training courses organised withing the TeComp project activities, as well as in regular communication with professors from EU partner universities.

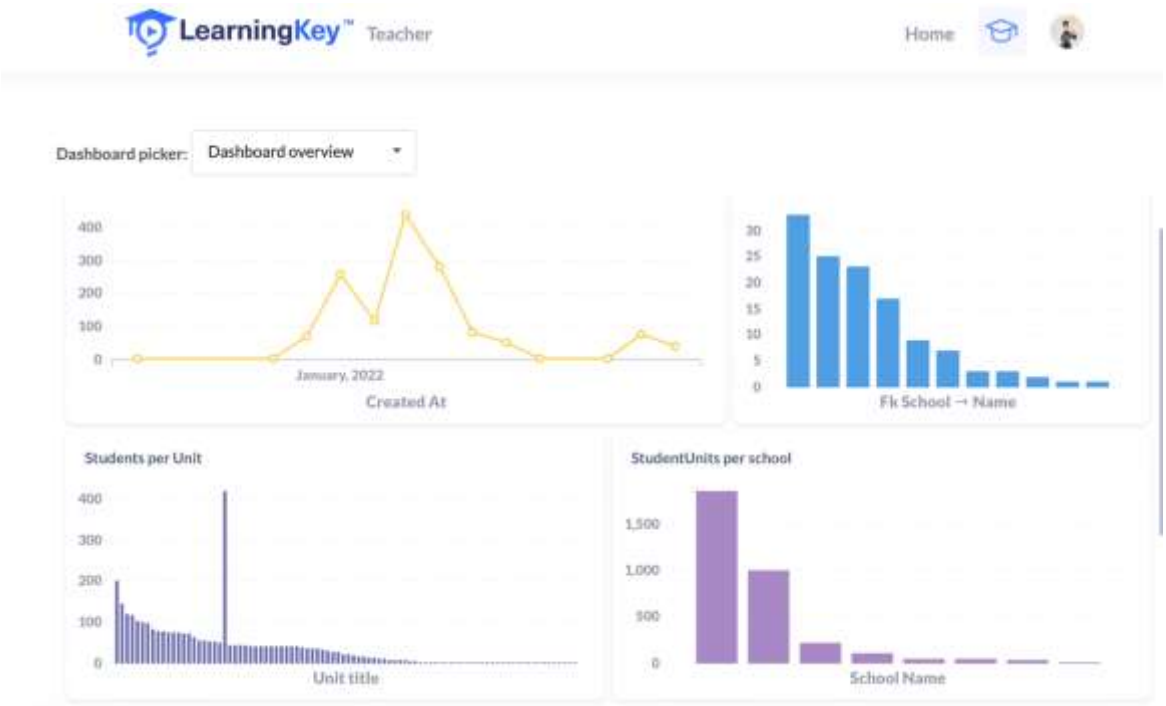
The monitoring (without editing) of all innovated courses, at six universities (UNI, UB, UNS, UNIKG, UGJ, UNIKO) as well as the statistics about number of courses and students involved in, is possible by logging on the platform via the link https://teacher.tecomp.ni.ac.rs , with the following credentials:

User name: monitor
Password: tecomp2021

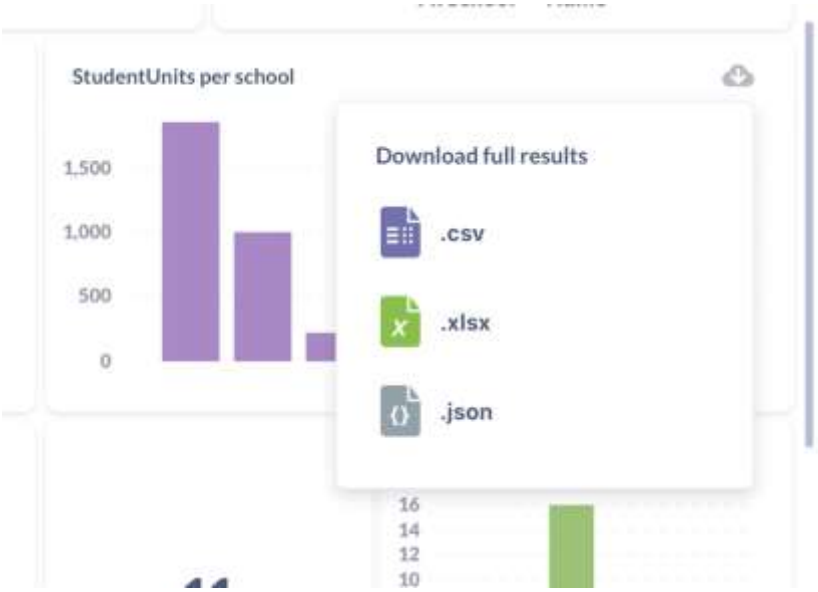
As can be seen, 87 subject are modernised by using contemporary pedagogical and methodical practice and modern technologies (considering the knowledge acquired during the TeComp activities) – 33 subjects at UNI, 13 subjects at UB, 9 subjects at UNS, 16 subjects at UNIKG, 4 subjects at ECUG and 12 subjects at UNIKO.

The complete statistics that present the number of innovated subject per school, number of teachers who modernised their courses by usage of the platform, as well as number of students who followed these innovated courses is regularly, automatically monitored and graphics are presented on the homepage. All the data is visible to everyone who log in the platform with the above given credentials.

The platform has been created and adapted during the project life, but the idea for its structure and realisation was created in close and longlisting collaboration between the Department of Computer Science, Faculty of sciences and mathematics, University of Niš and project coordinator PhD Jelena Ignjatovic, and a renowned software company Badin Soft from Nis, sometime before the project. Due to the high complexity of the platform, not all its features could be realised during the period of the project activities, so it is good we started developing it earlier.



Complete statistics, such as presented on the image above, can be downloaded from the platform website as well on Google Chrome browser (which is currently recommended for the use with LearningKey platform).



Below, the statistics of the students who listened to innovated subjects and actively used LearningKey platform can be seen.

Total student->units in School	School Name
1856	P1 - University of Niš
1001	P4 - University of Kragujevac
219	P3 - University of Novi Sad
111	P5 - Eqrem Çabej University Gjirokastër
42	P2 - University of Belgrade
35	P6 - Fan S. Noli University Korce

The report is prepared by:

Prof. dr Jelena Ignjatović, UNI

Prof. dr Nebojša Jasnić, UB

Prof. dr Andreja Tepavčević, UNS

Prof. dr Slađana Dimitrijević, UNIKG

Prof. dr Isidor Kokalari, UGJ

Silvja Cobani, UNIKO

All subject teachers who innovated their courses contributed to this report, as they provided the reports for their subjects.

BSc, MSc and PhD courses that have been modified by using new methods and tools

Report on the modernized courses at the University of Niš

New teaching materials related to selected lectures are published at LearningKey platform for the following modernized BSc and MSc courses at the University of Niš.

P01-1. Data structures and algorithms;
P01-2. Mathematics 1;
P01-3. Mathematics 2;
P01-4. Linear algebra (Computer Science);
P01-5. Design and analysis of algorithms;
P01-6. Discrete structures 1;
P01-7. Cryptographic algorithms- practical classes;
P01-8. Web programming- practical classes;
P01-9. Introduction to differential equations;
P01-10. The methodology of teaching mathematics;
P01-11. Design and analysis of algorithms- practical classes;
P01-12. Linear algebra- practical classes;
P01-13. Mathematics 2- practical classes;
P01-14. Linear algebra (Mathematics);
P01-15. Methodology of e-learning- practical classes;
P01-16. Introduction to Web programming;
P01-17. Introduction to Environmental chemistry;
P01-18. Chemodinamics of pollutants;
P01-19. Chemistry of water and soil;
P01-20. Humic substances in the environment;
P01-21. Laboratory analysis of water and soil;
P01-22. Advanced Environmental Chemistry - Problem Solutions;
P01-23. Advanced Environmental Chemistry;
P01-24. Multimedia systems in education;
P01-25. Pedagogy;
P01-26. Didactics 1;
P01-27. Andragogy (Adult education);
P01-28. Pedagogy for students of history and sociology;
P01-29. Didactis 2;
P01-30. Pedagogy (second semester 2021/22);
P01-31. History of pedagogy 1;
P01-32. History of pedagogy 2;
P01-33. Contemporary educational trends.

P01-1. Data structures and algotithms 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

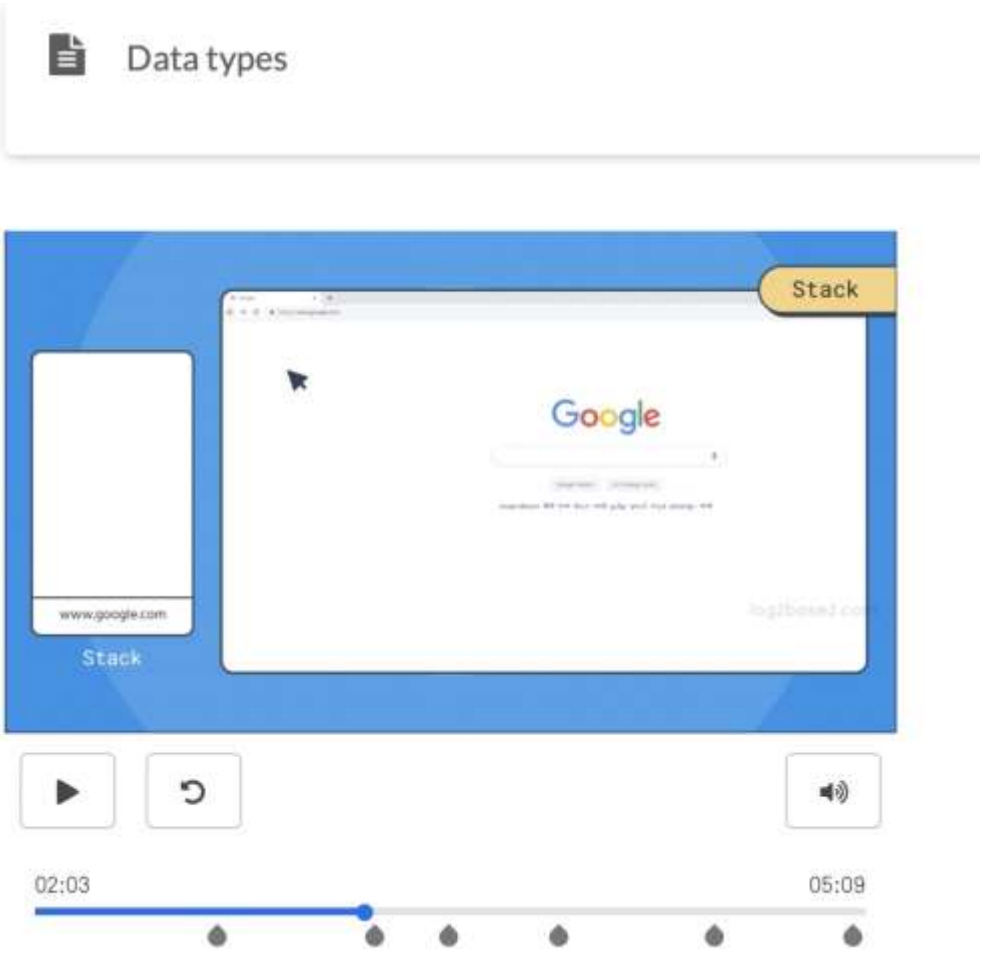
Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Data structures and algotithms**
Level of the study	**3rd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Ignjatović**
E-mail of the professor in charge	**Jelena.ignjatovic@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools* which are used in the course	**OBS studio, rubrics, mind maps, Ed puzzle**
Name of modernised teaching units	**Static and dynamic structures, Data types, Stack, Queue, Lists, Trees, Graphs**
Number of students	**41**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In this course (subject) I modernized almost all teaching units (except the hash functions, which are the most difficult and completely unknown theoretical part of the subject). I imagined to use the blended learning technics in the subject organization, but Covid-19 restriction forced us to work online all the time. After acquiring the basic knowledge by attending the theoretical classes and grasping it from given presentations, students were organised in teams. For each team, was defined a problem to be solved. The emphasis is on the group work when solving problems: e.g. defining problems, presenting hypotheses, proposing a procedure for collecting / measuring, collecting data, summarizing the results, discussing and writing conclusions, preparing the presentation of the solution.

At the beginning I provided a very clear and operational learning goals to students, so thay could understand well what my expectations of them, at the end were. I used educative videos (made in ed puzzle and online applications) to make teaching units more understandable to them. Many problems were solved by themselves true peer discussions, forums and the emphasize was on the importance of “individual” and “group responsibility”. For graph theory I used flipped classroom. They had to understand the given problem and to find the best solution for the given problem in a set of many various, possible solutions. In transferring knowledge to the students, I used modern technologies: quizzes for self-testing by usage different applications, educative videos, table of evaluated feedback, online discussions etc.



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P01-2. Mathematics 1 – 2021/22 and 2022/23

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

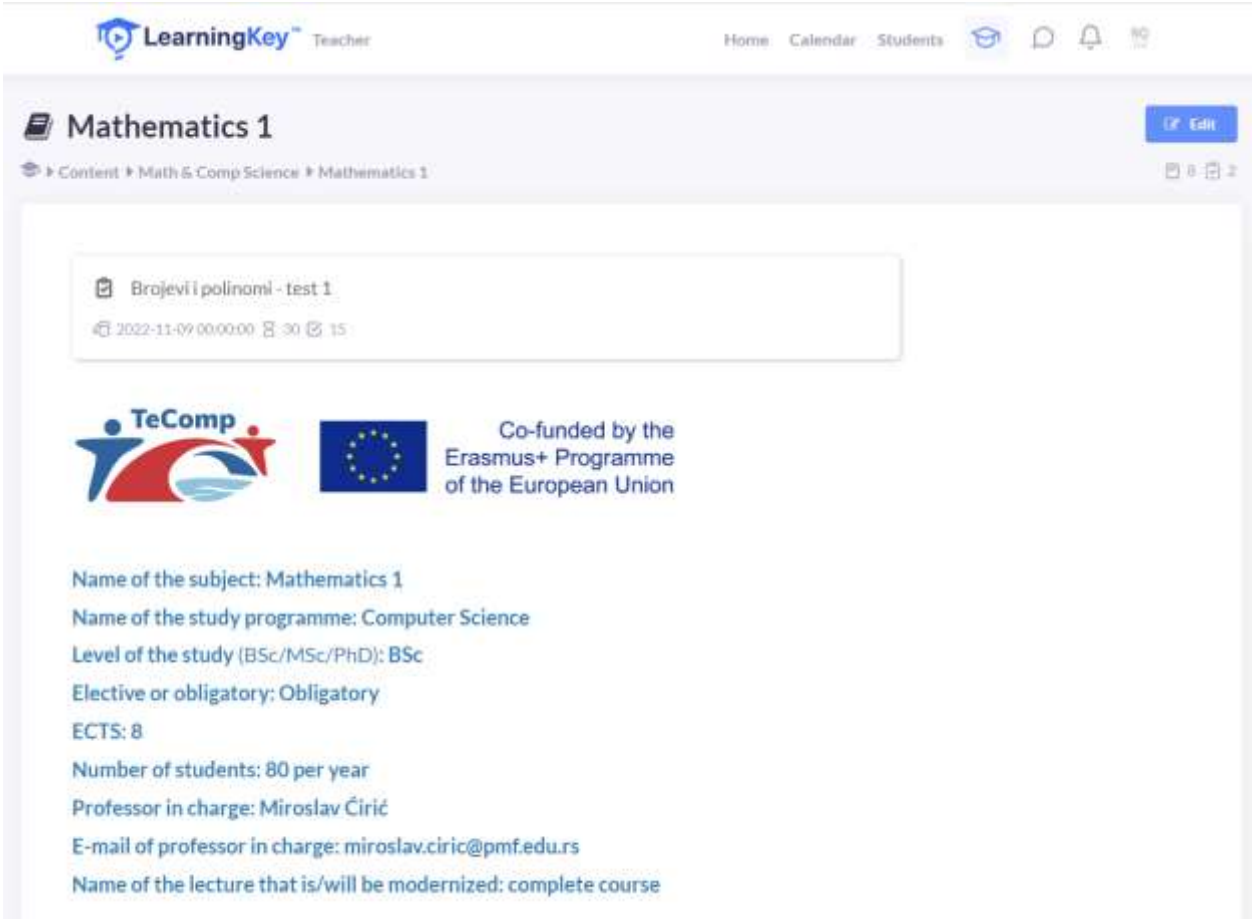
Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Mathematics 1**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Miroslav Ćirić**
E-mail of the professor in charge	**miroslav.ciric@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, inquiry-based learning, educative videos**
Tools* which are used in the course	**GeoGebra, PGF/TikZ, Beamer, AcroTeX eDucation Bundle**
Name of modernised teaching units	**Algebraic structures, numbers, polynomials, real sequences, functions of one real variable – limits and derivatives**
Number of students	**170 (75+95)**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

This is a new course introduced in the academic year 2021/22 by including some topics which were not previously covered in computer science studies (algebraic structures, number theory and polynomials), as well as some topics taken from the earlier course Mathematical Analysis 1 (sequences of real numbers and differential calculus for functions of one real variable). In addition to the introduction of new teaching content, this course is characterized by a new approach to the presentation of that content, which is reflected in the application of new pedagogical principles and the use of new teaching tools. Originally, it was planned that the teaching of this subject would be carried out using a blended learning model. However, in the academic year 2021/22, due to the measures to suppress the Covid19 pandemic, most of the teaching in this subject was conducted online, and only a small part using the blended learning model. This model was used more extensively after the relaxation of measures against Covid19, in the academic year 2022/23. The new approach that was used in teaching involves the presentation of abstract mathematical content with the support of numerous computational examples, illustrations, animations and short videos that significantly clarify that content. On many occasions, a historical overview of the discussed issues was given, as well as

examples of concrete applications, especially in computer science. An effort was made to involve students as extensively as possible in the teaching and learning process, for example by using some elements of inquiry-based learning. The students were provided with quizzes that were primarily used for self-testing, so that they would be able to check their own knowledge and instantly receive the test results, and thus also information on which segments they should correct and improve their knowledge. As part of the integration of new educational technologies in this subject, numerous technological tools were used. Seeing that the teaching material for this subject contains a plenty of mathematical symbols and formulas, most of these tools were LaTeX based. Slides for presentations were prepared using Beamer, illustrations in the slides and textbook manuscript were made with the help of PGF/TikZ and GeoGebra, whereas self-testing quizzes were made in PDF, using AcroTeX eDucation Bundle. A large part of the teaching content is explained directly in GeoGebra, and for additional explanations students are referred to short videos freely available on YouTube. For instance, many additional explanations for the concepts covered within the course (limits, derivatives, etc.) are provided by effective animations involved in these short videos.



LearningKey™ Teacher

Home Calendar Students

M1-01_03-ALGEBARSKE STRUKTURE

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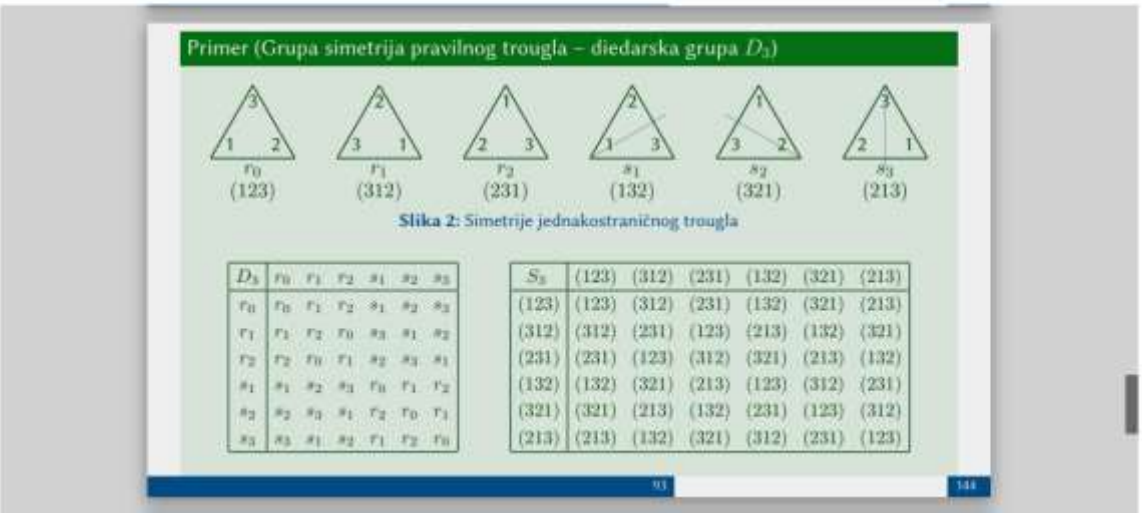
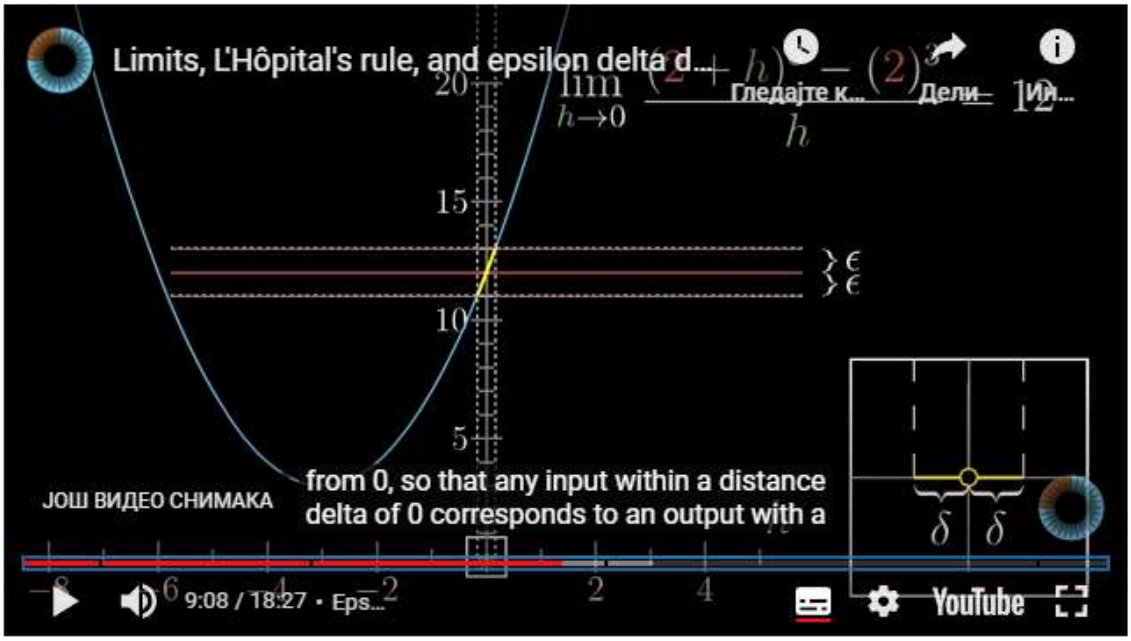
Content ▸ Math & Comp Science ▸ Mathematics 1 ▸ M1-01_03-ALGEBARSKE STRUKTURE



Klip 08–0.9.1 Granične vrednosti funkcija (od 4:55)



P01-3. Mathematics 2 – 2021/22

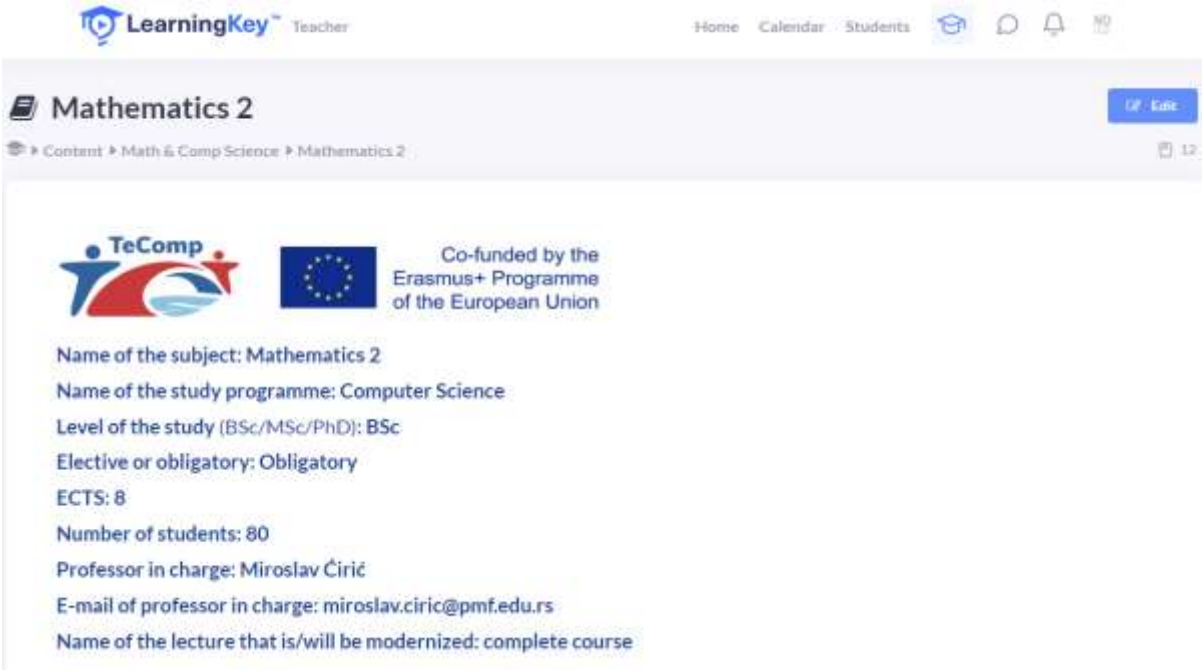
REPORT

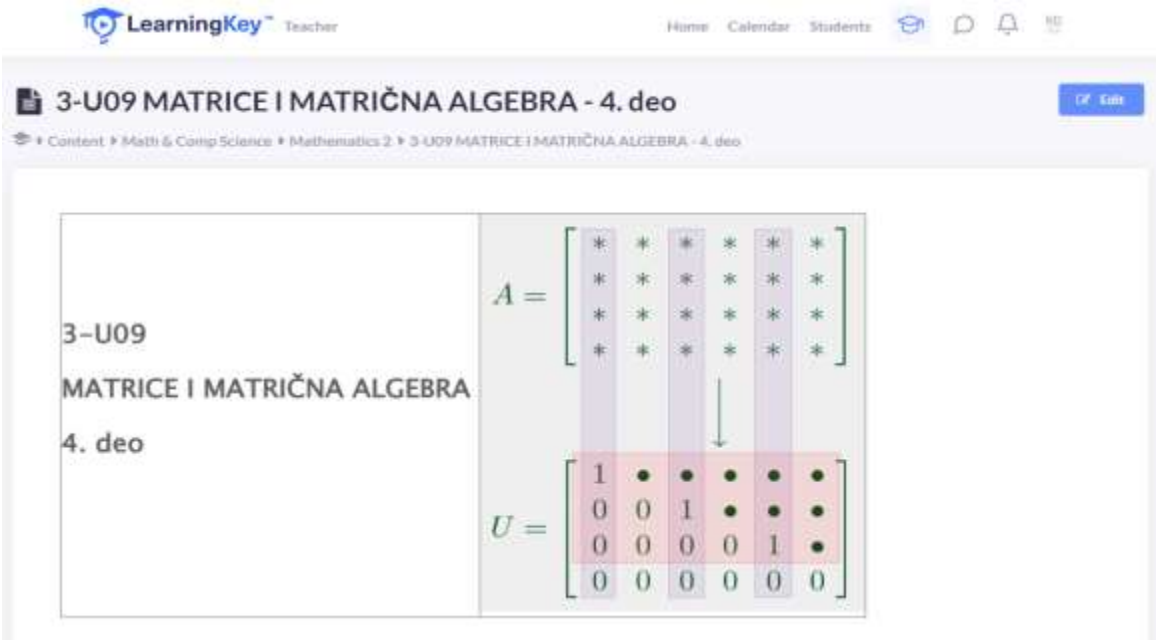
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Mathematics 2**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Miroslav Ćirić**
E-mail of the professor in charge	**miroslav.ciric@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, inquiry-based learning, educative videos**
Tools* which are used in the course	**GeoGebra, PGF/TikZ, Beamer, AcroTeX eDucation Bundle**
Name of modernised teaching units	**Vectors and vector spaces, systems of linear equations, matrices and matrix algebra, determinants, linear transformations, eigenvalues and eigenvectors**
Number of students	**75**

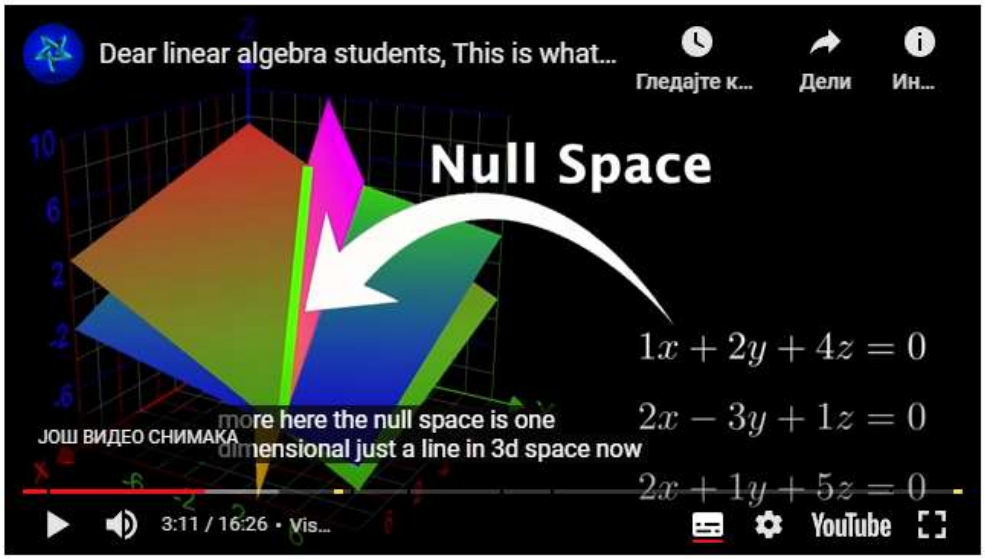
This is a new course introduced in the academic year 2021/22 as the replacement for the earlier course in Linear Algebra. The content of the new subject has been slightly modified compared to the content of the previous subject, and is adapted to the needs of today's computer science students. Significant novelties are a different way of presenting teaching and learning material, as well as the application of new teaching and learning methods. Originally, it was planned that the teaching of this subject would be carried out using a blended learning model. However, the implementation of the course in the academic year 2021/22 started under anti-Covid measures, so for a while classes were conducted completely online, and after the relaxation of anti-Covid measures, the implementation of the course continued according to the blended learning model. The new approach that was used in teaching involves the presentation of abstract mathematical content with the support of numerous computational examples, illustrations, animations and short videos that significantly clarify that content. Whenever convenient, a historical overview of the discussed issues was given, as well as examples of concrete applications, especially in computer science. A special effort was made to involve students as much as possible in the teaching and learning process, for example by using some elements of inquiry-based learning. The students were provided with quizzes that were primarily used for self-testing, so that they would be able to check their own knowledge and instantly receive the test results, and thus also information on which segments they should correct and improve their knowledge. As part of the integration of new educational technologies in this subject, numerous technological tools were used. Seeing that the teaching material for this subject contains a plenty of mathematical symbols and formulas, most of these tools were LaTeX based. Slides for presentations were prepared using

Beamer, illustrations in the slides and textbook manuscript were made with the help of PGF/TikZ and GeoGebra, whereas self-testing quizzes were made in PDF, using AcroTeX eDucation Bundle. A large part of the teaching content is explained directly in GeoGebra, and for additional explanations students are referred to short videos freely available on YouTube. For instance, many additional explanations for the concepts covered within the course are provided by effective animations involved in these short videos.

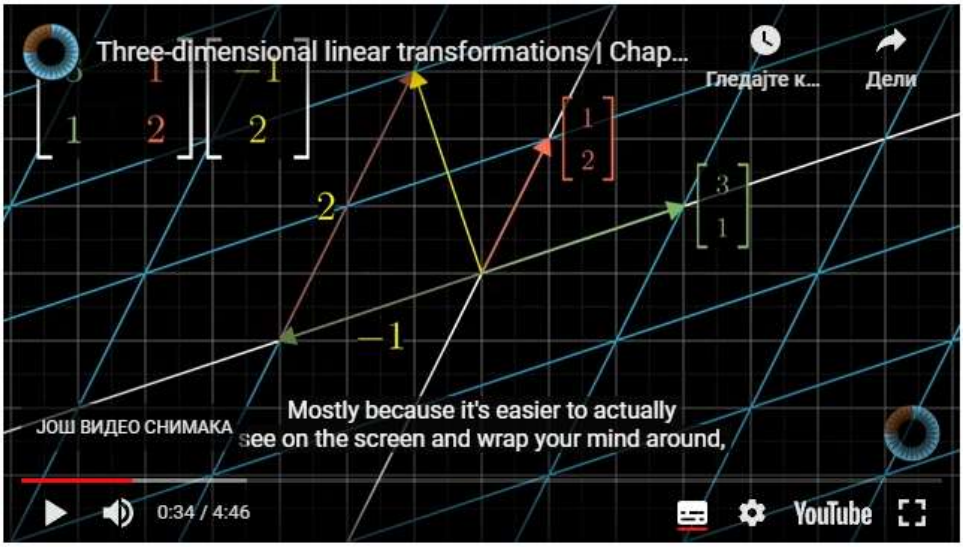




Klip 9.2 – Još o matricama i njihovim fundamentalnim prostorima: –



Klip 11.3 – Linearne transformacije u trodimenzionalnom prostoru: –



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P01-4. Linear algebra (Computer Science) – 2021/22 and 2022/23

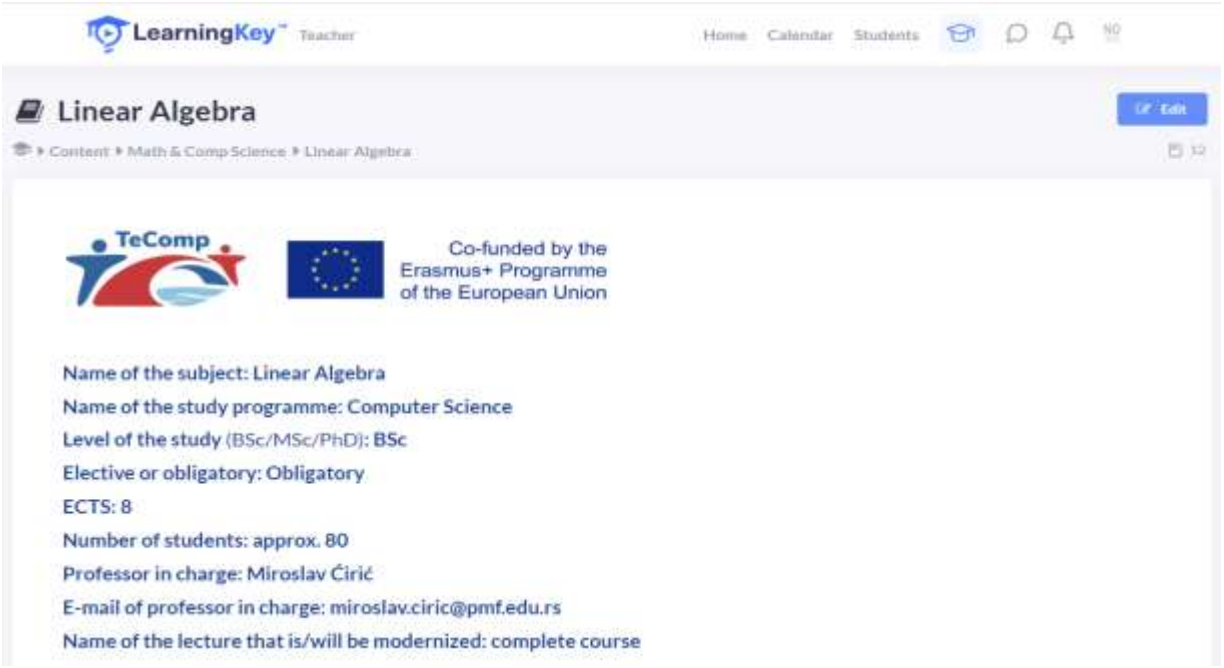
REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

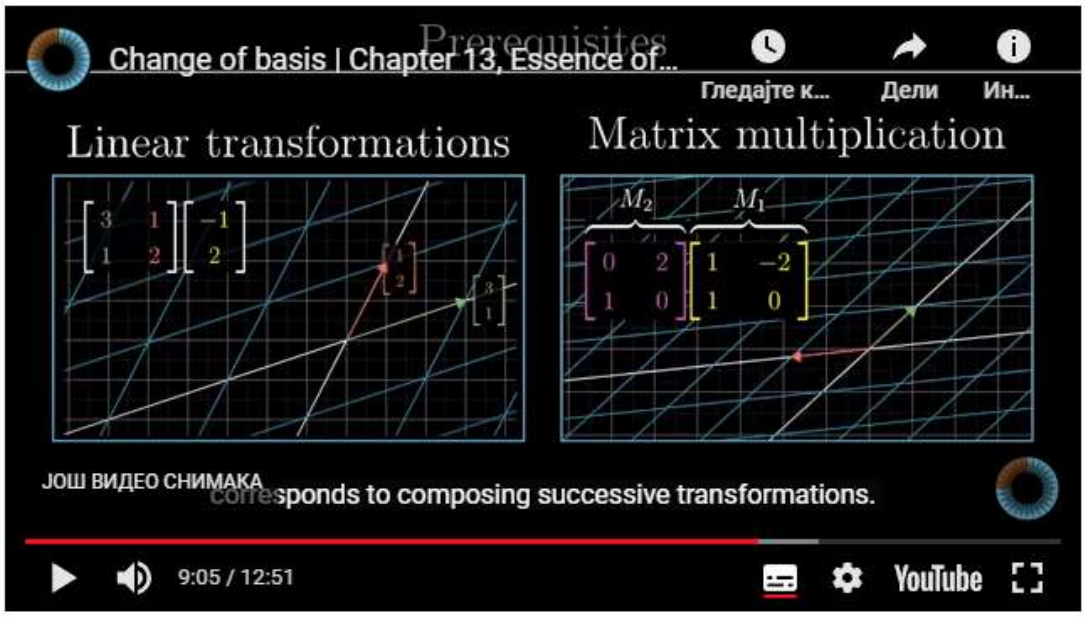
Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Linear Algebra**
Level of the study	**3rd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Miroslav Ćirić**
E-mail of the professor in charge	**miroslav.ciric@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, inquiry-based learning, educative videos**
Tools* which are used in the course	**GeoGebra, PGF/TikZ, Beamer, AcroTeX eDucation Bundle**
Name of modernised teaching units	**Vectors and vector spaces, linear systems, matrices and matrix algebra, determinants, linear transformations, eigen values and eigen vectors**
Number of students	**82 (59+23)**

In the academic year 2020/21, I was asked to take over this subject and try to solve the problem of a very low passing percentage on exams (only 22.22% in the academic year 2018/19 and 14.00% in the academic year 2019/20). I was expected to make certain changes in the course program and adapt it to the needs of today's computer science students, and even more to make changes in the way of presenting the teaching content, the way of teaching and learning, as well as the way of examining and evaluating students. I taught the Linear Algebra course for two academic years (after that it was replaced by the subject Mathematics 2), in the autumn semester, both times in the midst of anti-Covid measures, so the teaching was conducted mostly online. In order to better explain abstract mathematical content, as well as to better attract students' attention and provide them with better motivation for learning, the teaching material is enriched with numerous computational examples, illustrations, animations and short videos that significantly clarify that content. Whenever convenient, a historical notes of the discussed issues were given, as well as examples of concrete applications, especially in computer science. A special effort was made to involve students as much as possible in the teaching and learning process, for example by using some elements of inquiry-based learning. The students were provided with quizzes that were primarily used for self-testing, so that they would be able to check their own knowledge and instantly receive the test results, and thus also information on which segments they should correct and improve their knowledge. As part of the integration of new educational technologies in this subject, numerous technological tools were used. Seeing that the teaching material for this subject contains a plenty of mathematical symbols and formulas, most of these tools were LaTeX based. Slides for presentations were prepared using Beamer,

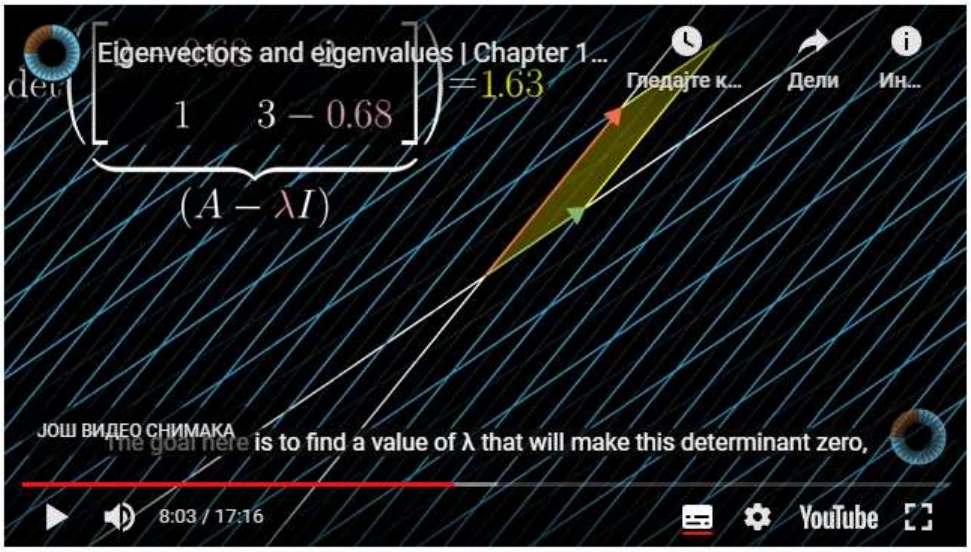
illustrations in the slides and textbook manuscript were made with the help of PGF/TikZ and GeoGebra, whereas self-testing quizzes were made in PDF, using AcroTeX eDucation Bundle. A large part of the teaching content is explained directly in GeoGebra, and for additional explanations students are referred to short videos freely available on YouTube. For instance, many additional explanations for the concepts covered within the course are provided by effective animations involved in these short videos.



Klip 11.4 – Promena baze kao linearna transformacija: –



Klip 12.1 – Sopstvene vrednosti i sopstveni vektori matrica: –



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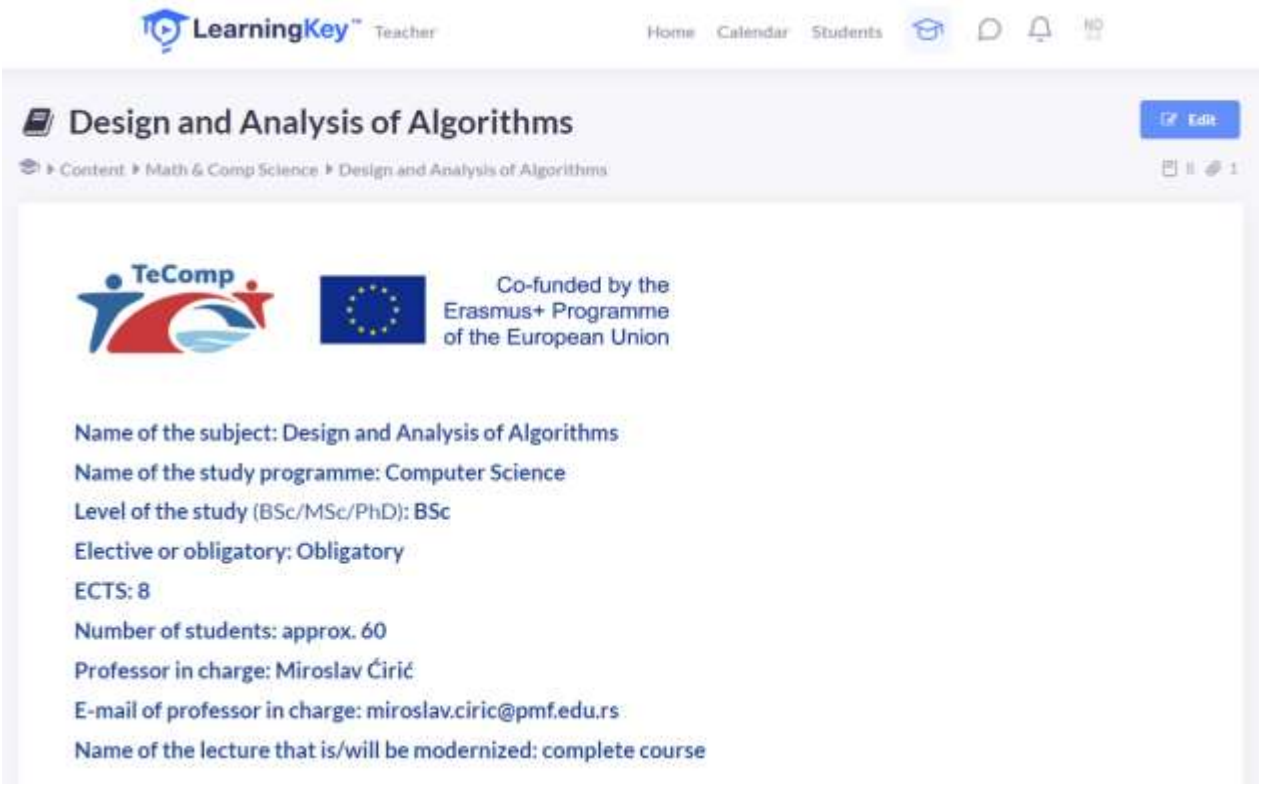
P01-5. Design and analysis of algorithms – 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Design and analysis of algorithms**
Level of the study	**4th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Miroslav Ćirić**
E-mail of the professor in charge	**miroslav.ciric@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, inquiry-based learning, educative videos**
Tools* which are used in the course	**PowerPoint, Drawboard PDF, MS Teams**
Name of modernised teaching units	**Algorithms with numbers, divide and conquer strategy, depth-first search and breadth-first search, greedy algorithms, dynamic programming, linear programing**
Number of students	**102**

This subject deals with general algorithmic strategies such as divide and conquer, greedy algorithms, graph algorithms, dynamic programming, linear programing, probabilistic algorithms, and others. The lectures cover the general theoretical principles of designing and analyzing algorithms, and the provided algorithms are described with pseudocode, while on the practical exercises the code is also written. The material presented is largely of a mathematical nature, and in order to ensure that students understand it properly, it is necessary to pay a lot of attention to the choice of the way in which the material will be presented, taught and learned. This is exactly what was done when innovating this subject. Originally, it was planned that the teaching of this subject would be carried out using a blended learning model. However, the implementation of the course in the academic year 2021/22 started under anti-Covid measures, so for a while classes were conducted completely online, and after the relaxation of anti-Covid measures, the implementation of the course continued according to the blended learning model. It has been shown that the subject is extremely suitable for the application of numerous modern pedagogical principles, such as teamwork, peer discussion, inquiry-based learning and problem solving method. Theoretical contents are supplemented with numerous concrete examples, illustrations, animations and short videos that significantly clarify that content. In particular, students are provided with short video clips (also freely available on YouTube) that very effectively explain general algorithmic strategies and specific algorithms, in which the entire flow of the algorithm can be followed very successfully. On practical exercises, the students were provided with quizzes that are primarily used for self-testing, so that they would be able to check their own knowledge and instantly receive the test results, and thus also information on which segments they should correct and improve their knowledge.


LearningKey Teacher
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Design and Analysis of Algorithms
Edit
Content ▸ Math & Comp Science ▸ Design and Analysis of Algorithms
TeComp
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Name of the subject: Design and Analysis of Algorithms
Name of the study programme: Computer Science
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obligatory
ECTS: 8
Number of students: approx. 60
Professor in charge: Miroslav Ćirić
E-mail of professor in charge: miroslav.ciric@pmf.edu.rs
Name of the lecture that is/will be modernized: complete course


LearningKey Teacher
Home Calendar Students
02-U03_04-STRATEGIJA PODELI-I-SAVLADAJ
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Content ▸ Math & Comp Science ▸ Design and Analysis of Algorithms ▸ 02-U03_04-STRATEGIJA PODELI-I-SAVLADAJ
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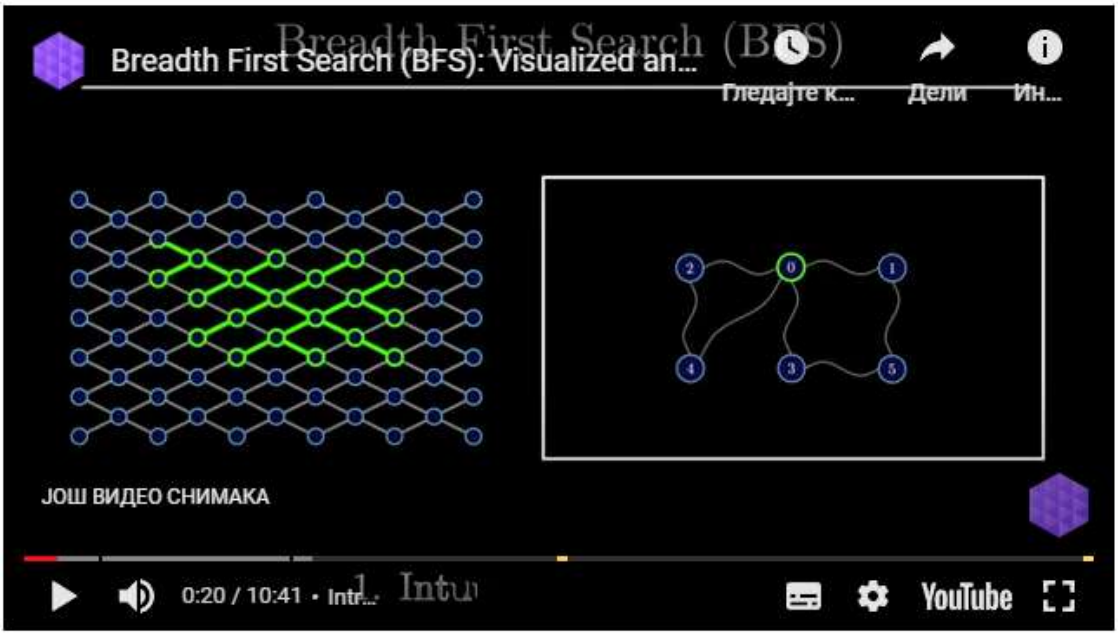
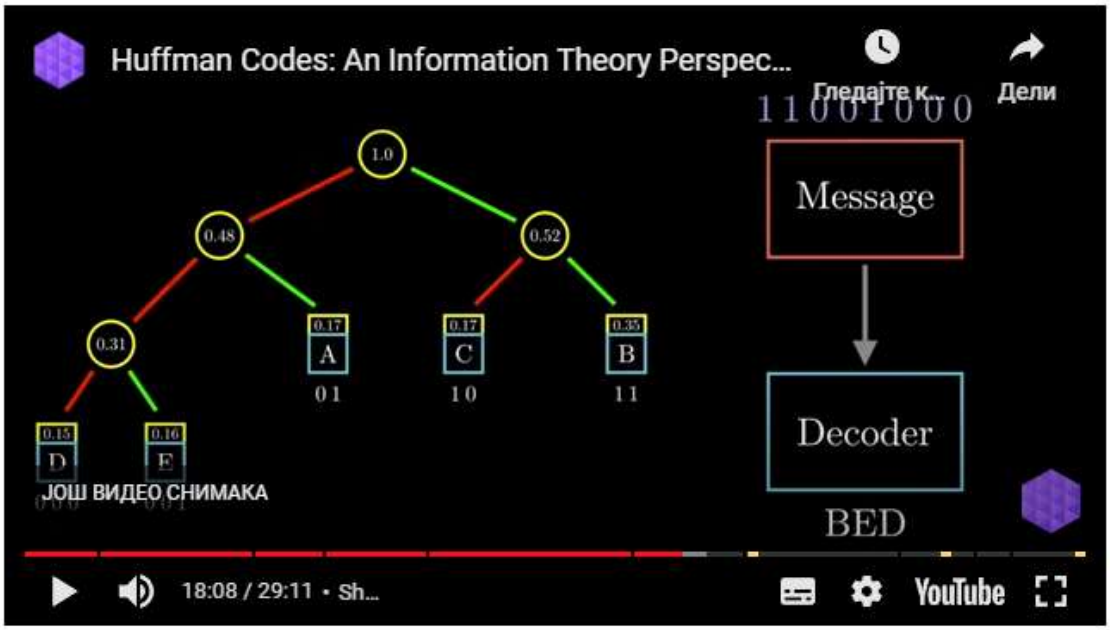
Klip 4.1 – BFS algoritam



Klip 5.8 – Hafmanovo kodiranje



P01-6. Discrete structures 1, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Data structures and algotithms**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Ignjatović**
E-mail of the professor in charge	**Jelena.ignjatovic@pmf.edu.rs**
Methods * which are used in the course	**Problem solving methods, peer discussions, videos, feedback**
Tools* which are used in the course	**OBS studio, rubrics, mind maps, Kahoot, Forms**
Name of modernised teaching units	**Statement and predicate logic, Proof techniques, Relations, Functions**
Number of students	**74**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In this course (subject) I involved new methodes of teaching and learning in all teaching units. Although this subject is intended for the first-year students, the most of the material of teaching units I theoretically taught to them. After each part, problems connected to that part were defined and solved by themselves. I defined problems and presented hypotheses and together we summarized the results, discussed, and wrote conclusions. For some main notions they had a homework to make mind maps by using application (software) selected by themselves. We used peer discussions and peer reviews for exercises and periodically I organized one-minute tests and quizzes to follow their advancement. For quizzes I used Kahoot, free forms and LearningKey. For each unit rubrics were prepared, too.

Discrete structures I

Content ▸ Math & Comp Science ▸ Discrete structures I

Name of the subject: Discrete structures I

Name of the study programme: Computer Science

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: Obligatory

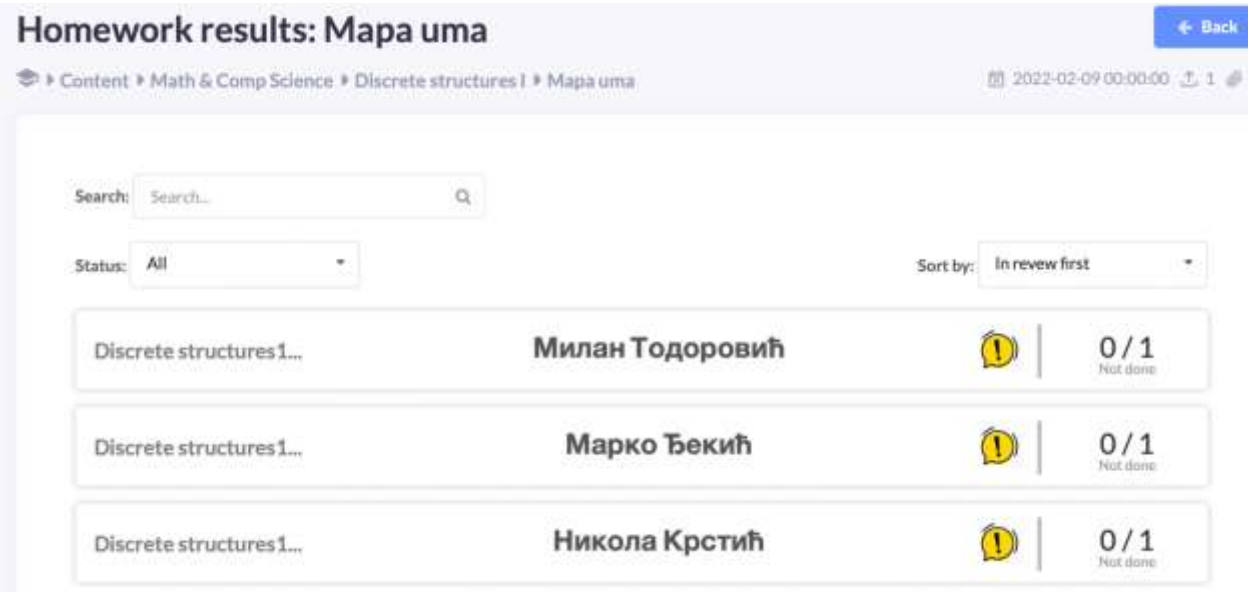
ECTS: 8

Number of students: 74

Professor in charge: Jelena Ignjatović

E-mail of professor in charge: jelena.ignjatovic@pmf.edu.rs

Name of the lecture that is/will be modernized:



P01-7. Cryptographic algorithms- practical classes

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Cryptographic algorithms - practical classes;**
Level of the study	**1st semester, MCs**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Matejić**
E-mail of the professor in charge	**jelena.matejic@pmf.edu.rs**
Methods * which are used in the course	**Educative videos, flipped classroom, problem solving skills**
Tools* which are used in the course	**LearningKey quizzes, Ed puzzle, Video Ant, OBS studio, mind maps - Coogle, ClassroomScreen**
Name of modernised teaching units	**Caesar cipher, Pigpen cipher, Playfair cipher, Morse code**
Number of students	**1**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

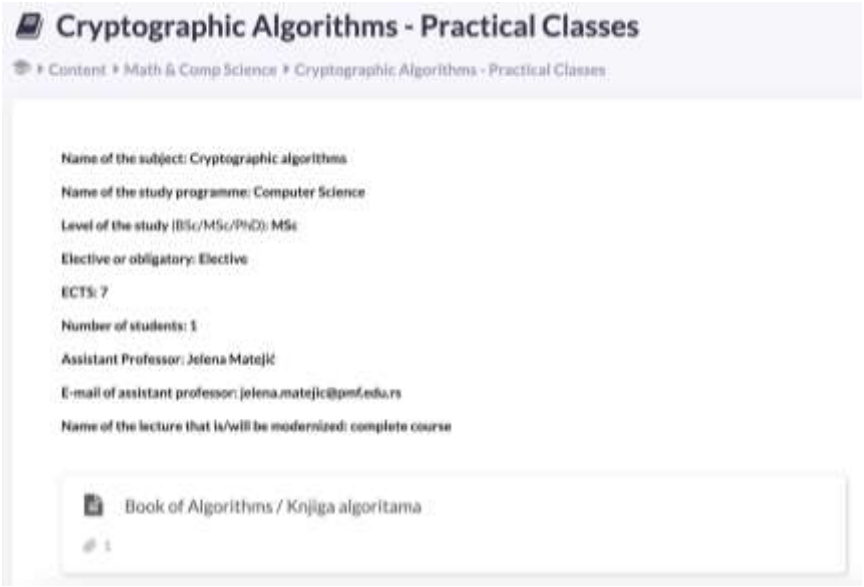
The methods/tools used in the course modernisation

In this course (subject) I modernised almost all teaching units (but in the previous table I emphasised Caesar cipher, Pigpen cipher, Playfair cipher, Morse code which are the most innovated subjects). Since the study program is attended by very few students, I decided to innovate the course using the flipped classroom method. Before each teaching unit, I would send video material on the topic that we will talk about in the

next lesson. The class would be a kind of discussion and consultation, where we would talk about the given topic, exchange opinions and where the students could implement the code for the considered problem in the desired programming language.

The video materials I used open source platforms or I created videos by myself using the OBS studio program. Video materials created in this way, I increased using Ed Puzzle application or Video Ant program, where I added questions, quizzes or comments to videos. In this way the passive viewing of video materials, become active.

At the end of the course, we used software to create mind maps. Students had the opportunity to present all acquired knowledge graphically through logical units.

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Content • Math & Comp Science • Cryptographic Algorithms - Practical Classes • Test kriptografija
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Sara Stanković
Showcase student
There is total: 2


Kriptografija
Klasična kriptografija
Vigenèreova šifrašifra
Playfairova šifra
Hillova šifra
Jednokratna beležnica
Transpozicijske šifre
Naprave za šifriranje
Cezarova šifra
Moderni simetrični blokovski kriptosistemi
DES
Advanced Encryption Standard
Kriptosistemi sa javnim ključem
RSA
Post-kvantna kriptografija
Ostali kriptosistemi sa javnim ključem
Supstitucione šifre

P01-8. Web programming - practical classes

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BCs course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Web programming- practical classes**
Level of the study	**6th semester, Bechelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Matejić**
E-mail of the professor in charge	**jelena.matejic@pmf.edu.rs**
Methods * which are used in the course	**Peer assessment, work in group, project work, rubrics**
Tools* which are used in the course	**LearningKey quizzes, OBS studio, Pixels, FreePick**
Name of modernised teaching units	**Social network project**
Number of students	**61**

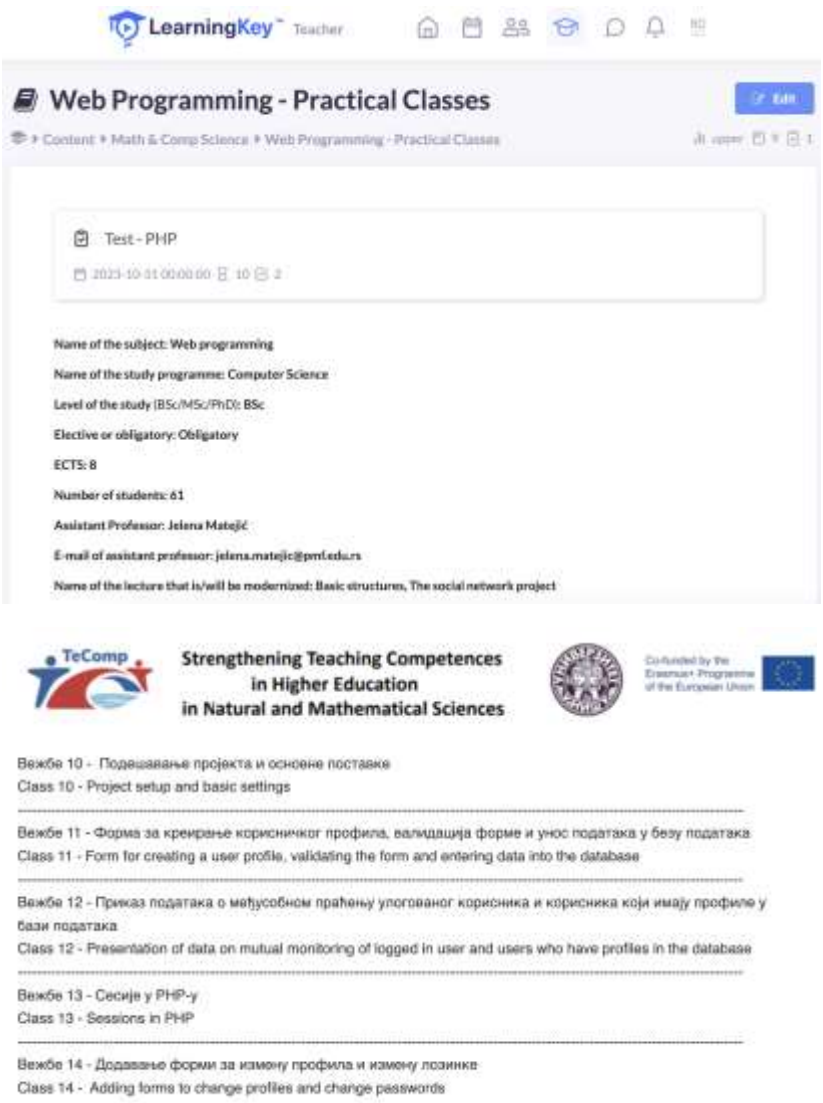
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

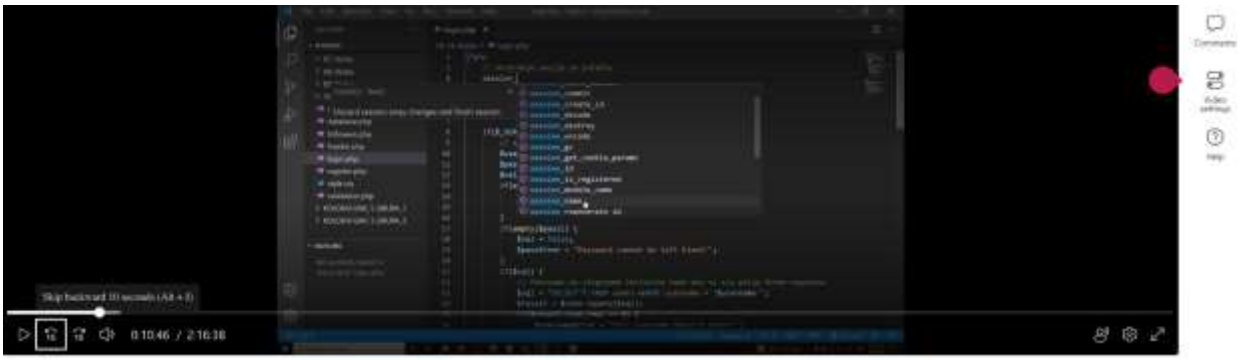
The methods/tools used in the course modernisation

The web programming course consists of two units. In the first part of the course, students master syntax and concepts in the PHP programming language. Innovations in this part of the course are educational videos, as well as quizzes. The quizzes are created on the LearningKey platform and have over 50 different questions.

In the second part of the course, all skills are applied and further improved on a practical project. The project I chose for the students is - Social network. In making this project, students have the opportunity to work in a team, learn to give feedback and accept comments received from colleagues. For this purpose, they use various open source sources for photos, video materials and styles.

At the end of the course, each of the students should choose a topic and develop their own project on that topic. The project is evaluated according to rubrics, where the distribution of points and the method of evaluation are clearly defined at the very beginning.

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P01-10. The methodology of teaching mathematics, 2021/22

REPORT

In the framework of the project:" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **MSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study program	**Mathematics**
Name of the course	**The methodology of teaching mathematics**
Level of the study	**1st semester, Master/ 3rd semester, Master**
Type of the course (elective/obligatory)	**Obligatory/ Elective**
Professor in charge	**Aleksandra Kapešić**
E-mail of the professor in charge	**akapesic@pmf.ni.ac.rs**
Methods * which are used in the course	**Problem-solving methods, peer discussions, feedback, group method**
Tools* which are used in the course	**Rubrics, Tests, ThatQuiz for Teachers, HotPotatoes, QuestionWriter, ProProofs Quiz Maker**
Name of modernized teaching units	**Assessment and Grading in High School**
Number of students	**5**

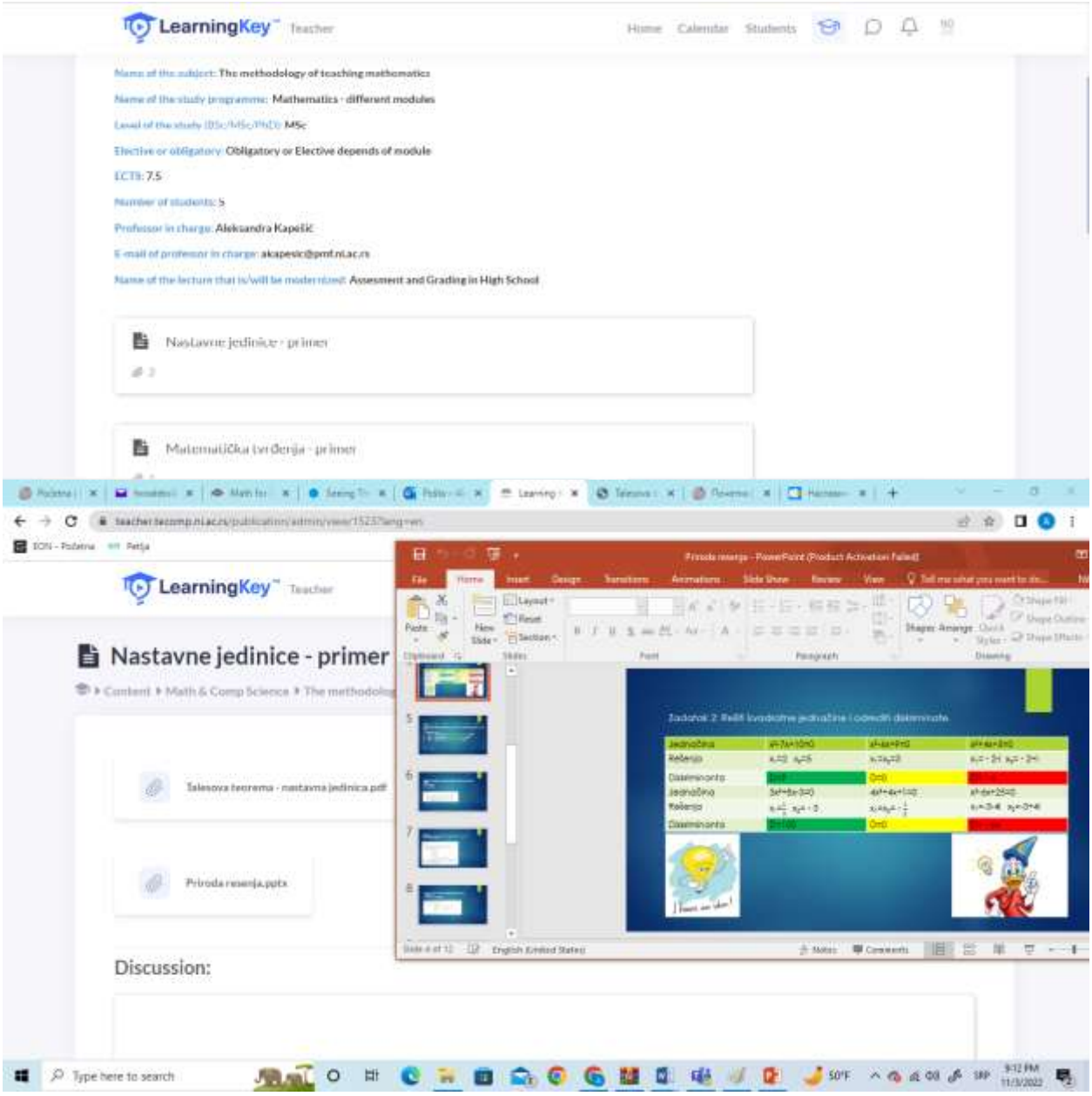
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics (Other applications introduced during the training courses and webinars)

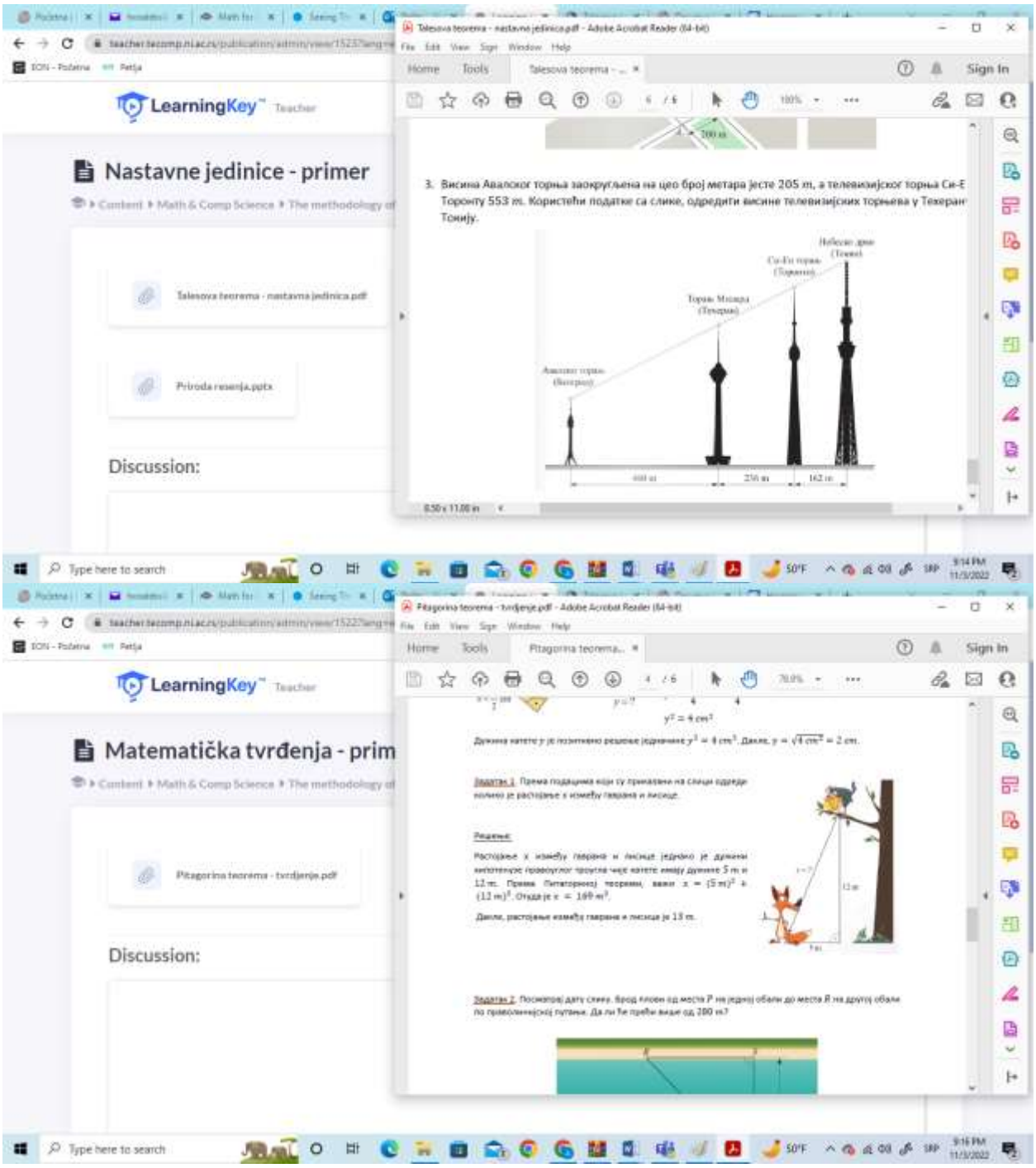
The methods/tools used in the course modernization

The new methods of teaching and learning are involved in almost all teaching units. The main focus was on the unit ''Assessment and grading in high school''. Each unit except the first was presented by the students, after which we used peer discussions and peer reviews for their presentation methods. For the unit ''Assessment and grading in high school'', students are given three exercises. In each of them, they had to compose a certain number of problems according to educational levels, as well as compose a test and score each of the given problems on that test. For the last task, students are suggested to use the following free forms:

ThatQuiz for Teachers https://www.thatquiz.org/tq/registration.html
HotPotatoes https://hotpot.uvic.ca/index.php
QuestionWriter http://www.questionwriter.com/quiz-software.html

ProProofs Quiz Maker https://www.proprofs.com/quiz-school/create-a-quiz/




LearningKey
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Priroda resenja.pptx
Discussion:
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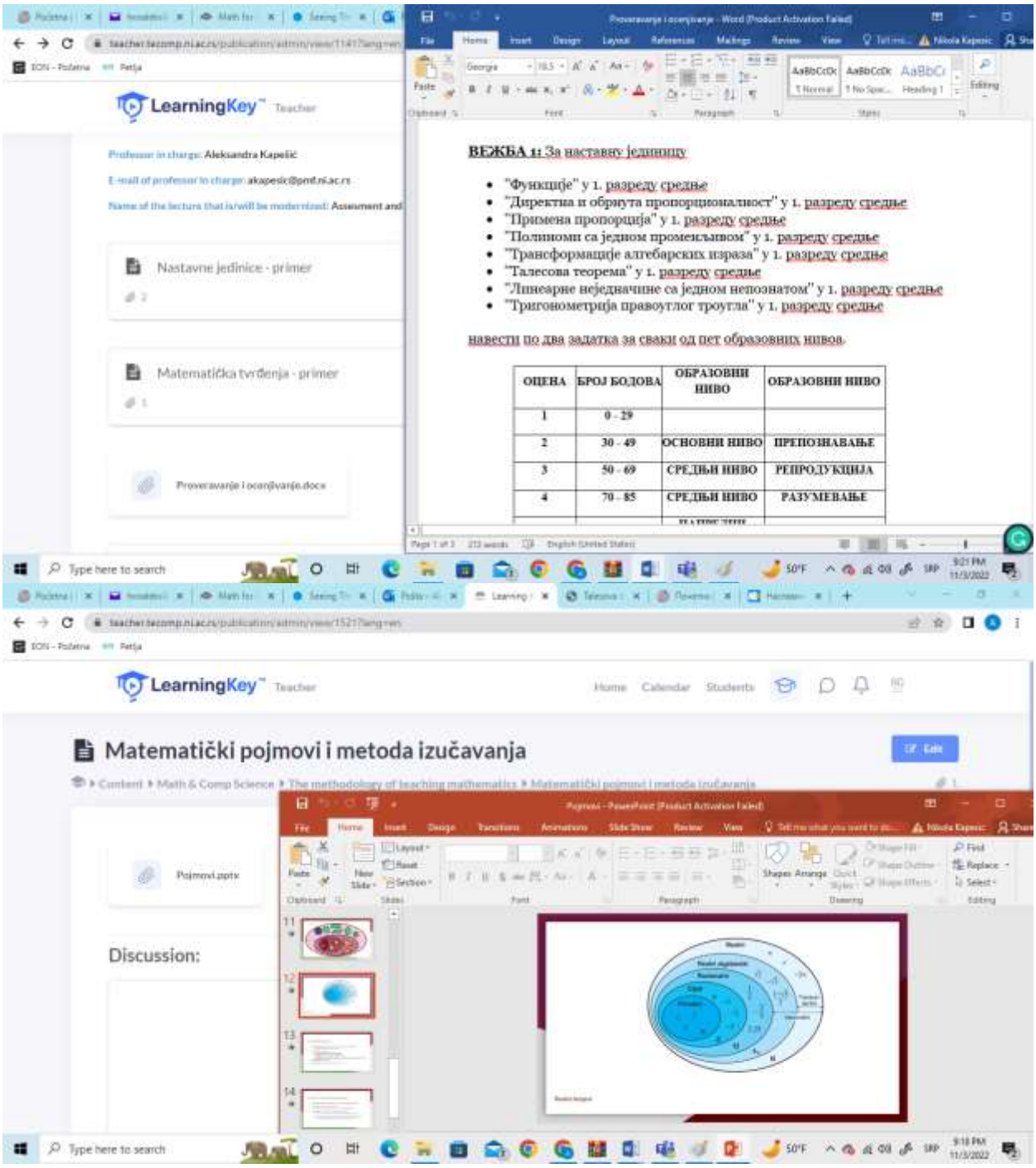
Home
Tools
Sign In
Type here to search


LearningKey
Nastavne jedinice - primer
Matematička tvrđenja - primer
Proveravanje i ocenjivanje.docx
ВЕЖБА 1: За наставну јединицу
"Функције" у 1. разреду средње
"Директна и обрнута пропорционалност" у 1. разреду средње
"Примена пропорција" у 1. разреду средње
"Полиноми са једном променљивом" у 1. разреду средње
"Трансформације алгебарских израза" у 1. разреду средње
"Талесова теорема" у 1. разреду средње
"Линеарне неједначине са једном непознатом" у 1. разреду средње
"Тригонометрија правоуглог троугла" у 1. разреду средње
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70 - 85
СРЕДЊИ НИВО
РАЗУМЕВАЊЕ
LearningKey
Matematički pojmovi i metoda izučavanja
Pojmovi.pptx
Discussion:

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P01-11. Design and analysis of algorithms- practical classes 2021/22

REPORT

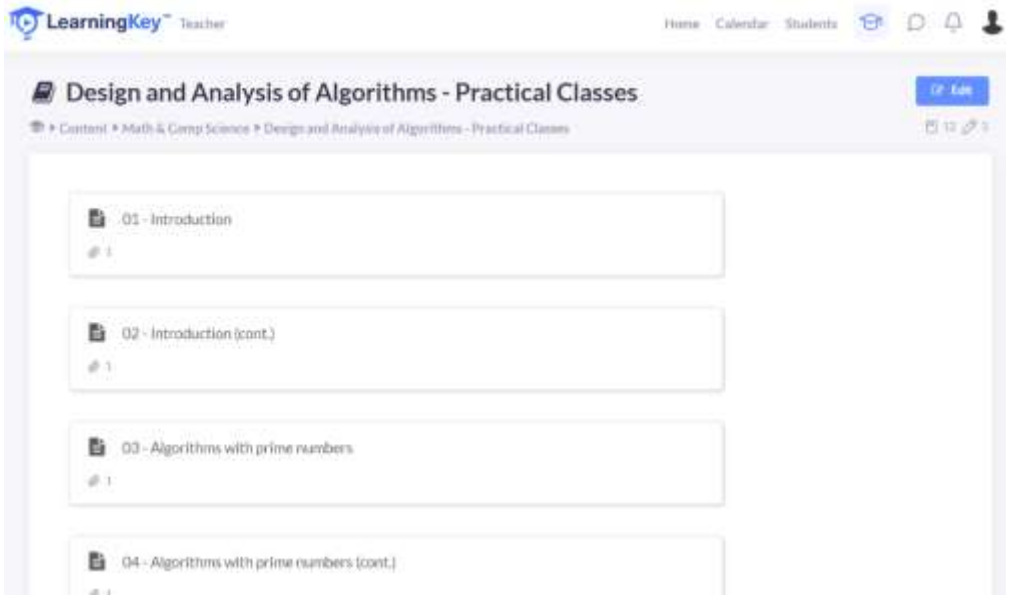
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**P1-11. Design and analysis of algorithms- practical classes**
Level of the study	**4th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Stefan Stanimirović**
E-mail of the professor in charge	**stefan.stanimirovic@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools* which are used in the course	**MS Teams, VS Code, SonarQube**
Name of modernised teaching units	**Algorithms with prime numbers, Divide and conquer algorithms, DFS, BFS, Dynamic programming**
Number of students	**102**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

The focus on modernization of this course was to motivate students to take interactions in writing their own codes and to take live discussions during the classes. The first third of every class was designed to show students a main topic of the class, mainly through a code example or a motivating video. Then the rest of the class was designed so that they try to design their own code solutions, and then to discuss their solutions and to conclude through the discussion what is the best possible solution to the given problem. Students used VS code and MS Teams as tools to create their own code and to share it with their colleagues, while they used SonarQube to factorize their code and to learn how to optimize their code and to deliver the best possible solution. Regular homework given through the whole semester were designed to complement the activity on the classes, and to provide the opportunity for students to have more exercises before the examination.


LearningKey Teacher
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Design and Analysis of Algorithms - Practical Classes
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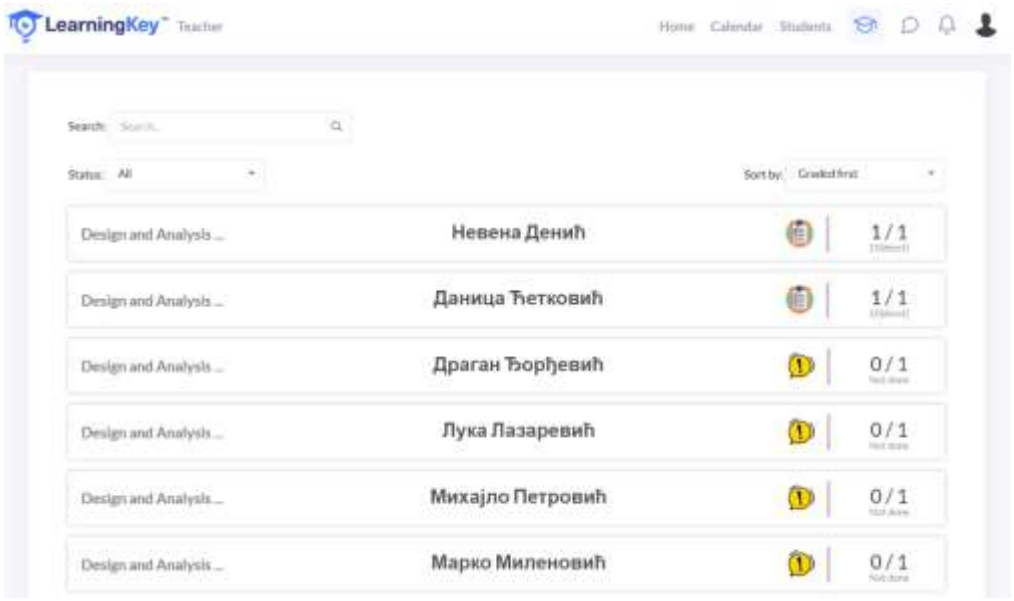
02 - Introduction (cont.)
03 - Algorithms with prime numbers
04 - Algorithms with prime numbers (cont.)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Design and Analysis ... Лука Лазаревић 0 / 1
Design and Analysis ... Михајло Петровић 0 / 1
Design and Analysis ... Марко Миленовић 0 / 1

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P01-12. Linear Algebra - practical classes, Computer Science 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

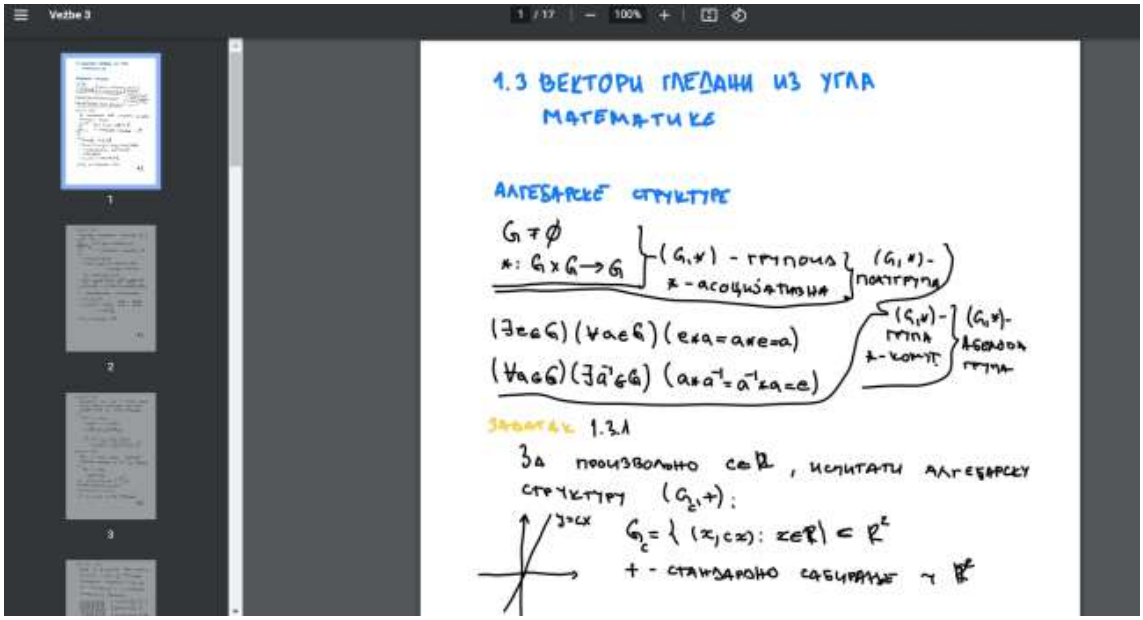
Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Linear Algebra**
Level of the study	**3rd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Lazar Stojković**
E-mail of the professor in charge	**Lazar.stojkovic@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions**
Tools* which are used in the course	**GeoGebra, MS Teams, LearningKey, YouTube**
Name of modernised teaching units	**Most of the units**
Number of students	**~80**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

During the exercises, teaching material was supplemented by various videos available on YouTube, which intuitively visualized mathematical concepts (www.youtube.com/c/3blue1brown). GeoGebra.org was used for plotting and visualization of functions. Course material largely produced during Online lectures via MS Teams, by screensharing Pages iOS app which enabled real-time writing.
Students were encouraged to actively participate in peer discussions by doing exercises; all present students were able to provide their inputs and opinions and there solve problems as a team. This is not only motivating students to study regularly, but also helped develop their presentational skills. Platform LearningKey provided useful tools for constructing self-tests in quiz-like format, which was a new concept to our students when it comes to mathematical subjects. Modernization is also achieved by improving communication by using the MS Teams platform in parallel, where students could be promptly updated

on new course material; they also obtained access to more flexible and personalized consultations and a possibility for online lectures if circumstances so required.



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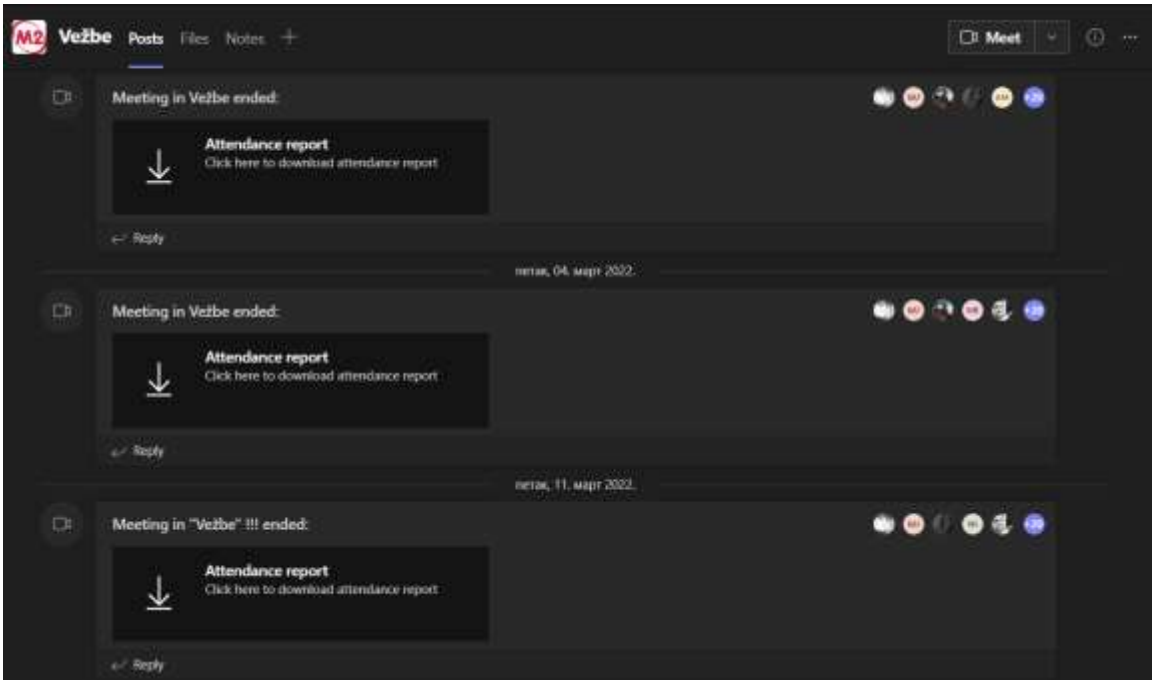

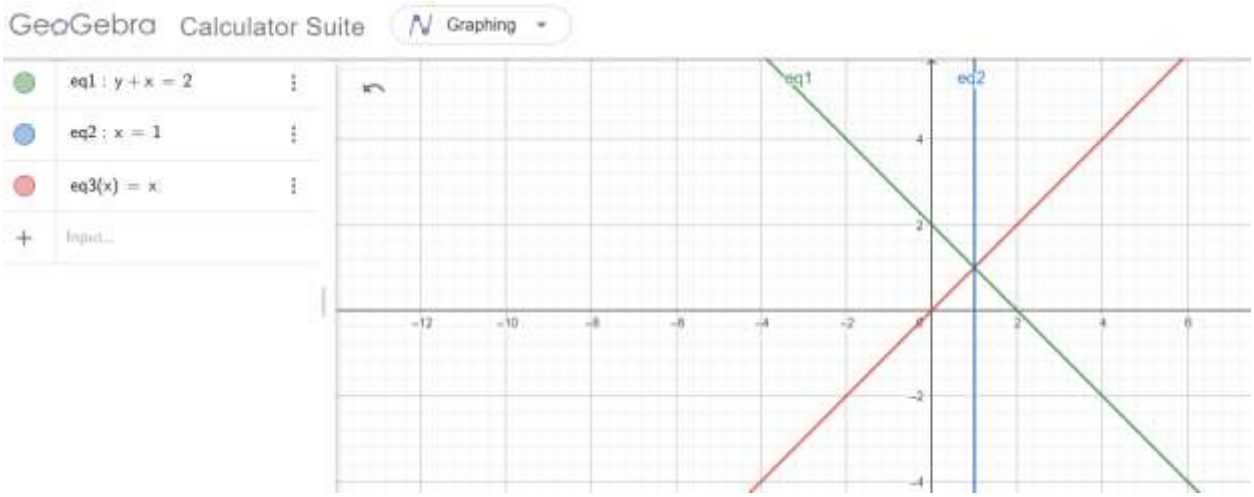
GeoGebra Calculator Suite
Graphing
eq1 : y + x = 2
eq2 : x = 1
eq3(x) = x
Input...
eq1
eq2

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P01-13. Mathematics 2 - practical classes, Computer Science 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Mathematics 2**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Lazar Stojković**
E-mail of the professor in charge	**Lazar.stojkovic@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions**
Tools* which are used in the course	**GeoGebra, MS Teams, LearningKey, YouTube**
Name of modernised teaching units	**Most of the units**
Number of students	**~80**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

This practical course is by design a modernized version of Linear Algebra (Computer Science) practical course. Most of the exercises are redesigned to better fit computer science students. This results in more *practical* examples with focus on concept understanding and intuition behind it, while abstract theoretical exercises and results are not in the first plan. During the exercises, teaching material was supplemented by various videos available on YouTube, which intuitively visualized mathematical concepts (www.youtube.com/c/3blue1brown). GeoGebra.org was used for plotting and visualization of functions. Course material largely produced during Online lectures via MS Teams, by screensharing Pages iOS app which enabled real-time writing.

Students were encouraged to actively participate in peer discussions by doing exercises; all present students were able to provide their inputs and opinions and there solve problems as a team. This is not only motivating students to study regularly, but also helped develop their presentational skills. Platform LearningKey provided useful tools for constructing self-tests in quiz-like format, which was a new concept to our students when it comes to mathematical subjects. Modernization is also achieved by improving

communication by using the MS Teams platform in parallel, where students could be promptly updated on new course material; they also obtained access to more flexible and personalized consultations and a possibility for online lectures if circumstances so required.

Name of the subject: Mathematics 2, Practical Classes

Name of the study programme: Computer Science

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: Obligatory

ECTS: 8

Number of students: 80

Professor in charge: Lazar Stojković

E-mail of professor in charge: lazar.stojkovic@pmf.edu.rs

Name of the lecture that is/will be modernized: complete course

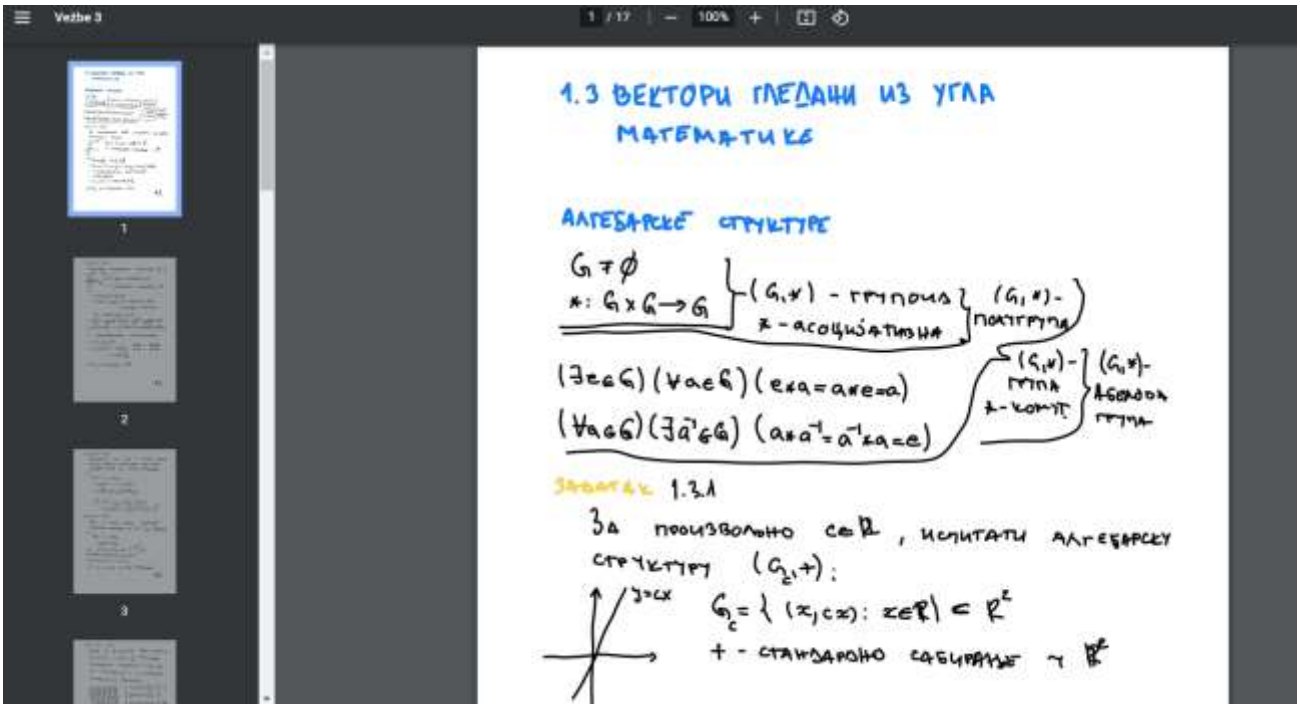

Figure 2 Pages iOS app generated PDF

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P01-14. Linear algebra (Mathematics), 2021/22

REPORT

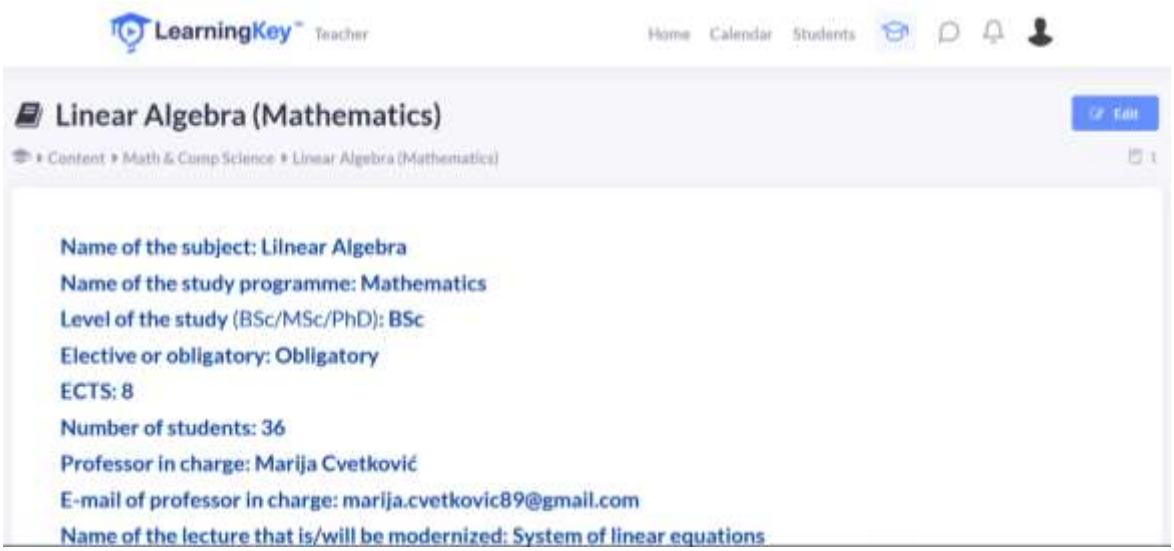
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Mathematics**
Name of the course	**Linear algebra**
Level of the study	**11^{st} semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Marija Cvetković**
E-mail of the professor in charge	**marija.cvetkovic@pmf.edu.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools* which are used in the course	**Wolfram demonstration project, Rubrics, Mind maps, Quizlet**
Name of modernised teaching units	**Solving systems of linear equations**
Number of students	**36**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

The course of Linear algebra is a challenge for every generation of freshmen due to the new insight in mathematics I comparison to their previous high school knowledge. This was even more obvious in the online surrounding without direct teacher-student interaction. Therefore, several online tools and methodological techniques were used in order to overcome those difficulties and improve the quality of online teaching. Quizlet was used as an after-class tool or a preparation in the beginning of the class. Mind maps are presented in the beginning intentionally to give students a clear picture of what we intend to achieve during the course and what will be the chosen topics. Regarding problem solving, many problems were solved by themselves true individual work, peer discussions, or quick competitions and every lesson, including the one on the Learning key platform, are followed with a selected list of practical problems. The implementation of video material and some Wolfram demonstration projects is presented at the Learning key platform for one chosen topic-Solving systems of linear equations.


LearningKey Teacher
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Linear Algebra (Mathematics)
Edit
Content › Math & Comp Science › Linear Algebra (Mathematics)
Name of the subject: Lilnear Algebra
Name of the study programme: Mathematics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obligatory
ECTS: 8
Number of students: 36
Professor in charge: Marija Cvetković
E-mail of professor in charge: marija.cvetkovic89@gmail.com
Name of the lecture that is/will be modernized: System of linear equations


LearningKey Teacher
Home Calendar Students
Sistemi linearnih jednačina
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Content › Math & Comp Science › Linear Algebra (Mathematics) › Sistemi linearnih jednačina
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1. The Geometry of Linear Equations
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P01-15. Methodology of e-learning- practical classes

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MCs course is modified by using new methods and tools.**

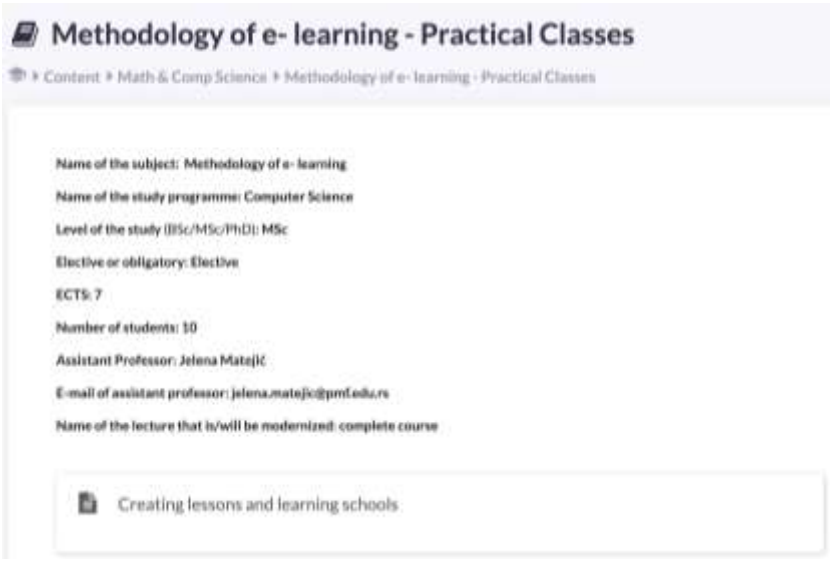
Name of the University	**University of Niš**
Name of the study programme	**Computer Science**
Name of the course	**Methodology of e-learning- practical classes**
Level of the study	**2nd semester, Master studies**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Jelena Matejić**
E-mail of the professor in charge	**jelena.matejic@pmf.edu.rs**
Methods * which are used in the course	**Peer assessment, work in group, project work, rubrics, flipped classroom, blended learning**
Tools* which are used in the course	**OBS studio, Moodle, FreePick, ClassroomScreen, Canva**
Name of modernised teaching units	**Blended learning, Educational posters, Platforms For Online Learning, Quizzes**
Number of students	**10**

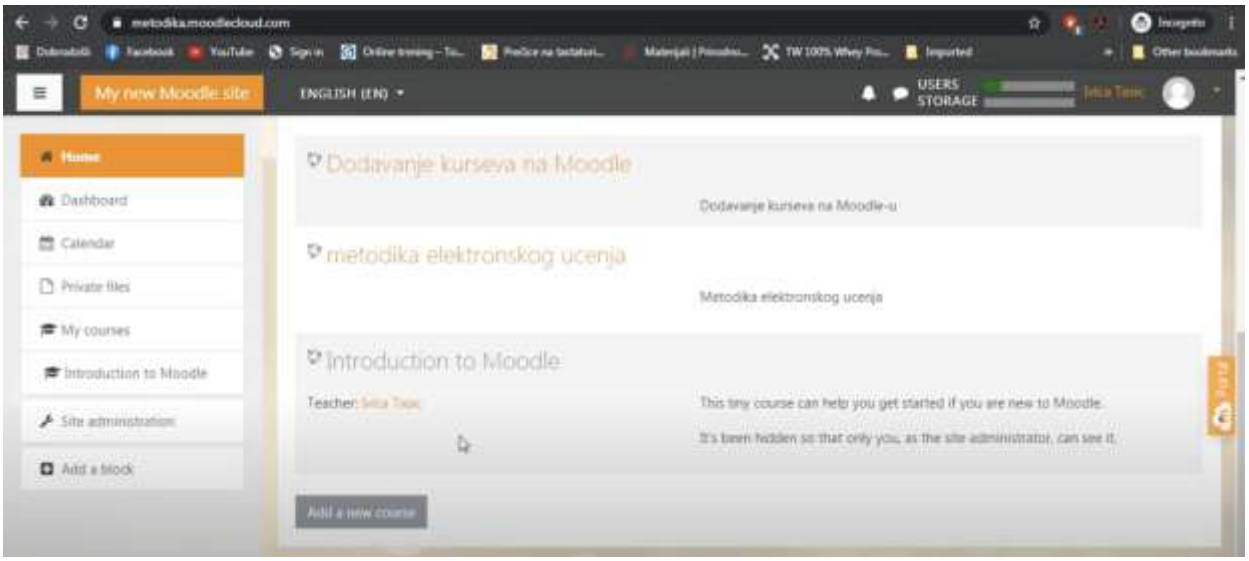
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

The methodology of e-learning course applied almost all new methods that we had the opportunity to learn during the TeComp project. I tried to apply as wide a range of knowledge and skills as possible, to show students what tools they can use in their future teaching, in what ways to animate my students and make the classes interactive and interesting.

During the course, we based our work on the Moodle Cloud platform, where we uploaded various materials. The materials had videos created by the students themselves, posters, pictures, mind maps, presentations etc. In addition to IT skills, we tried to review psychological and pedagogical tools that can be used in teaching. How to keep the students' attention is a big challenge, but for that very reason we got acquainted with different techniques that can help us in this.




metodika.moodlecloud.com
My new Moodle site
ENGLISH (EN)
USERS STORAGE
Home
Dashboard
Calendar
Private files
My courses
Introduction to Moodle
Site administration
Add a block
Dodavanje kurseva na Moodle
Dodavanje kurseva na Moodle-u
metodika elektronskog ucenja
Metodika elektronskog ucenja
Introduction to Moodle
Teacher:
This tiny course can help you get started if you are new to Moodle.
It's been hidden so that only you, as the site administrator, can see it.
Add a new course

P01-17. Introduction to Environmental Chemistry, 2021/22

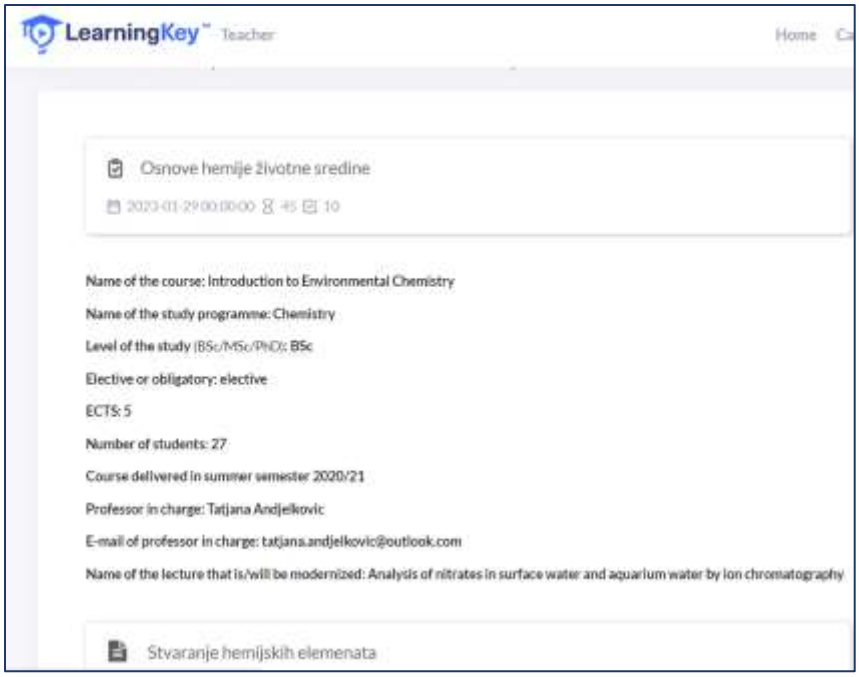
REPORT

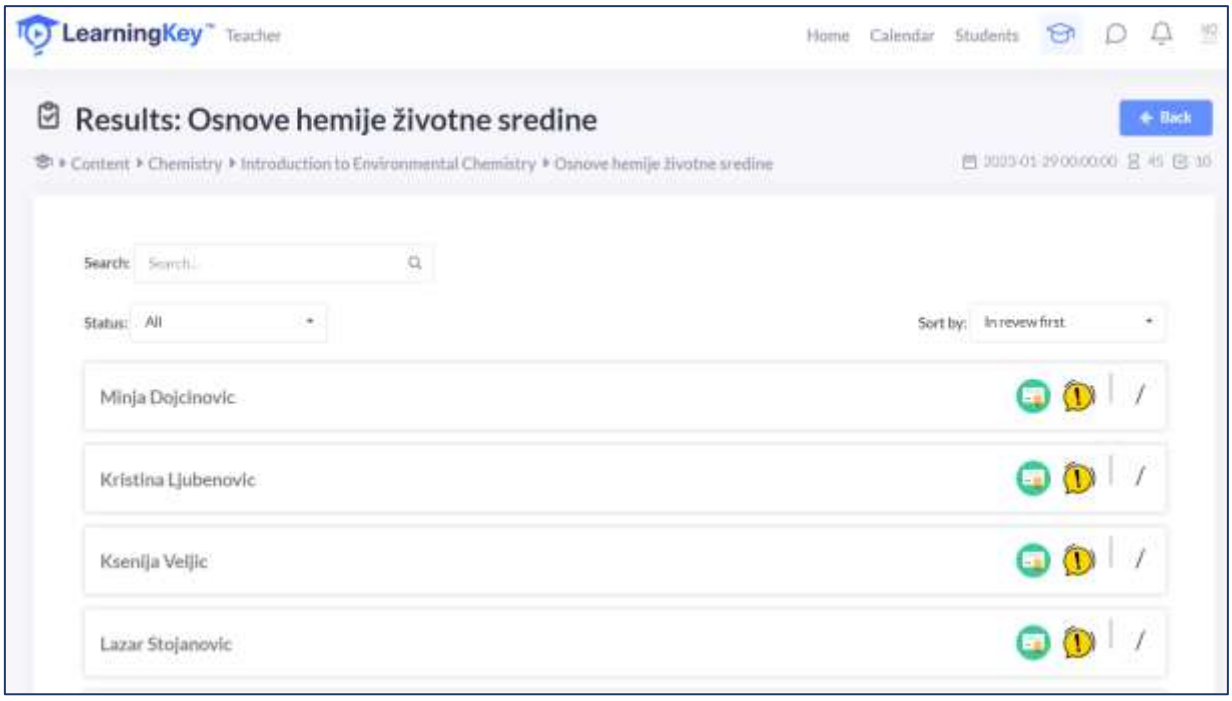
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and question tests.**

Name of the University	**University of Niš**
Name of the study programme	**Chemistry**
Name of the course	**Introduction to Environmental Chemistry**
Level of the study	**5th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Tatjana Anđelković**
E-mail of the professor in charge	**tatjana.andjelkovic@pmf.edu.rs**
Methods which are used in the course	**Remote control of instruments, lecture according to Bloom's taxonomy**
Test questions which are used in the course	**Database of exam questions with multiple choice**
Name of modernised teaching units	**Analysis of nitrates in surface water and aquarium water by ion chromatography, Formation of chemical elements, all lectures through database of exam questions**
Number of students	**27**

The methods/tools used in the course modernisation

Course titled Introduction to Environmental Chemistry has been improved through database of test questions, remote control of instruments and innovated lecture following the principles of Bloom's taxonomy. By innovative lectures, students had a clear insight into the outcome of the lectures. Remote control of the instrument made it possible to all students to see all settings before analysis of sample. Using database of test questions, students have hade possibility to test their knowledge before exam. Also, teacher has had possibility to check level of understanding of lectures.


LearningKey™ Teacher
Home
Osnove hemije životne sredine
Name of the course: Introduction to Environmental Chemistry
Name of the study programme: Chemistry
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: elective
ECTS: 5
Number of students: 27
Course delivered in summer semester 2020/21
Professor in charge: Tatjana Andjelkovic
E-mail of professor in charge: tatjana.andjelkovic@outlook.com
Name of the lecture that is/will be modernized: Analysis of nitrates in surface water and aquarium water by ion chromatography
Stvaranje hemijskih elemenata


LearningKey™ Teacher
Home
Calendar
Students
Results: Osnove hemije životne sredine
Back
Content
Chemistry
Introduction to Environmental Chemistry
Osnove hemije životne sredine
Search:
Status:
All
Sort by:
In review first
Minja Dojcinovic
Kristina Ljubenovic
Ksenija Veljic
Lazar Stojanovic

P01-18. Chemodinamics of pollutants, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods.**

Name of the University	**University of Niš**
Name of the study programme	**Chemistry**
Name of the course	**Chemodinamics of pollutants**
Level of the study	**6th semester, Bachelor**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Tatjana Anđelković**
E-mail of the professor in charge	**tatjana.andjelkovic@pmf.edu.rs**
Methods which are used in the course	**Lecture according to Bloom's taxonomy**
Name of modernised teaching units	**Soil pollution and remediation**
Number of students	**17**

The methods/tools used in the course modernisation

Course titled Introduction to Chemodinamics of pollutants has been improved through innovated lecture following the principles of Bloom's taxonomy. By innovative lectures, students had a clear insight into the outcome of the lectures. Also, they learned about the Bloom's taxonomy, which could help them to understand lecture better and follow the direction of learning.

P01-19. Chemistry of Water and Soil, 2021/22

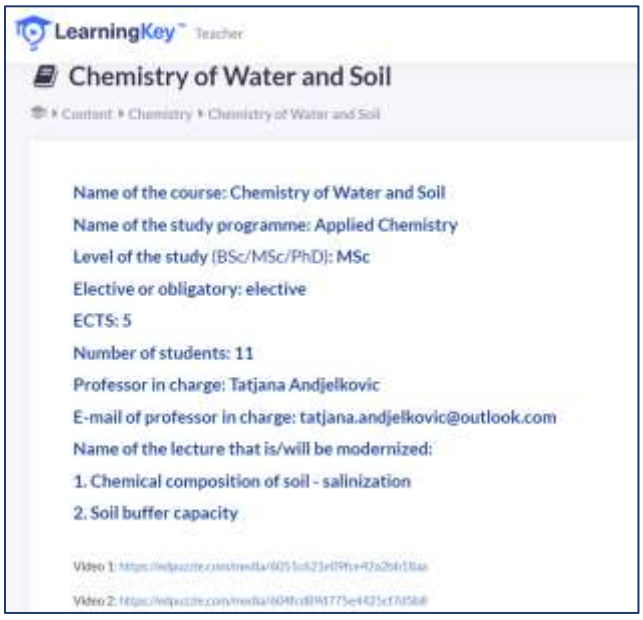
REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MSc course is modified by using Edpuzzle videos with questions.**

Name of the University	**University of Niš**
Name of the study programme	**Applied Chemistry**
Name of the course	**Chemistry of Water and Soil**
Level of the study	**2nd semester, Master**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Tatjana Anđelković**
E-mail of the professor in charge	**tatjana.andjelkovic@pmf.edu.rs**
Methods which are used in the course	**Edpuzzle videos with questions**
Name of modernised teaching units	**Chemical composition of soil – salinization; Soil buffer capacity**
Number of students	**11**

The methods/tools used in the course modernisation

Lecture part of course titled Chemistry of Water and Soil has been improved by using Edpuzzle videos to better understand some soil properties. Edpuzzle videos contain appropriate questions (multiple choice or free answer) which are used to check and evaluate the understanding of the previously presented knowledge.


LearningKey Teacher
Chemistry of Water and Soil
Content ▸ Chemistry ▸ Chemistry of Water and Soil
Name of the course: Chemistry of Water and Soil
Name of the study programme: Applied Chemistry
Level of the study (BSc/MSc/PhD): MSc
Elective or obligatory: elective
ECTS: 5
Number of students: 11
Professor in charge: Tatjana Andjelkovic
E-mail of professor in charge: tatjana.andjelkovic@outlook.com
Name of the lecture that is/will be modernized:
1. Chemical composition of soil - salinization
2. Soil buffer capacity
Video 1:
Video 2:


edpuzzle
4. Puferski kapacitet zemljišta
Video Events

P01-20. Humic substances in the environment, 2021/22

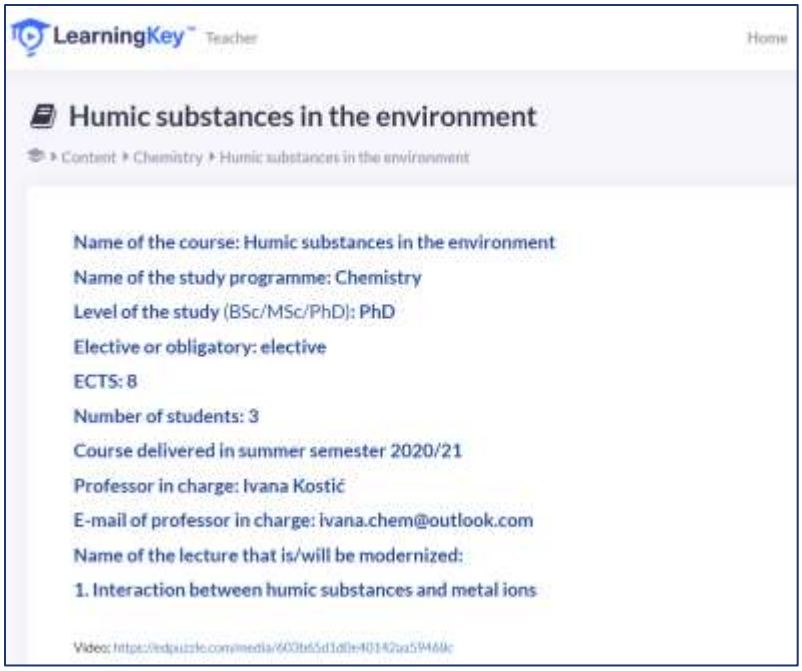
REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **PhD course is modified by using Edpuzzle video with questions.**

Name of the University	**University of Niš**
Name of the study programme	**Chemistry**
Name of the course	**Humic substances in the environment**
Level of the study	**4th semester, PhD**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Ivana Kostić Kokić**
E-mail of the professor in charge	**ivana.chem@outlook.com**
Methods which are used in the course	**Edpuzzle video with questions**
Name of modernised teaching units	**Interaction between humic substances and metal ions**
Number of students	**3**

The methods/tools used in the course modernisation

Course titled Humic substances in the environment has been improved using video. Video will help students to understand principle of humic substances formation and interaction with metal ions. Edpuzzle videos contain appropriate questions (multiple choice or free answer) which are used to check and evaluate the understanding of the previously presented knowledge.



LearningKey™ Teacher Home

Humic substances in the environment

Content › Chemistry › Humic substances in the environment

Name of the course: Humic substances in the environment

Name of the study programme: Chemistry

Level of the study (BSc/MSc/PhD): PhD

Elective or obligatory: elective

ECTS: 8

Number of students: 3

Course delivered in summer semester 2020/21

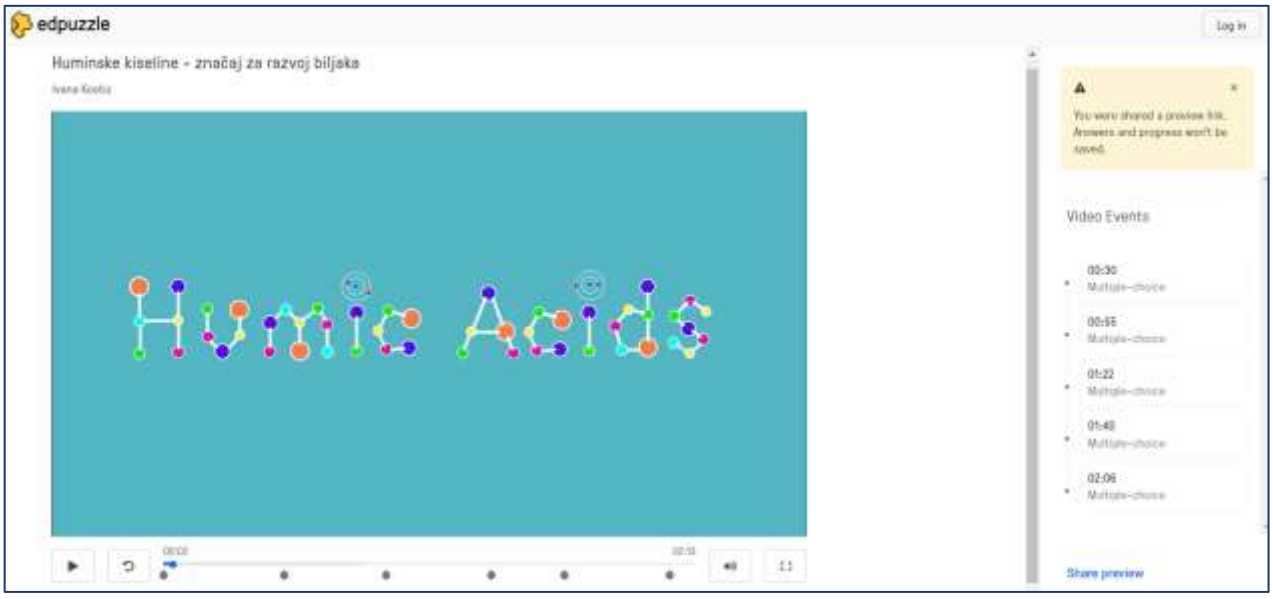
Professor in charge: Ivana Kostić

E-mail of professor in charge: ivana.chem@outlook.com

Name of the lecture that is/will be modernized:

1. Interaction between humic substances and metal ions

Video: https://edpuzzle.com/media/603b65d1d0e40142aa59466c



P01-21. Laboratory analysis of water and soil, 2021/22

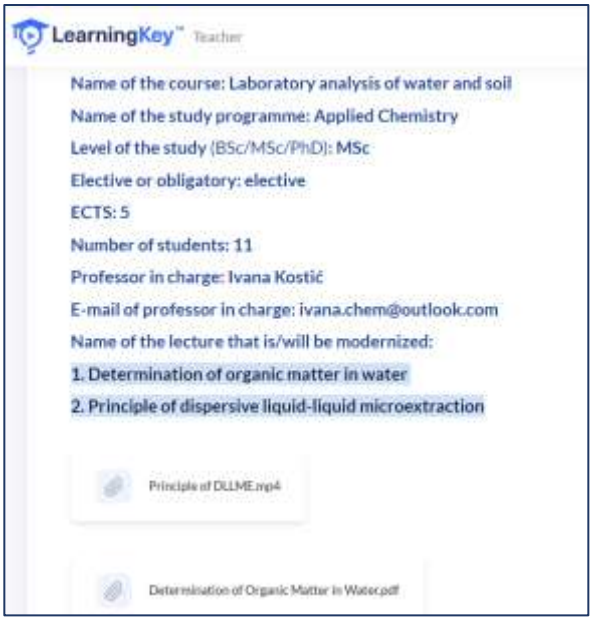
REPORT

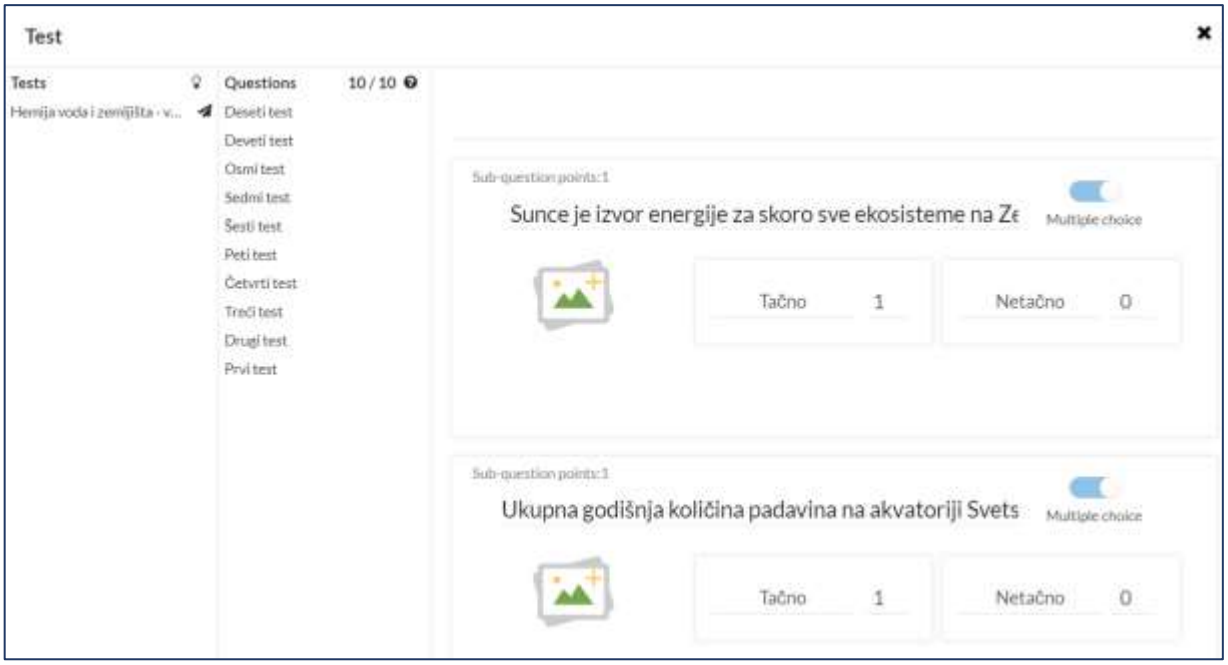
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MSc course is modified by using Database of test questions, video clip, mind map.**

Name of the University	**University of Niš**
Name of the study programme	**Applied Chemistry**
Name of the course	**Laboratory analysis of water and soil**
Level of the study	**2nd semester, Master**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Ivana Kostić Kokić**
E-mail of the professor in charge	**ivana.chem@outlook.com**
Methods which are used in the course	**Database of test questions, video clip, mind map**
Name of modernised teaching units	**Determination of organic matter in water, Principle of dispersive liquid-liquid microextraction, All laboratory exercises through database of test questions**
Number of students	**11**

The methods/tools used in the course modernisation

Laboratory analysis of water and soil as experimental part of course titled Chemistry of Water and Soil has been improved through database of test questions, videos and mind map. Database of test questions could help students to check their knowledge before access to exercises in laboratory. Video will help students to understand principle of dispersive liquid-liquid microextraction, while mind map helps students to overcome principle of determination of organic matter in water.


LearningKey™ Teacher
Name of the course: Laboratory analysis of water and soil
Name of the study programme: Applied Chemistry
Level of the study (BSc/MSc/PhD): MSc
Elective or obligatory: elective
ECTS: 5
Number of students: 11
Professor in charge: Ivana Kostić
E-mail of professor in charge: ivana.chem@outlook.com
Name of the lecture that is/will be modernized:
1. Determination of organic matter in water
2. Principle of dispersive liquid-liquid microextraction
Principle of DLLME.mp4
Determination of Organic Matter in Water.pdf


Test
Tests
Hemija voda i zemljišta - v...
Questions
10 / 10
Deseti test
Deveti test
Osmi test
Sedmi test
Šesti test
Peti test
Četvrti test
Treći test
Drugi test
Prvi test
Sub-question points: 1
Sunce je izvor energije za skoro sve ekosisteme na Ze
Multiple choice
Tačno 1
Netačno 0
Sub-question points: 1
Ukupna godišnja količina padavina na akvatoriji Svets
Multiple choice
Tačno 1
Netačno 0

P01-22. Advanced Environmental Chemistry - Problem Solutions, 2021/22

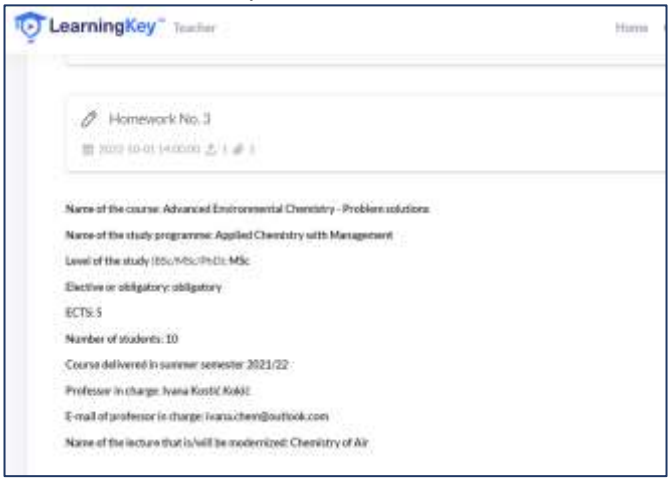
REPORT

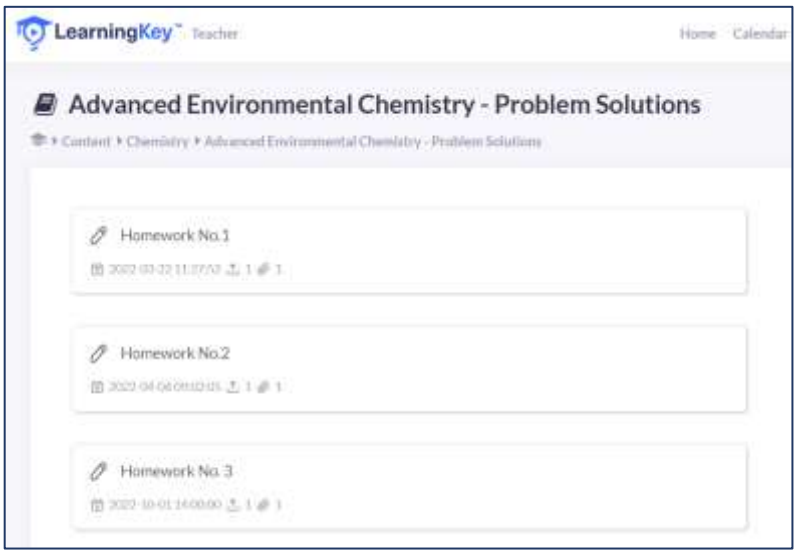
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MSc course is modified by using time limited homework.**

Name of the University	**University of Niš**
Name of the study programme	**Applied Chemistry with Management**
Name of the course	**Advanced Environmental Chemistry - Problem Solutions**
Level of the study	**2nd semester, Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Ivana Kostić Kokić**
E-mail of the professor in charge	**ivana.chem@outlook.com**
Methods which are used in the course	**Time limited homework**
Name of modernised teaching units	**Chemistry of Air**
Number of students	**10**

The methods/tools used in the course modernisation

This part of the course Advanced Environmental Chemistry is named Advanced Environmental Chemistry - Problem Solutions and it includes theoretical exercises. This part has been improved using homework tests. These tests are with limited working time. This enables the continuous learning of the students because the homework was mandatory for the next term of theoretical exercises.




LearningKey
Teacher
Home
Calendar
Advanced Environmental Chemistry - Problem Solutions
Content
Chemistry
Advanced Environmental Chemistry - Problem Solutions
Homework No.1
Homework No.2
Homework No. 3

P01-23. Advanced Environmental Chemistry, 2021/22

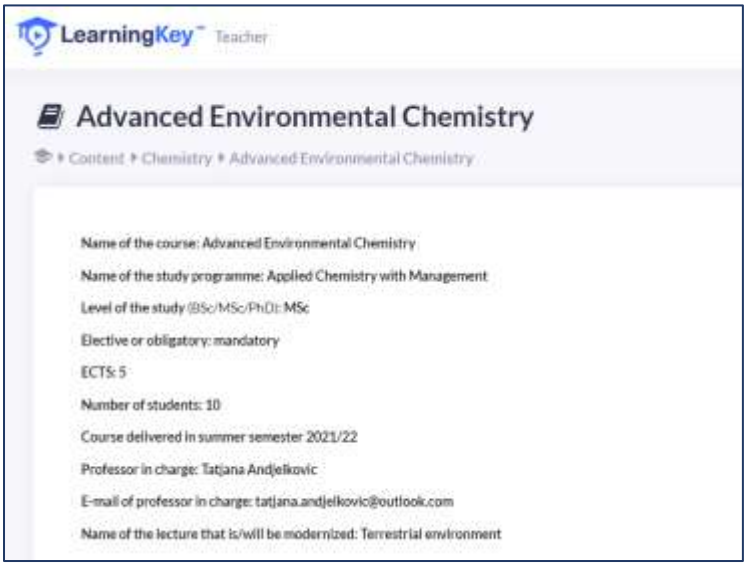
REPORT

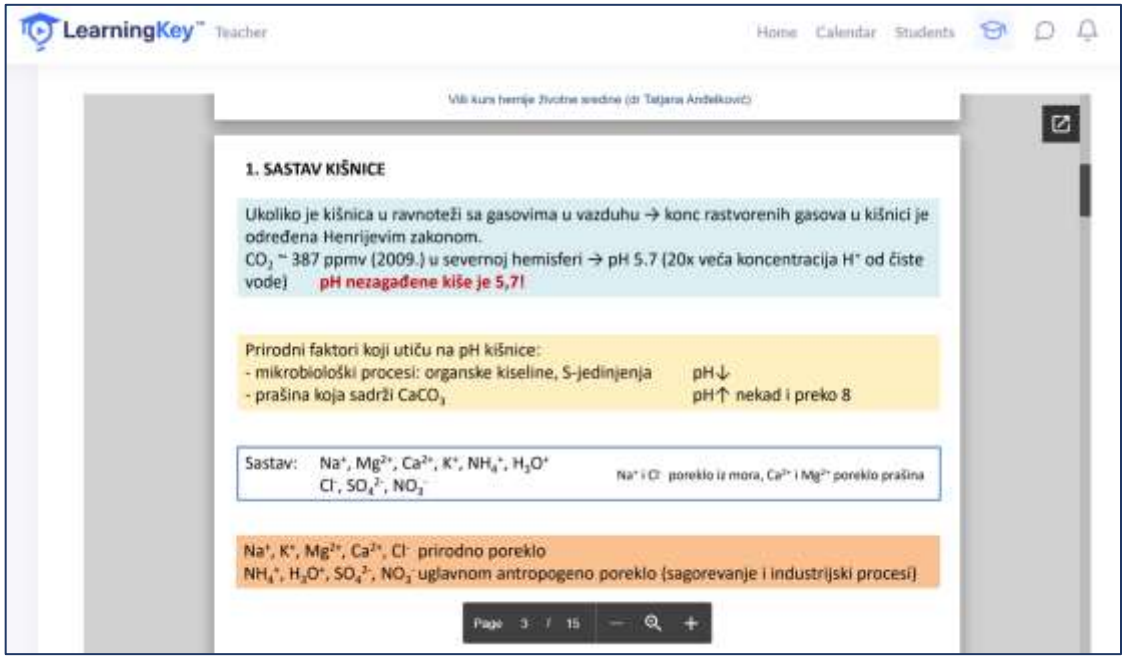
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MSc course is modified by new methods.**

Name of the University	**University of Niš**
Name of the study programme	**Applied Chemistry with Management**
Name of the course	**Advanced Environmental Chemistry**
Level of the study	**2nd semester, Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Tatjana Anđelković**
E-mail of the professor in charge	**tatjana.andjelkovic@outlook.com**
Methods which are used in the course	**Lectures according to Bloom's taxonomy**
Name of modernised teaching units	**Terrestrial environment**
Number of students	**10**

The methods/tools used in the course modernisation

Course titled Advanced Environmental Chemistry has been improved by innovated lectures which follow the principles of Bloom's taxonomy. By innovative lectures, students had a clear insight into the outcome of the lectures.




LearningKey™ Teacher
Home Calendar Students
1. SASTAV KIŠNICE
Ukoliko je kišnica u ravnoteži sa gasovima u vazduhu → konc rastvorenih gasova u kišnici je određena Henrijevim zakonom.
CO_2 ~ 387 ppmv (2009.) u severnoj hemisferi → pH 5.7 (20x veća koncentracija H^+ od čiste vode) pH nezagađene kiše je 5,7!
Prirodni faktori koji utiču na pH kišnice:
- mikrobiološki procesi: organske kiseline, S-jedinjenja pH↓
- prašina koja sadrži $CaCO_3$ pH↑ nekad i preko 8
Sastav: Na^+, Mg^{2+}, Ca^{2+}, K^+, NH_4^+, H_3O^+
Cl^-, SO_4^{2-}, NO_3^-
Na^+ i Cl^- poreklo iz mora, Ca^{2+} i Mg^{2+} poreklo prašina
Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^- prirodno poreklo
NH_4^+, H_3O^+, SO_4^{2-}, NO_3^- uglavnom antropogeno poreklo (sagorevanje i industrijski procesi)
Page 3 / 15

P01-25. Pedagogy, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

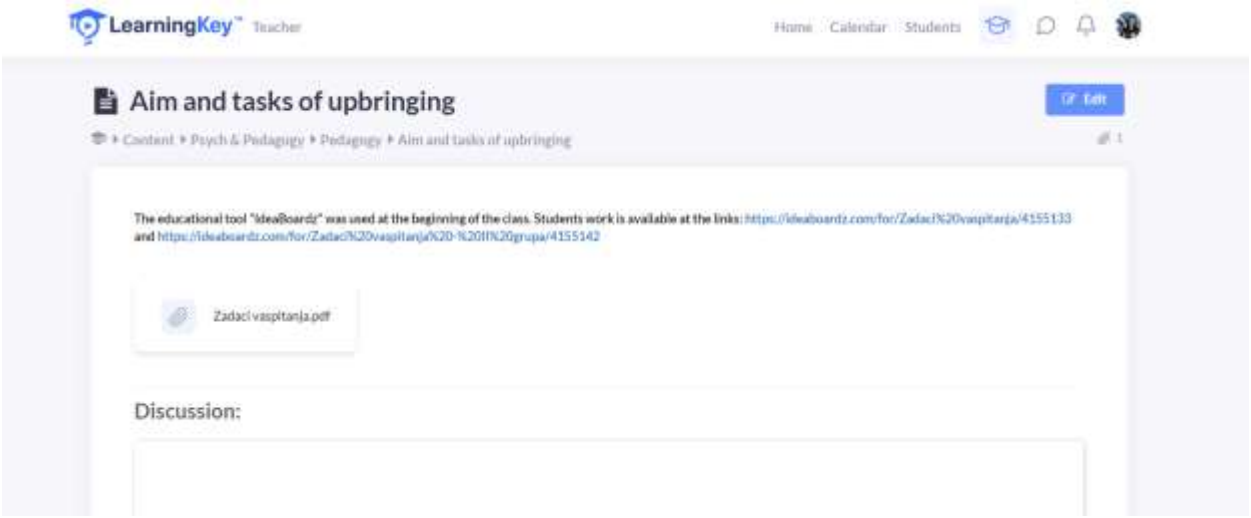
Name of the University	**University of Niš**
Name of the study programme	**Department of English**
Name of the course	**Pedagogy**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**associate professor Marija Jovanovic, Dragana Dimitrijevic (teaching assistant)**
E-mail of the professor in charge	**marija.jovanovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools* which are used in the course	**CANVA, mind maps, quiziss, Animaker, IdeaBoardz**
Name of modernised teaching units	**Aim and tasks of upbringing. Teaching systems: exemplar, problem, individualized, heuristics..Teaching principles: individualization, rationalization, systematization.Teaching methods: conversation, illustration, demonstration. Forms of teaching work: frontal, group, individual, pair work, pedagogical workshop**
Number of students	**92**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In this course, we modernized the main lessons using innovative teaching methods and educational tools. Our intention was that some lessons students learn through group work in theoretical classes, and to better understood some themes through practical classes. At the beginning of the semester, we prepared and share with students a video (make in animaker) with all the main information about the course. This approach was motivate students and indicated that an innovative approach will be used for teaching in this course.

Based on the aim of the class and theme we used different educational tools such as IdeaBoardz for the beginning of the class and introduction to the theme; canva for synthesizing the theme and marking the main elements. The main part of class often was dedicated to group work, each group had a different assignment and 45 minutes for work, after group work was done, all groups presented their work and discussed it with all students.



P01-26. Didactics 1, 2021/22

REPORT

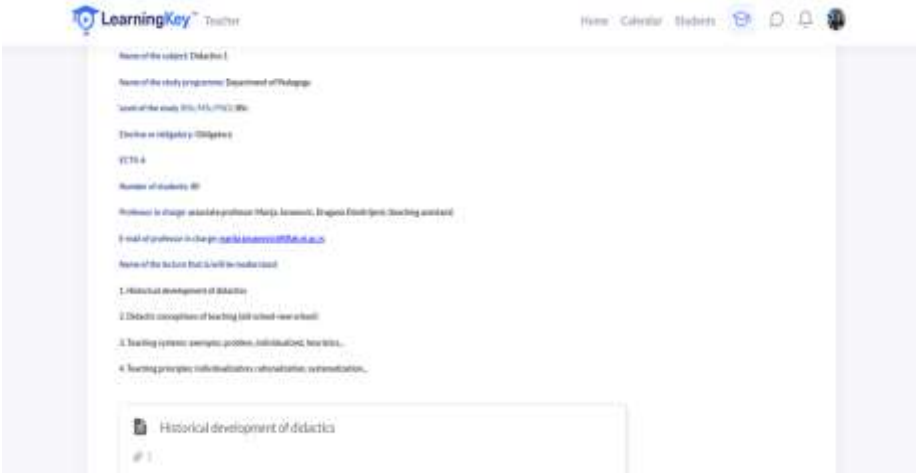
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Department of Pedagogy**
Name of the course	**Pedagogy**
Level of the study	**5th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**associate professor Marija Jovanovic, Dragana Dimitrijevic (teaching assistant)**
E-mail of the professor in charge	**marija.jovanovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Group work, peer discussions, educative videos, mind maps**
Tools* which are used in the course	**IdeaBoard, EdPuzzle, Canva, Video Maker**
Name of modernised teaching units	**Historical development of didactics. Didactic conceptions of teaching (old school-new school). Teaching systems: exemplar, problem, individualized, heuristics...Teaching principles: individualization, rationalization, systematization.**
Number of students	**40**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In this course, we realized using innovative teaching methods and educational tools. On this platform were presented 4 lessons, which are the most innovative. For teaching the lesson "historical development of didactics" we used group work and the result was a timeline of a significant period of didactics' development. After class we prepared a video clip with content selected in the class by the groups of students, video is available on youtube and uploaded to the platform. Also, for the lesson "teaching principles" we used group work, and each group has the assignment to prepare material using Canva, Animaker of PowerPoint Presentation. For other lessons, we used IdeaBoard, at the beginning of the class to motivate students, and EdPuzzle to make interaction and get students' opinions on the topic.


LearningKey
Historical development of didactics


LearningKey
Home
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Students
NASTANAK I UTEMELJIVANJE
DIDAKTIKE KAO CELOVITE KONCEPCIJE


IdeaBoardz
Didaktičke vežbe
Stara škola karakteristike
Nova škola - karakteristike

P01-29. Didactics 2, 2021/22

REPORT

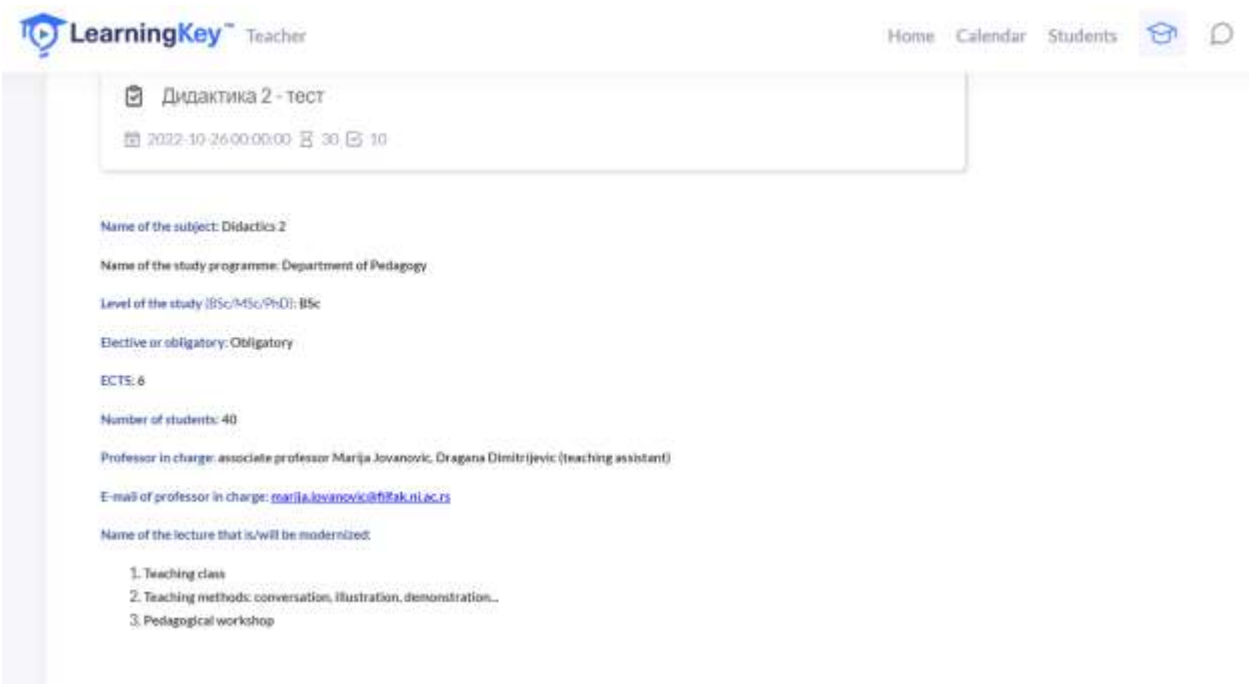
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Department of Pedagogy**
Name of the course	**Pedagogy**
Level of the study	**6th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**associate professor Marija Jovanovic, Dragana Dimitrijevic (teaching assistant)**
E-mail of the professor in charge	**marija.jovanovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Group work, peer discussions, educative videos**
Tools* which are used in the course	**Video maker, PPT, quizizz**
Name of modernised teaching units	**Teaching class. Teaching methods: conversation, illustration, demonstration....Pedagogical workshop**
Number of students	**40**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Subject Didactics 2 which comes in the next semester after Didactics 1. So we have continued to modernize our classes, this time primarily using group work as a base and presentations made by students. Besides that, we used educational videos and Kahoot quizzes to check students' knowledge after a few lessons.



LearningKey™ Teacher

Home Calendar Students

Дидактика 2 - тест

2022-10-26 00:00:00 30 10

Name of the subject: Didactics 2

Name of the study programme: Department of Pedagogy

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: Obligatory

ECTS: 6

Number of students: 40

Professor in charge: associate professor Marija Jovanovic, Dragana Dimitrijevic (teaching assistant)

E-mail of professor in charge: marija.jovanovic@filfak.ni.ac.rs

Name of the lecture that is/will be modernized:

1. Teaching class
2. Teaching methods: conversation, illustration, demonstration...
3. Pedagogical workshop

Discussion:

P01-30. Pedagogy (second semester 2021/22), 2021/22

REPORT

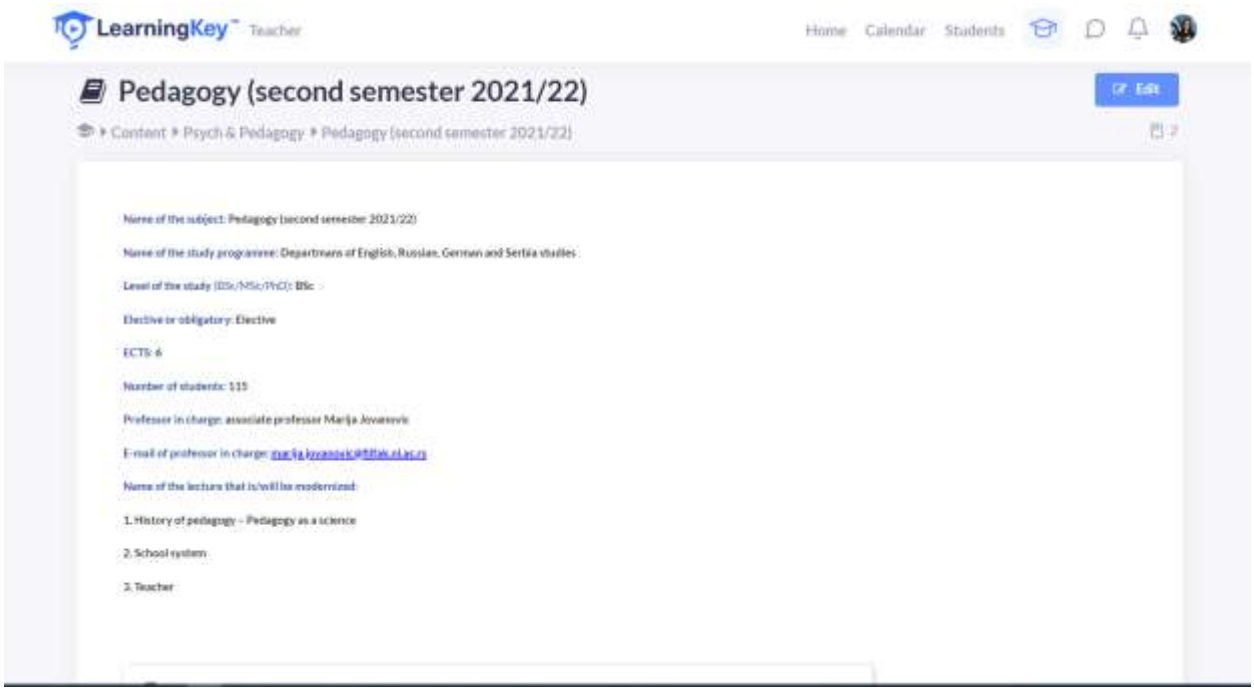
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

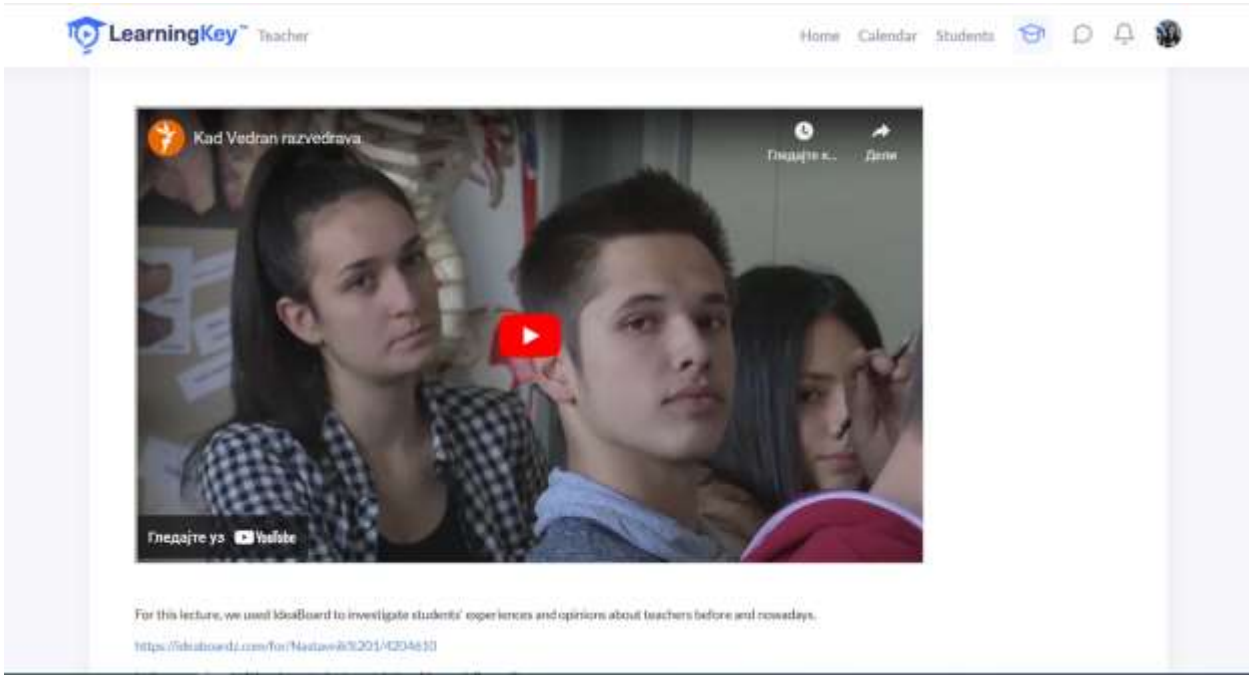
Name of the University	**University of Niš**
Name of the study programme	**Departmans of English, Russian, German and Serbia studie**
Name of the course	**Pedagogy**
Level of the study	**6th ,4th semester, Bachelor**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**associate professor Marija Jovanovic**
E-mail of the professor in charge	**marija.jovanovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Group work, peer discussions, educative videos**
Tools* which are used in the course	**Video, IdeaBoard**
Name of modernised teaching units	**History of pedagogy – Pedagogy as a science. School system. Teacher**
Number of students	**115**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Course Pedagogy in the second semester as an elective subject includes students' from departments of English, Russian, German, and Serbia studies. All lectures in this course were modernized, some of them using the same tools as in the first semester for students of English. Besides that, in this semester we used educational videos in different languages for new themes such as Teacher, History of pedagogy..For the lecture Teacher, we used IdeaBoard to investigate students' experiences and opinions about teachers before and nowadays. In the second part of the class, students watched the video and discuss it. Also, we used Kahoot quizzes to check students' knowledge after a few lessons.


LearningKey Teacher
Home Calendar Students
Pedagogy (second semester 2021/22)
Edit
Content › Psych & Pedagogy › Pedagogy (second semester 2021/22)
Name of the subject: Pedagogy (second semester 2021/22)
Name of the study programme: Departments of English, Russian, German and Serbia studies
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Elective
ECTS: 6
Number of students: 115
Professor in charge: associate professor Marija Jovanović
E-mail of professor in charge:
Name of the lecture that is/will be modernized:
1. History of pedagogy – Pedagogy as a science
2. School system
3. Teacher


LearningKey Teacher
Home Calendar Students
Kad Vedran razvedrava
Гледајте на...
Дели
Гледајте уз YouTube
For this lecture, we used IdeaBoard to investigate students' experiences and opinions about teachers before and nowadays.

P01-31. History of pedagogy 1, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Pedagogy**
Name of the course	**History of Pedagogy 1**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Petrović**
E-mail of the professor in charge	**Jelena.petrovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Collaborative learning, flipped classroom, group discussions,**
Tools* which are used in the course	**Whiteboard collaborative tools, mind maps, Kahoot, educative videos, VideoAnt, Mural**
Name of modernised teaching units	**Education in the countries of Old Eastern Civilisation; Education in Old Greece (Sparta, Athens, and ancient Greek philosophers on education); Jan Amos Comenius, his life and work, educational ideas, school organization and teaching principle**
Number of students	**51**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

This course is a first-year course, and it is very theoretical in nature. That is why I had to set the goal of the course in terms of higher order learning and emphasise that analytical and synthetical approach will be rated higher than information reproduction. In order to achieve that I modernized many of the teaching units to foster active participation, group work and cooperative learning in classes. I also adjusted evaluation techniques to provide timely feedback to students and used short tests for objective

knowledge via LearningKey platform, peer evaluation techniques and self-evaluation techniques during the process.

Cooperative learning was a great challenge in the situation of pandemic because we worked online, but I found it even more important to sustain some forms of cooperative learning in this situation. Using online collaborative tools helped very much in this respect. We used the available applications that were free, for example Mural. The other way to support group work and online collaboration was by making mind maps. For example, I divided students in groups and every group made a mind map describing education in the specific region in ancient times. At the end on the class all groups presented they work, and it was followed by discussion on common traits and major differences. We usually used MindMeister for mind maps. Finally, the flipped classroom method turned very useful because I shared with students some video or written materials they were supposed to analyse before class and present their conclusions, ideas, questions or dilemmas during the class. This method turned to be as useful in online classes as it is in in person teaching. Videos were taken from educative channels and adjusted for our purposes by VideoAnt or similar applications.

History of pedagogy 1

Content ▸ Psych & Pedagogy ▸ History of pedagogy 1

Name of the subject: History of pedagogy 1

Name of the study programme: Department of Pedagogy

Level of the study (BSc/MSc/PhD)**:** BSc

Elective or obligatory: Obligatory

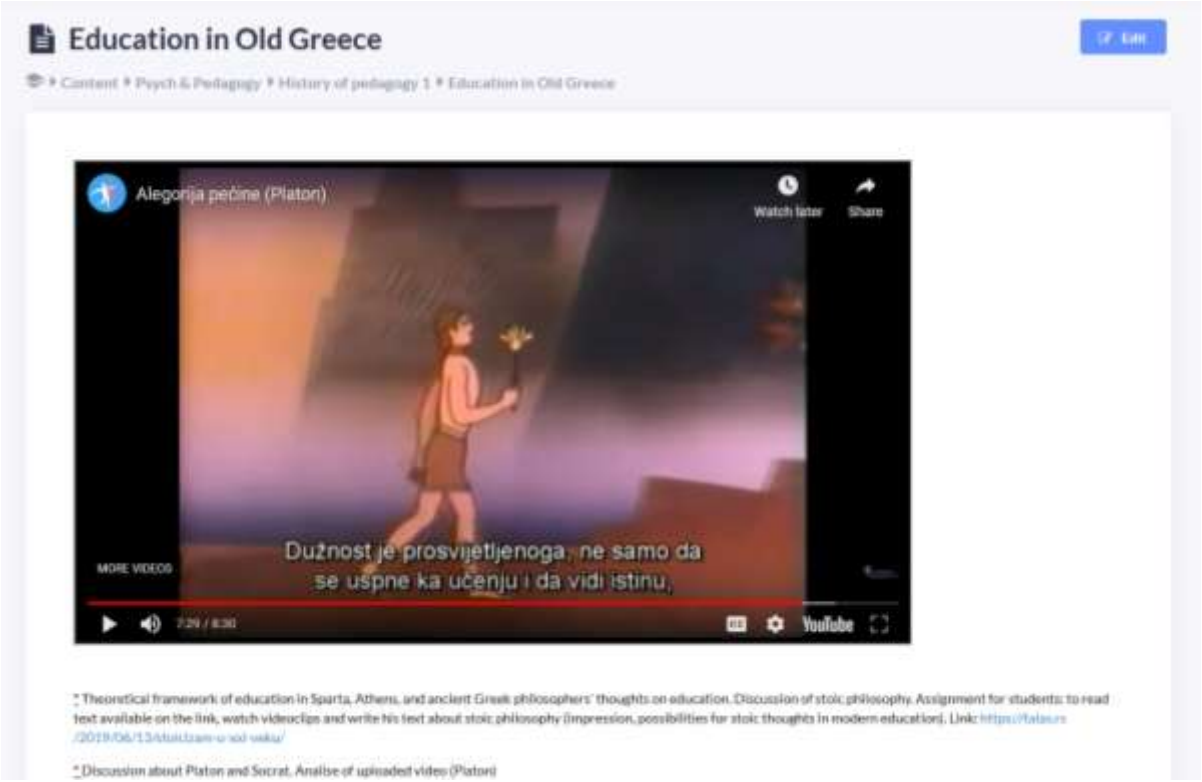
ECTS: 5

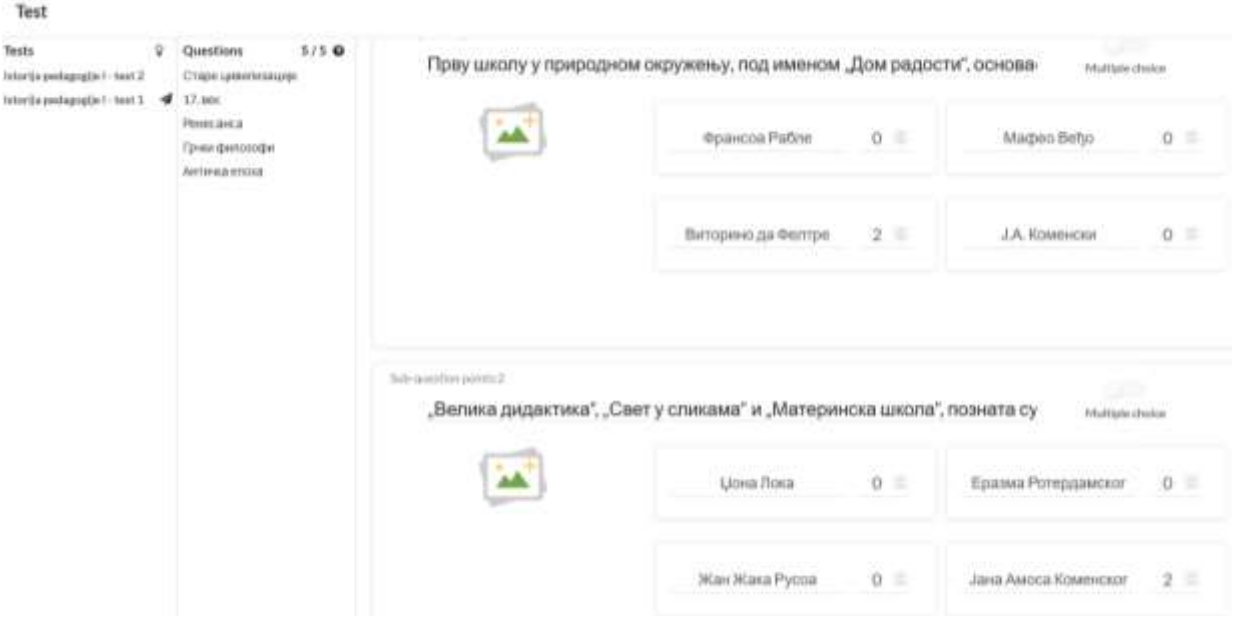
Number of students: 51

Professor in charge: associate professor Jelena Petrović, Dragana Dimitrijevic (teaching assistant)

E-mail of professor in charge: jelena.petrovic@filfak.ni.ac.rs

Name of the lecture that is/will be modernized:


Education in Old Greece
Edit
Content › Psych & Pedagogy › History of pedagogy 1 › Education in Old Greece
Alegorija pećine (Platon)
Watch later
Share
Dužnost je prosvijetljenoga, ne samo da
se uspne ka učenju i da vidi istinu,
MORE VIDEOS
YouTube
* Theoretical framework of education in Sparta, Athens, and ancient Greek philosophers' thoughts on education. Discussion of stoic philosophy. Assignment for students: to read text available on the link, watch videoclips and write his text about stoic philosophy (impression, possibilities for stoic thoughts in modern education). Link:
* Discussion about Platon and Socrat. Analise of uploaded video (Platon)


Test
Tests
Questions
5 / 5
Прву школу у природном окружењу, под именом „Дом радости", основа
Франсоа Рабле
0
Мафео Вегио
0
Виторино да Фелтре
2
Ј.А. Коменски
0
„Велика дидактика", „Свет у сликама" и „Материнска школа", познате су
Џона Лока
0
Еразма Ротердамског
0
Жан Жака Русоа
0
Јана Амоса Коменског
2

P01-32. History of pedagogy 2, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

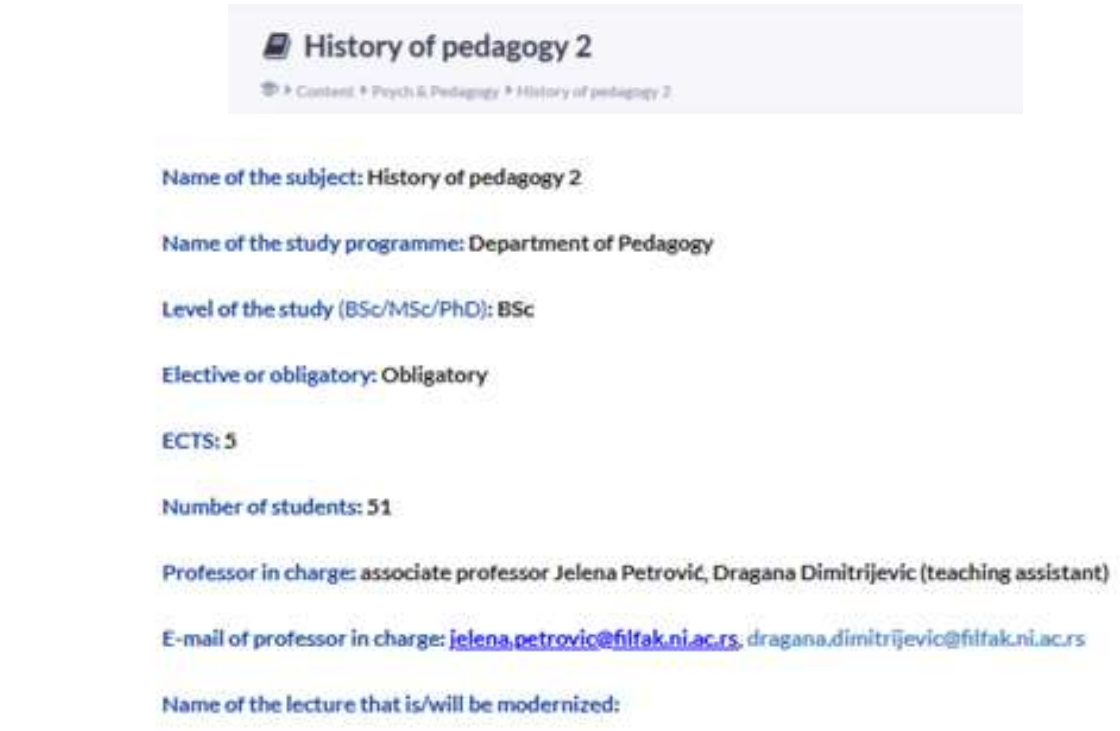
Name of the University	**University of Niš**
Name of the study programme	**Pedagogy**
Name of the course	**History of Pedagogy 2**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Petrović**
E-mail of the professor in charge	**Jelena.petrovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Collaborative learning, flipped classroom, group discussions,**
Tools* which are used in the course	**Whiteboard collaborative tools, mind maps, Kahoot, educative videos, VideoAnt, Mural**
Name of modernised teaching units	**Development of school and major educational ideas during 17th and 18th century; Educational thought in 19th century (Immanuel Kant, Johann Heinrich Pestalozzi, Friedrich Froebel, and others); School development in 19th century; Pragmatism and related educational theories; Reform pedagogy**
Number of students	**51**

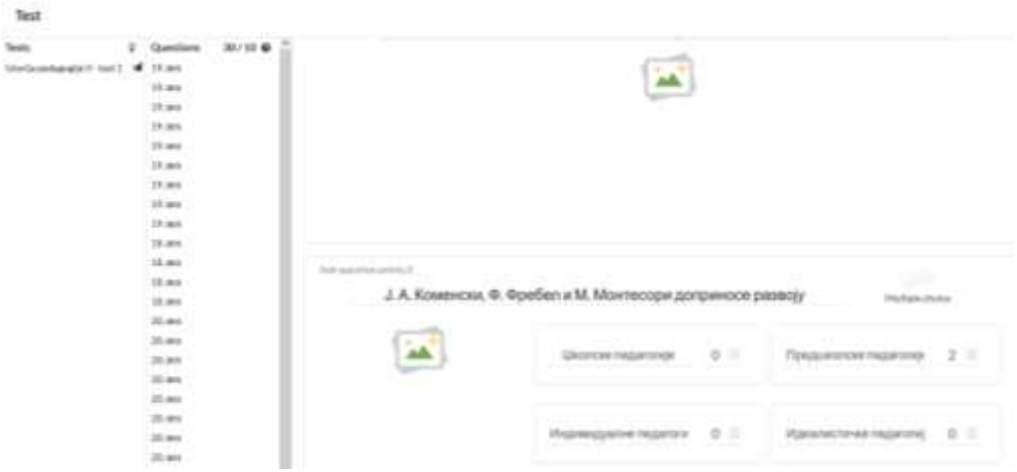
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

The course History of Pedagogy 2 is a continuation of a previous course with only difference in the historic period studied. It is in the second semester of the first year and is attended by the same students. The methods and tools of modernization of the courses remained the same. In this course I still valued active involvement, but started emphasizing individual research tasks and their presentation in class as a means to activate students. Since students were more skilled and materials were more available, the students

could fully respond to the tasks. We continued with collaborative work, group tasks and evaluations techniques and tools such as observation, essay/presentation analysis, checklist, assessment scale and rubric.




Test
Тests
Questions
Ја. А. Коменски, Ф. Фребел и М. Монтесори допринесе развоју

P01-33. Contemporary educational trends, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Niš**
Name of the study programme	**Pedagogy**
Name of the course	**Contemporary educational trends**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Petrović**
E-mail of the professor in charge	**Jelena.petrovic@filfak.ni.ac.rs**
Methods * which are used in the course	**Collaborative learning, flipped classroom, group discussions, active learning, project-based learning**
Tools* which are used in the course	**Whiteboard collaborative tools, Kahoot, educative videos, VideoAnt, Mural, Canva**
Name of modernised teaching units	**The trends of individual orientation (variants of individual pedagogy, and influences); Pragmatism in education (Main representatives; its influences on educational thought and practice); Education and its aims in the educational theory of John Dewey; Deschooling movements**
Number of students	**43**

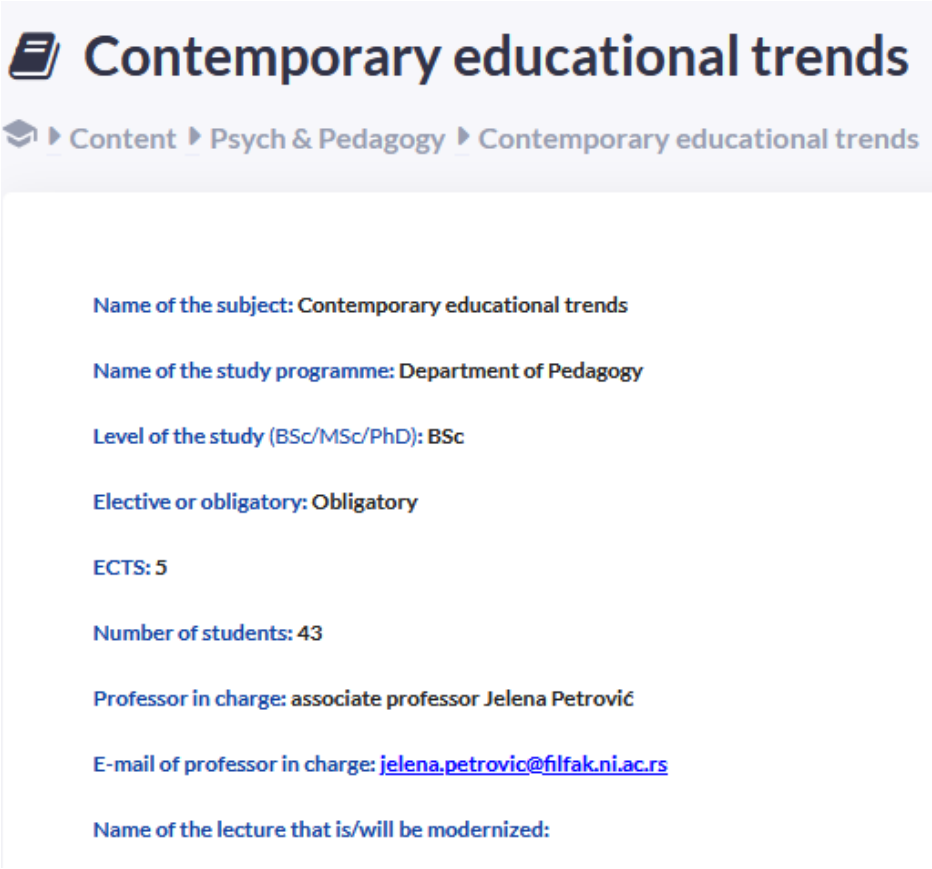
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

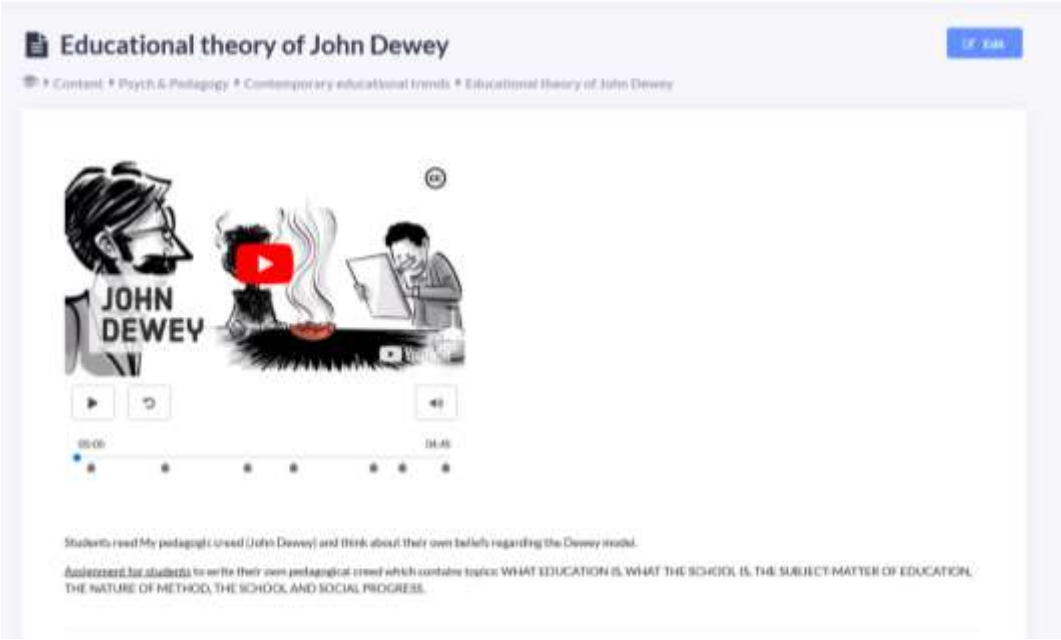
The methods/tools used in the course modernisation

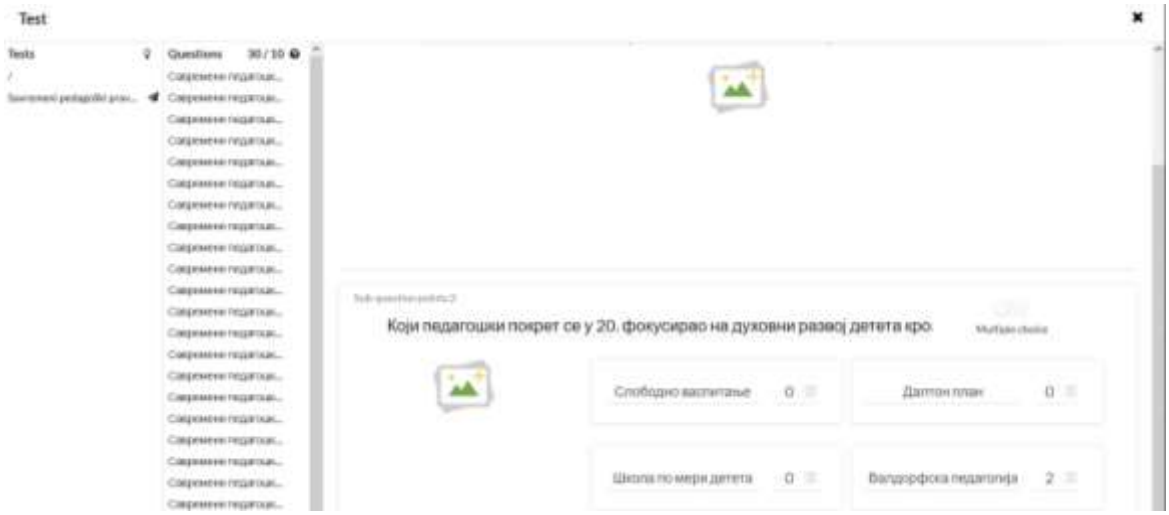
The course Contemporary educational trends is a fourth-year course and also theoretical in nature. In this course I insisted on active learning and project-based learning. Active learning was achieved through individual tasks that included poster making (using Canva or some other educative tool) and essay writing, homework activities based on a flipped class method or literature research and analysis. Active learning

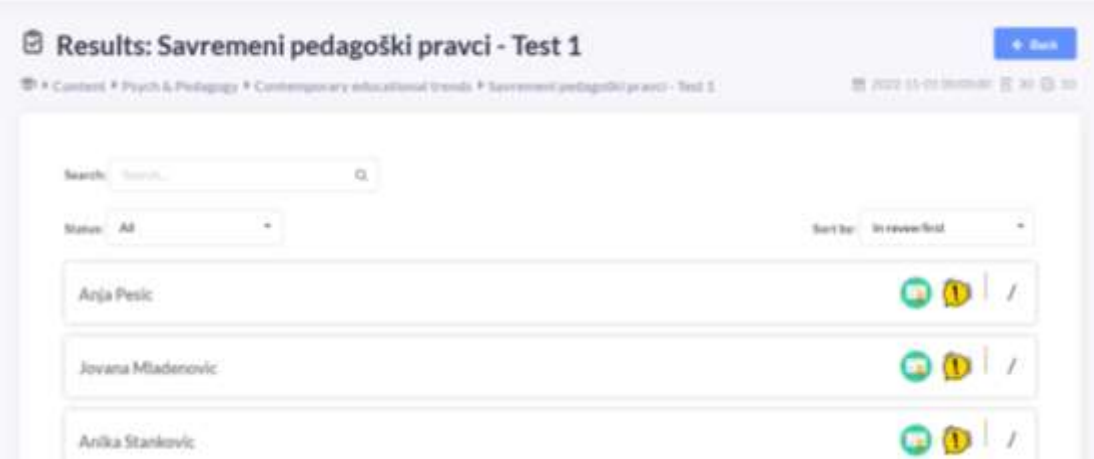
in class was achieved by participation in class discussions and collaboration in group or whole class discussions. In this teaching units I also used white board collaborative tools, but also shared google documents and other forms of exchange. Working with more mature and skillful students enabled introducing student-led learning that takes place in small groups where each member has the opportunity to lead others through the text assigned using different tools. The emphasis was on students observing, analyzing, spotting the relationships within the text and delivering conclusions.

In evaluation I used similar methods of assessment and feedback, and while I still used objective tests via LearningKey that could give fast results, checklists and rubrics for essays I introduced portfolio as an evaluation method since it enabled continuous evaluation and more importantly self-evaluation of students' work during the whole semester.




Educational theory of John Dewey
JOHN DEWEY
Students read My pedagogic creed (John Dewey) and think about their own beliefs regarding the Dewey model.
Assignment for students to write their own pedagogical creed which contains topics: WHAT EDUCATION IS, WHAT THE SCHOOL IS, THE SUBJECT-MATTER OF EDUCATION, THE NATURE OF METHOD, THE SCHOOL AND SOCIAL PROGRESS.


Test
Tests
Questions
Који педагошки покрет се у 20. фокусирао на духовни развој детета кро
Слободно васпитање
Дантон план
Школа по мери детета
Валдорфска педагогија


Results: Savremeni pedagoški pravci - Test 1
Anja Pesic
Jovana Mladenovic
Anika Stankovic

Report on the modernized courses at the University of Belgrade

New teaching materials related to selected lectures were published at LearningKey platform or implemented directly in subjects' curriculums for the following modernized BSc and MSc courses at the University of Belgrade.

P01-1. Biomedical Ecophysiology;
P01-2. Endocrinology;
P01-3. Physiology of animals;
P01-4. Ethnobotany and phytochemistry;
P01-5. Basis of medical genetics;
P01-6. Computers and society;
P01-7. Methodology of teaching physics 1;
P01-8. Methodology of teaching physics 2;
P01-9. Pedagogical research in physics;
P01-10. Applied methodology of teaching physics;
P01-11. Modern teaching tools;
P01-12. Educational standards;
P01-13. Distance learning.

BSc, MSc and PhD courses that have been modified by using new methods and tools

P02-1. Biomedical Ecophysiology 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **MSc course is modified by using new methods and tools.**

Name of the University	**University of Belgrade**
Name of the study programme	**Biology**
Name of the course	**Biomedical Ecophysiology**
Level of the study	**1st semester, Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Nebojsa Jasnic**
E-mail of the professor in charge	**jasnicn@bio.bg.ac.rs**
Methods which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools which are used in the course	**Quizizz, rubrics, mind maps, Ed puzzle, Learning key**
Name of modernised teaching units	**Diving physiology, Circadian rhythms, Space physiology, Ecotoxicology**
Number of students	**10**

The methods/tools used in the course modernisation

The implementation of the mentioned course included methods presented to us by teachers from EU HEIs, such as educational video materials, posters, quizzes, etc. In addition, students were divided into groups, solving individual problems in order to fit them into a larger whole. In the end, the students' activities were scored using rubrics, and the final grade was the result of the students' comprehensive activities throughout the semester. In this way, every teaching unit that was previously an integral part of this course was modernized.


LearningKey Teacher
Home Calendar Students Administration
Biomedicinska ekofiziologija
Edit
Content › Biology and Ecology › Biomedicinska ekofiziologija
Name of the subject: Biomedicinska ekofiziologija
Name of the study programme:
Level of the study (BSc/MSc/PhD): MSc
Elective or obligatory: Obavezan za MBI-EF; izborni za MMF-EB, MMF-GI, MMF-FB, MMF-HB
ECTS: 6
Number of students: 10
Professor in charge: Nebojsa Jasnic
E-mail of professor in charge: jasnicn@bio.bg.ac.rs
Name of the lecture that is/will be modernized: Diving physiology, Space physiology, Ecotoxicology
Poster_Ekotoksikologija

P02-2. Endocrinology, 2021/22

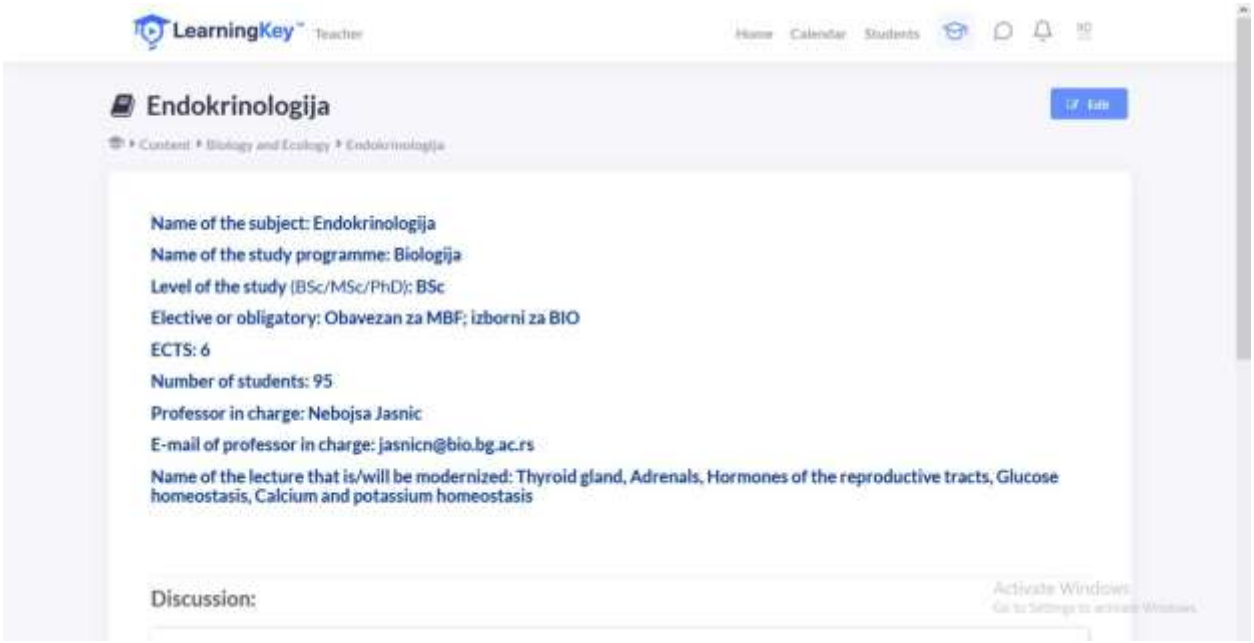
REPORT

In the framework of project:" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Belgrade**
Name of the study programme	**Biology**
Name of the course	**Endocrinology**
Level of the study	**7th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Nebojsa Jasnic**
E-mail of the professor in charge	**jasnicn@bio.bg.ac.rs**
Methods which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools which are used in the course	**Quizizz, rubrics, mind maps, Ed puzzle**
Name of modernised teaching units	**Thyroid gland, Adrenals, Hormones of the reproductive tracts, Glucose homeostasis, Calcium and potassium homeostasis**
Number of students	**95**

The methods/tools used in the course modernisation

The course has been modernized by introducing virtual physiology in a way that is described in detail in the section on digital competencies resulting from the TeComp project. In addition, various other tools such as Quizizz, Animaker, Camtasia were used. For grading purposes, rubrics were used and students also worked in groups to solve problem situations.


LearningKey Teacher
Home Calendar Students
Endokrinologija
Edit
Content Biology and Ecology Endokrinologija
Name of the subject: Endokrinologija
Name of the study programme: Biologija
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obavezan za MBF; izborni za BIO
ECTS: 6
Number of students: 95
Professor in charge: Nebojsa Jasnic
E-mail of professor in charge: jasnicn@bio.bg.ac.rs
Name of the lecture that is/will be modernized: Thyroid gland, Adrenals, Hormones of the reproductive tracts, Glucose homeostasis, Calcium and potassium homeostasis
Discussion:
Activate Windows


Exit
Go To
Experiment
Tools
Help
MetaDollam
Clamp closed
Chamber & manometer connected
LEVEL
Elapsed Time
Weight
Normal
Hypox

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P02-3. Physiology, 2021/22

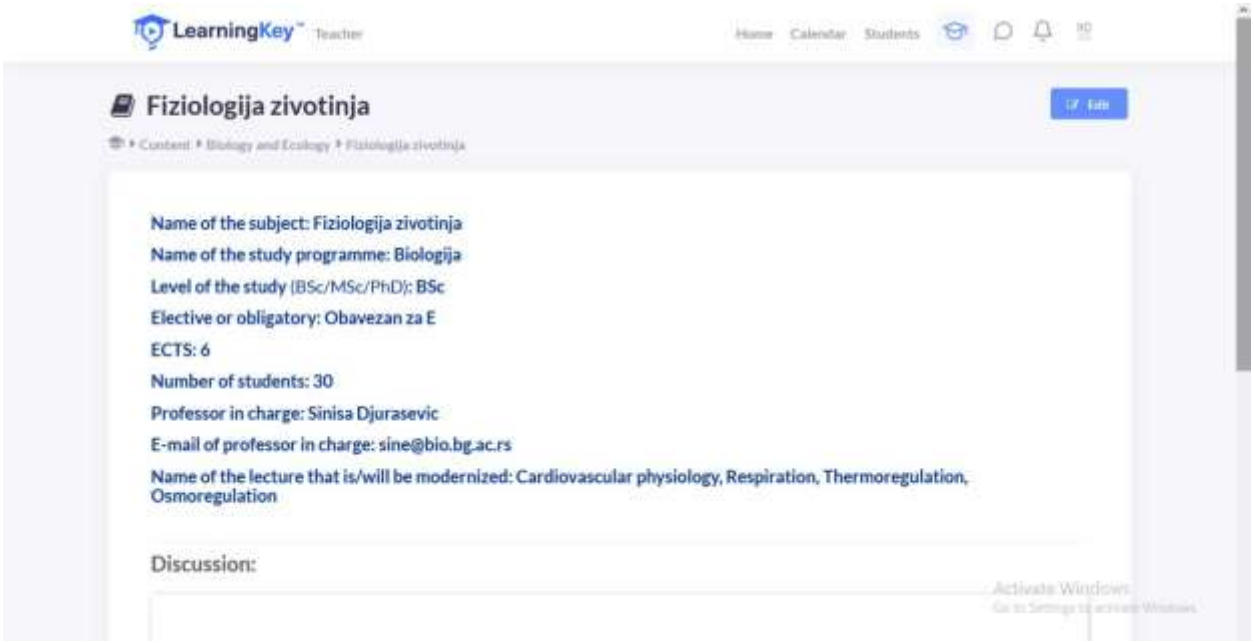
REPORT

In the framework of project:" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Belgrade**
Name of the study programme	**Biology**
Name of the course	**Physiology of animals**
Level of the study	**5th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Sinisa Djurasevic**
E-mail of the professor in charge	**sine@bio.bg.ac.rs**
Methods which are used in the course	**Group work, problem solving methods, peer discussions, educative videos**
Tools which are used in the course	**Quizizz, rubrics, mind maps, Ed puzzle**
Name of modernised teaching units	**Cardiovascular physiology, Respiration, Thermoregulation, Osmoregulation**
Number of students	**30**

The methods/tools used in the course modernisation

The course has been modernized by introducing virtual physiology in a way that is described in detail in the section on digital competencies resulting from the TeComp project. In addition, various other tools such as Quizizz, Animaker, Camtasia were used. For grading purposes, rubrics were used and students also worked in groups to solve problem situations.


LearningKey Teacher
Home Calendar Students
Fiziologija zivotinja
Edit
Content > Biology and Ecology > Fiziologija zivotinja
Name of the subject: Fiziologija zivotinja
Name of the study programme: Biologija
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obavezan za E
ECTS: 6
Number of students: 30
Professor in charge: Sinisa Djurasevic
E-mail of professor in charge: sine@bio.bg.ac.rs
Name of the lecture that is/will be modernized: Cardiovascular physiology, Respiration, Thermoregulation, Osmoregulation
Discussion:
Activate Windows


Ruffle - 10_EndoPhysio.swf
Exit
Go To
Experiment
Tools
Help
Simulating Glomerular Filtration
55.00
Glomerular Pressure
124.99
Glomerular Filt. Rate
Afferent Radius
0.50
Efferent Radius
0.45
Pressure (mmHg)
90
Conc. Grad. (mosm)
1200
Data Sets
Afferent
Pressure
Combined
Add Data Set
Delete Data Set
Urine Volume
41.66
Stop
Refill
Afferent Radius
Efferent Radius
Beaker Press.
Glomerular Press.
Glom. Filt. Rate
Urine Volume
Record Data
Delete Line
Clear Data Set

P02-4. Ethnobotany and phytochemistry, 2021/22

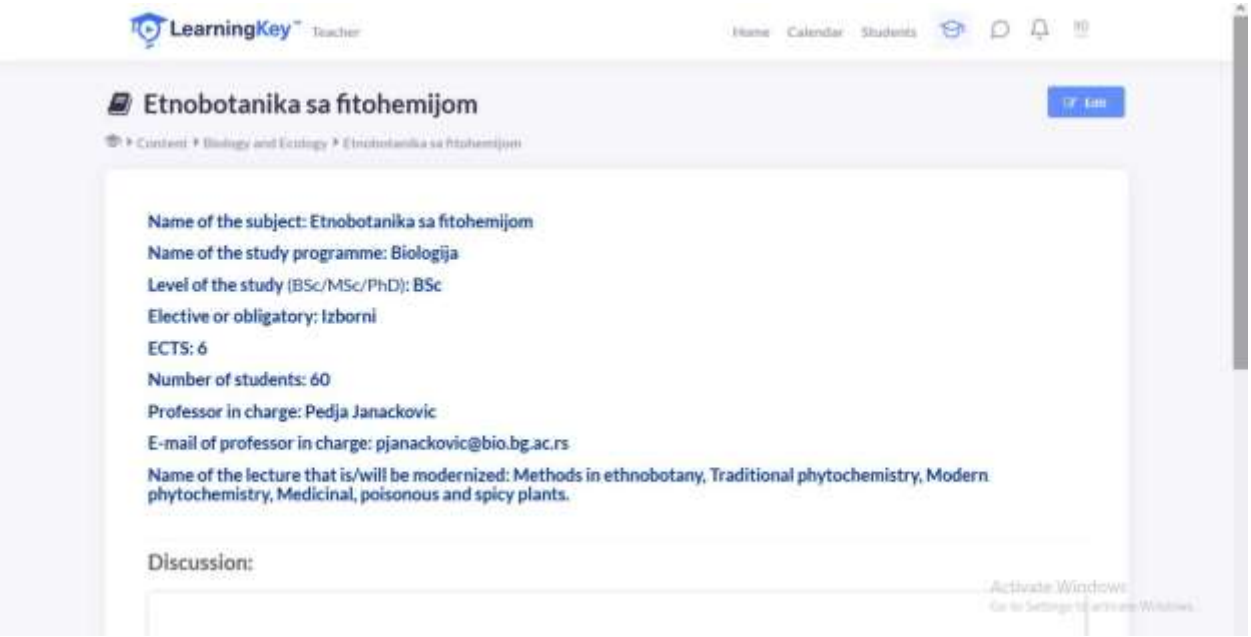
REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and question tests.**

Name of the University	**University of Belgrade**
Name of the study programme	**Biology**
Name of the course	**Ethnobotany and phytochemistry**
Level of the study	**5th semester, BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Pedja Janackovic**
E-mail of the professor in charge	**pjanackovic@bio.bg.ac.rs**
Methods which are used in the course	**group work, peer instruction**
Tools which are used in the course	**Animaker, quizizz, Camtasia**
Name of modernised teaching units	**Methods in ethnobotany, Traditional phytochemistry, Modern phytochemistry, Medicinal, poisonous and spicy plants.**
Number of students	**60**

The methods/tools used in the course modernisation

The course has been modernized using new learning methods, such as group work and peer instruction. In addition, modern tools such as Animaker, Quizizz were used. Students were tasked with creating posters and mind maps. At the end, students were evaluated in a previously known way, using rubrics.


LearningKey Teacher
Home Calendar Students
Etnobotanika sa fitohemijom
Edit
Content > Biology and Ecology > Etnobotanika sa fitohemijom
Name of the subject: Etnobotanika sa fitohemijom
Name of the study programme: Biologija
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Izborni
ECTS: 6
Number of students: 60
Professor in charge: Pedja Janackovic
E-mail of professor in charge: pjanackovic@bio.bg.ac.rs
Name of the lecture that is/will be modernized: Methods in ethnobotany, Traditional phytochemistry, Modern phytochemistry, Medicinal, poisonous and spicy plants.
Discussion:
Activate Windows

P02-5. Basis of medical genetics, 2021/22

REPORT

In the framework of project:" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods.**

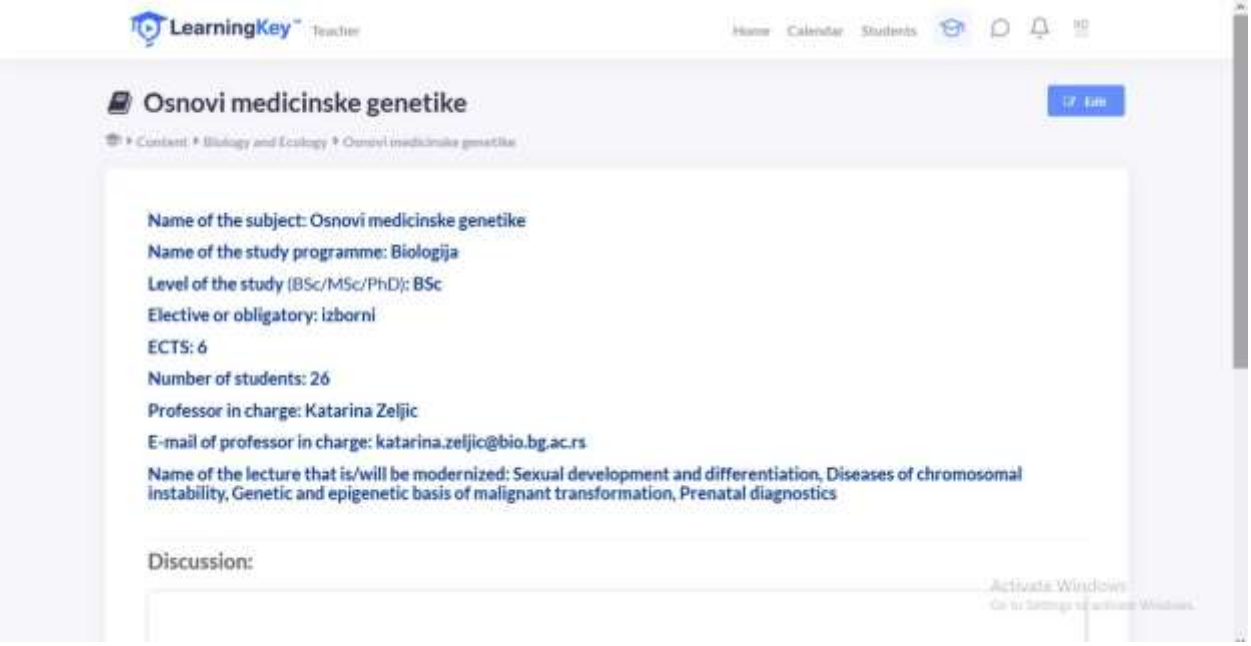
Name of the University	**University of Belgrade**
Name of the study programme	**Biology**
Name of the course	**Basis of medical genetics**
Level of the study	**BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Katarina Zeljic**
E-mail of the professor in charge	**katarina.zeljic@bio.bg.ac.rs**
Methods which are used in the course	**Peer instruction, group work, mini projects**
Name of modernised teaching units	**Sexual development and differentiation, Diseases of chromosomal instability, Genetic and epigenetic basis of malignant transformation, Prenatal diagnostics**
Number of students	**26**

The methods/tools used in the course modernisation

Lectures were held for the entire group of 26 students with insisting on their active participation. To stimulate active participation of students during the course were organized: short 5 minute tests (by using testmoz - www.testmoz.com) prior or during the lecture, answering the questions (by mentimeter – www.mentimeter.com), discussions etc.
For the practical part of the course (on line activities in Google classroom, due to COVID-19 pandemic)Students were divided into smaller groups, up to 5 members. Each group discussed real-life problems in medical genetics and provided a final solution. One student from each group orally presented their group case and proposed a problem solution.

• Example of a real-life case for discussion
A fourteen-year-old boy who has normal intelligence, but also has certain problems in sexual development with gynecomastia (developed breasts). Based on the anamnesis, the clinician assumes that it is Klinefelter's syndrome. The presence of excess X chromosomes was also confirmed cytogenetically. Discuss the case, answer the questions and explain:
1. What is the cause of excess X chromosome? Illustrate schematically (by showing meiosis) and explain.
2. How can the origin (of which parent) of the X chromosome in excess be determined?

3. The boy's aunt is planning a pregnancy and asks if she can give birth to a child with the same problem. Explain what the risk is for her, if any.



P02-6. Computers and society, 2021/22

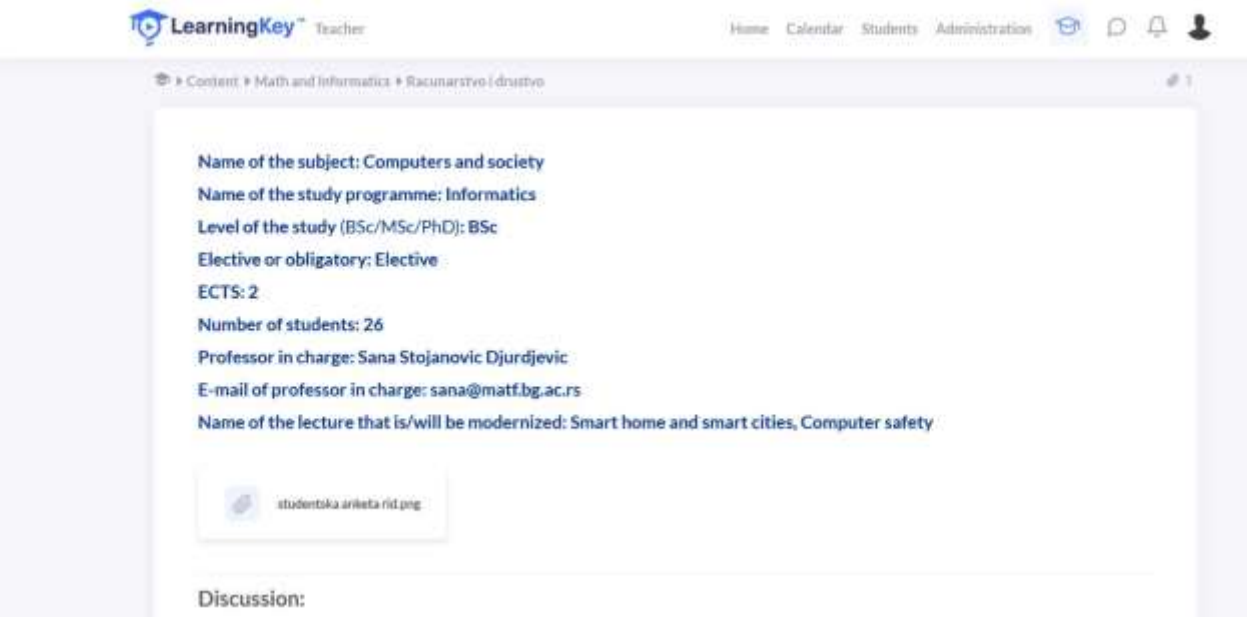
REPORT

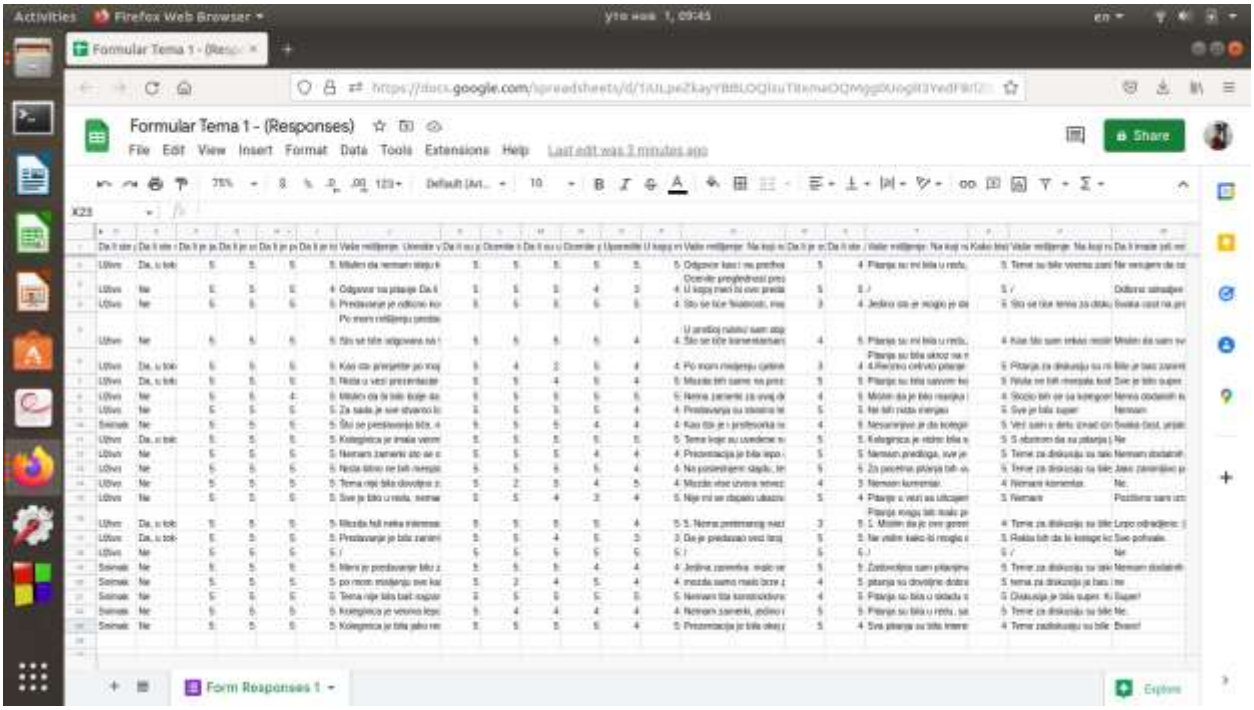
In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods.**

Name of the University	**University of Belgrade**
Name of the study programme	**Informatics**
Name of the course	**Computers and society**
Level of the study	**BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Sana Stojanovic Djurdjevic**
E-mail of the professor in charge	**sana@matf.bg.ac.rs**
Methods which are used in the course	**Group work, peer instructions**
Name of modernised teaching units	**Smart home and smart cities, Computer safety**
Number of students	**26**

The methods/tools used in the course modernisation

During the course surveys were created for each lecture and lecturer. Students were also asked to give oral presentation, power point presentation and additionally had to formulate their own questions and discussion topics. Besides, students were asked to choose scientific papers related to the curriculum and write a seminal paper inspired by that paper. At the end, students were asked to create poster inspired by their seminal paper. All the tasks were formulated with the idea of increased communication between students themselves and with a teacher. Classes were obligatory, discussions were highly motivated (and affected students' grades), and filling the surveys was rewarded.


LearningKey Teacher
Home Calendar Students Administration
Content ▸ Math and Informatics ▸ Racunarstvo i drustvo
Name of the subject: Computers and society
Name of the study programme: Informatics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Elective
ECTS: 2
Number of students: 26
Professor in charge: Sana Stojanovic Djurdjevic
E-mail of professor in charge: sana@matf.bg.ac.rs
Name of the lecture that is/will be modernized: Smart home and smart cities, Computer safety
studentska anketa rid.png
Discussion:


Activities
Firefox Web Browser
Formular Tema 1 - (Responses)
File Edit View Insert Format Data Tools Extensions Help
Share
Form Responses 1

P02-7. Methodology of teaching physics 1, 2021/22

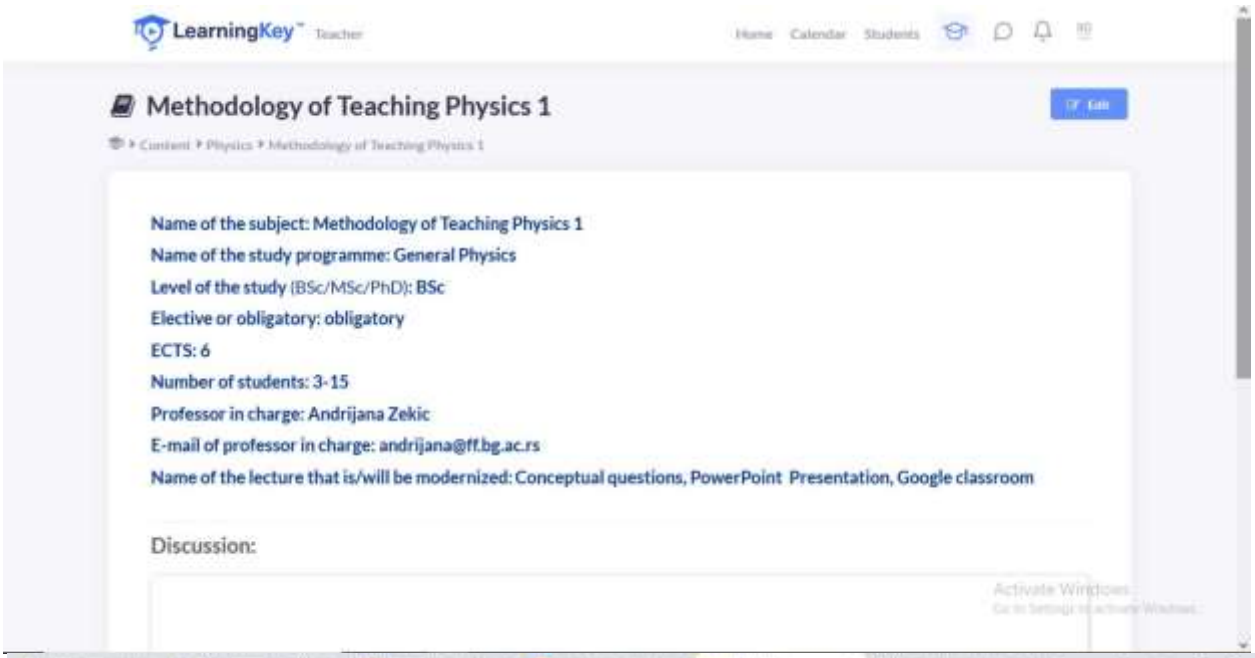
REPORT

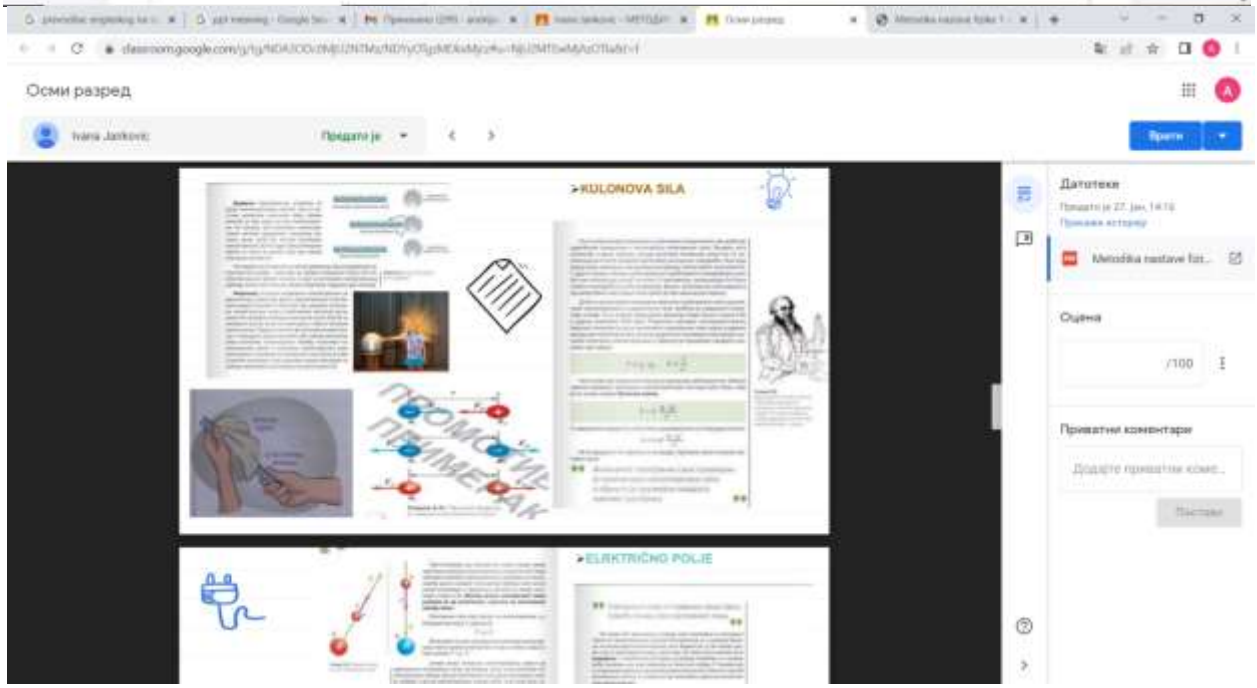
In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BCs course is modified by implementation of Peer instruction by Eric Mazur.**

Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Methodology of Teaching Physics 1**
Level of the study	**BSc**
Type of the course (elective/obligatory)	**obligatory**
Professor in charge	**Andrijana Žekić**
E-mail of the professor in charge	**andrijana@ff.bg.ac.rs**
Methods which are used in the course	**Conceptual learning, peer discussion**
Name of modernised teaching units	**Method has been implemented in whole course.**
Tools used in the course modernisation	**Conceptual questions, PowerPoint Presentation, Google classroom**
Number of students	**3-15**

The methods/tools used in the course modernisation

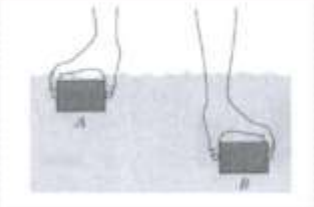
Peer instruction teaching technique was implemented. Conceptual problems change part of the lecture, and by answering the questions, the teacher and students get an instant insight into the level of students' understanding of the topic. Questions can be asked via PowerPoint Presentation or different types of quizzes, such as Socrative, which provide immediate feedback. Also, Google classroom, Zoom, Big Blue Button platforms were used for assignments in students' work.


LearningKey Teacher
Home Calendar Students
Methodology of Teaching Physics 1
Edit
Content > Physics > Methodology of Teaching Physics 1
Name of the subject: Methodology of Teaching Physics 1
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: obligatory
ECTS: 6
Number of students: 3-15
Professor in charge: Andrijana Zekic
E-mail of professor in charge: andrijana@ff.bg.ac.rs
Name of the lecture that is/will be modernized: Conceptual questions, PowerPoint Presentation, Google classroom
Discussion:
Activate Windows


Осми разред
Предато је
Врати
КУЛОНОВА СИЛА
ПРОМОЋИ ПИТАЊЕ
ЕЛЕКТРИЧНО ПОЉЕ
Датотеке
Оцена
/100
Приватни коментари

Example - ***Boyancy***

Imagine holding two identical bricks under water. Brick *A* is just beneath the surface of the water, while brick *B* is at a greater depth. The force needed to hold brick *B* in place is



1. larger than
2. the same as
3. smaller than

the force required to hold brick *A* in place.

Mazur, E. Peer Instruction: A User's Manual, New Jersey: Prentice Hall, Inc., (1997)

P02-8. Methodology of teaching physics 2, 2021/22

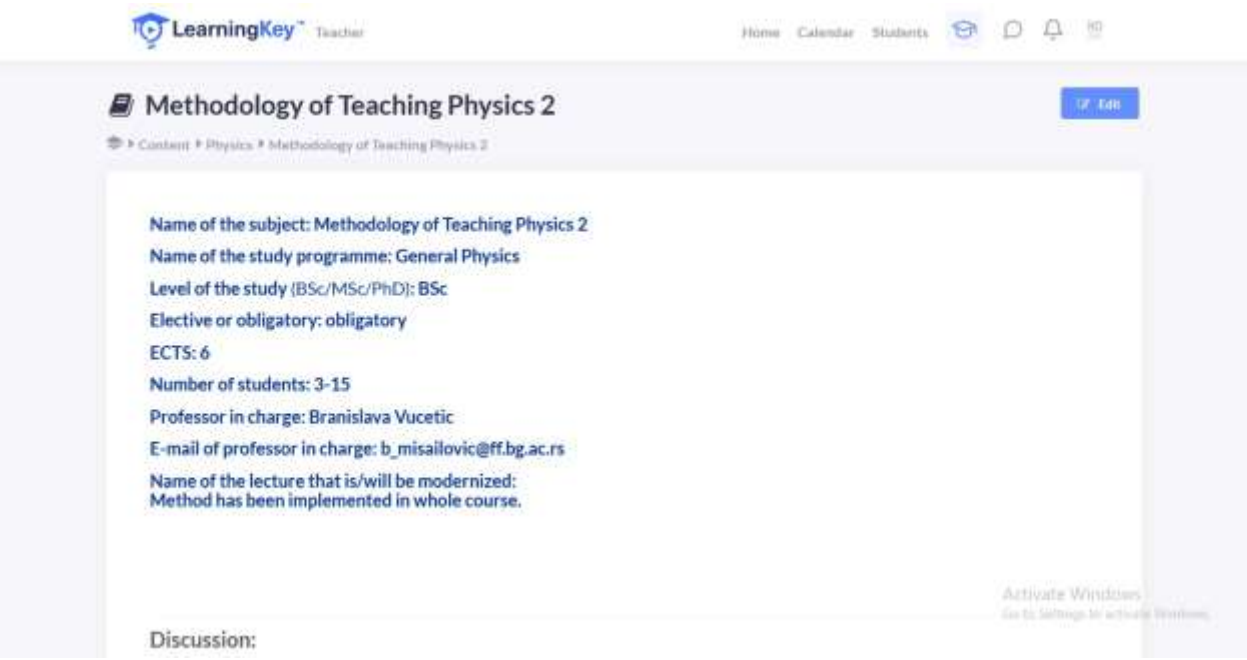
REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this BSc **course is modified by implementation of Peer instruction by Eric Mazur.**

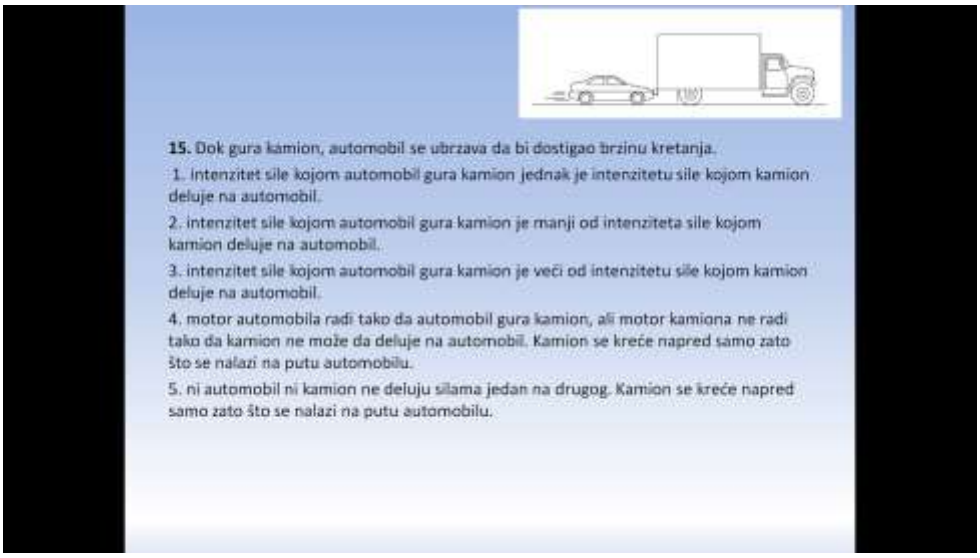
Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Methodology of Teaching Physics 2**
Level of the study	**BSc**
Type of the course (elective/obligatory)	**obligatory**
Professor in charge	**Branislava Vučetić**
E-mail of the professor in charge	**b_misailovic@ff.bg.ac.rs**
Methods which are used in the course	**Conceptual learning, peer discussion**
Name of modernised teaching units	**Method has been implemented in whole course.**
Tools used in the course modernisation	**Conceptual questions, PowerPoint Presentation Google classroom**
Number of students	**3-15**

The methods/tools used in the course modernisation

Peer instruction teaching technique was implemented. Conceptual problems change part of the lecture, and by answering the questions, the teacher and students get an instant insight into the level of students' understanding of the topic. Questions can be asked via PowerPoint Presentation or different types of quizzes, such as Socrative, which provide immediate feedback. Also, Google classroom, Zoom, Big Blue Button platforms were used for assignments in students' work.


LearningKey Teacher
Home Calendar Students
Methodology of Teaching Physics 2
Edit
Content ▸ Physics ▸ Methodology of Teaching Physics 2
Name of the subject: Methodology of Teaching Physics 2
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: obligatory
ECTS: 6
Number of students: 3-15
Professor in charge: Branislava Vucetic
E-mail of professor in charge: b_misailovic@ff.bg.ac.rs
Name of the lecture that is/will be modernized:
Method has been implemented in whole course.
Activate Windows
Discussion:


Analiza udžbenika za 2. razred


15. Dok gura kamion, automobil se ubrzava da bi dostigao brzinu kretanja.
1. intenzitet sile kojom automobil gura kamion jednak je intenzitetu sile kojom kamion deluje na automobil.
2. intenzitet sile kojom automobil gura kamion je manji od intenziteta sile kojom kamion deluje na automobil.
3. intenzitet sile kojom automobil gura kamion je veći od intenzitetu sile kojom kamion deluje na automobil.
4. motor automobila radi tako da automobil gura kamion, ali motor kamiona ne radi tako da kamion ne može da deluje na automobil. Kamion se kreće napred samo zato što se nalazi na putu automobilu.
5. ni automobil ni kamion ne deluju silama jedan na drugog. Kamion se kreće napred samo zato što se nalazi na putu automobilu.

P02-9. Pedagogical research in Physics, 2021/22

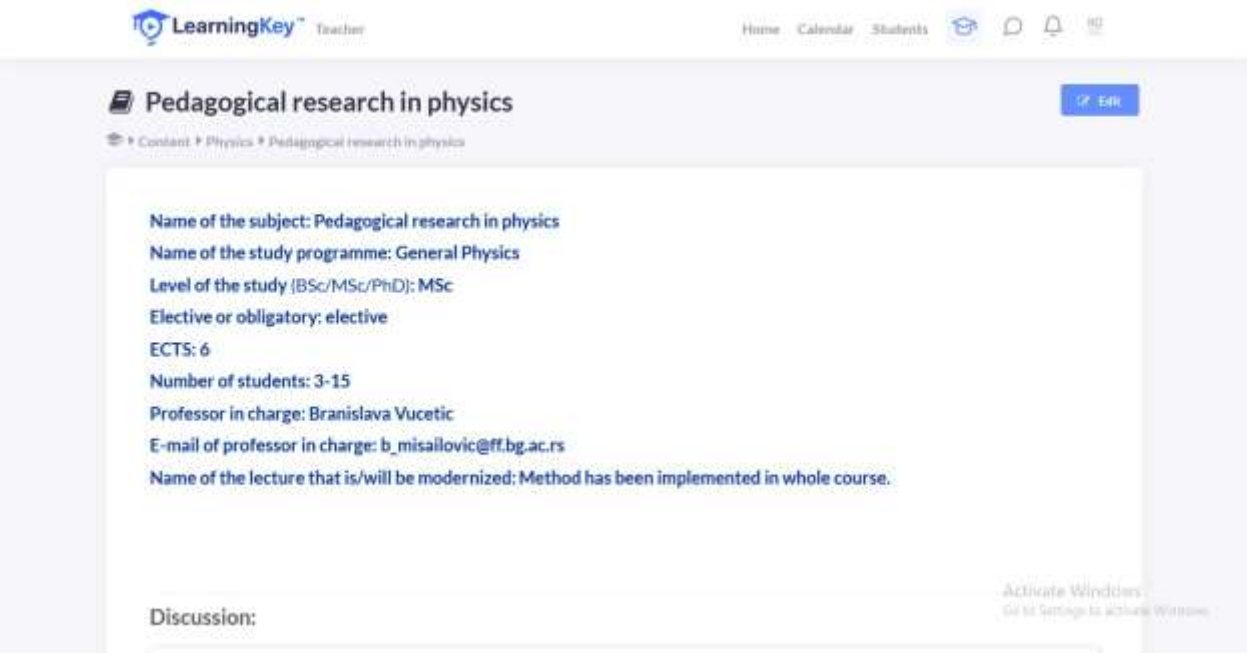
REPORT

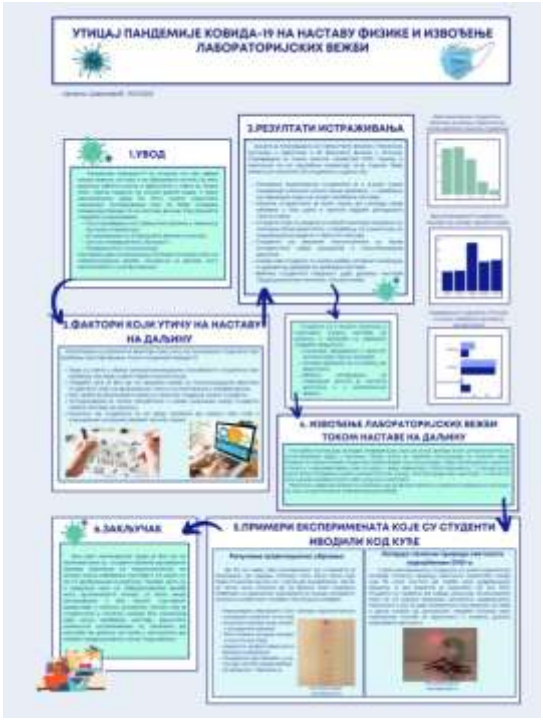
In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **MSc course is modified by using educational posters.**

Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Pedagogical Research in Physics**
Level of the study	**MSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Branislava Vučetić**
E-mail of the professor in charge	**b_misailovic@ff.bg.ac.rs**
Methods which are used in the course	**educational posters, PowerPoint Presentation, platforms such as Google classroom, Zoom, Big Blue Button**
Name of modernised teaching units	**Method has been implemented in whole course.**
Number of students	**3-10**

The methods/tools used in the course modernisation

In order for students to learn to distinguish essential from less essential content, an educational posters, as an old and somewhat forgotten technique but very important, were used to modernize this course. By creating posters and presentations, students learn to present and emphasize essential content.


LearningKey Teacher
Home Calendar Students
Pedagogical research in physics
Edit
Content ▸ Physics ▸ Pedagogical research in physics
Name of the subject: Pedagogical research in physics
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): MSc
Elective or obligatory: elective
ECTS: 6
Number of students: 3-15
Professor in charge: Branislava Vucetic
E-mail of professor in charge: b_misailovic@ff.bg.ac.rs
Name of the lecture that is/will be modernized: Method has been implemented in whole course.
Discussion:
Activate Windows
Go to Settings to activate Windows.


УТИЦАЈ ПАНДЕМИЈЕ КОВИДА-19 НА НАСТАВУ ФИЗИКЕ И ИЗВОЂЕЊЕ ЛАБОРАТОРИЈСКИХ ВЕЖБИ
1.УВОД
2.РЕЗУЛТАТИ ИСТРАЖИВАЊА
3.ФАКТОРИ КОЈИ УТИЧУ НА НАСТАВУ НА ДАЉИНУ
4. ИЗВОЂЕЊЕ ЛАБОРАТОРИЈСКИХ ВЕЖБИ ТОКОМ НАСТАВЕ НА ДАЉИНУ
5.ПРИМЕРИ ЕКСПЕРИМЕНАТА КОЈЕ СУ СТУДЕНТИ ИЗВОДИЛИ КОД КУЋЕ
6.ЗАКЉУЧАК

P02-10. Applied Methodology of Teaching Physics, 2021/22

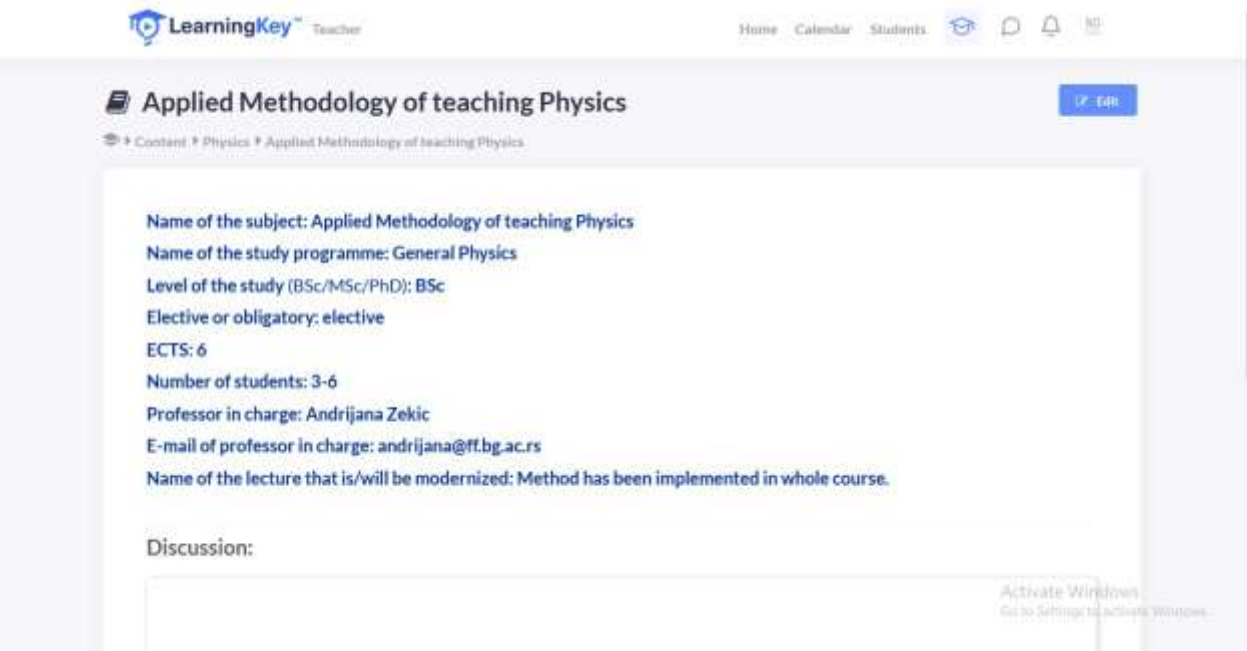
REPORT

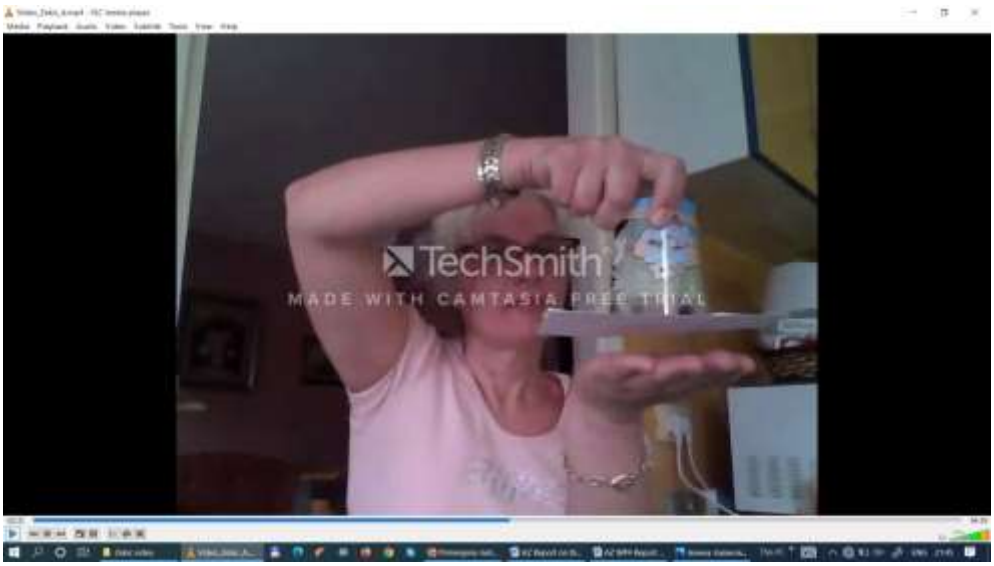
In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using Camtasia, Edpuzzle videos with different types of questions.**

Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Applied Methodology of teaching Physics**
Level of the study	**BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Andrijana Žekić**
E-mail of the professor in charge	**andrijana@ff.bg.ac.rs**
Methods which are used in the course	**Camtasia, Edpuzzle, Animaker**
Name of modernised teaching units	**Method has been implemented in whole course.**
Number of students	**3-6**

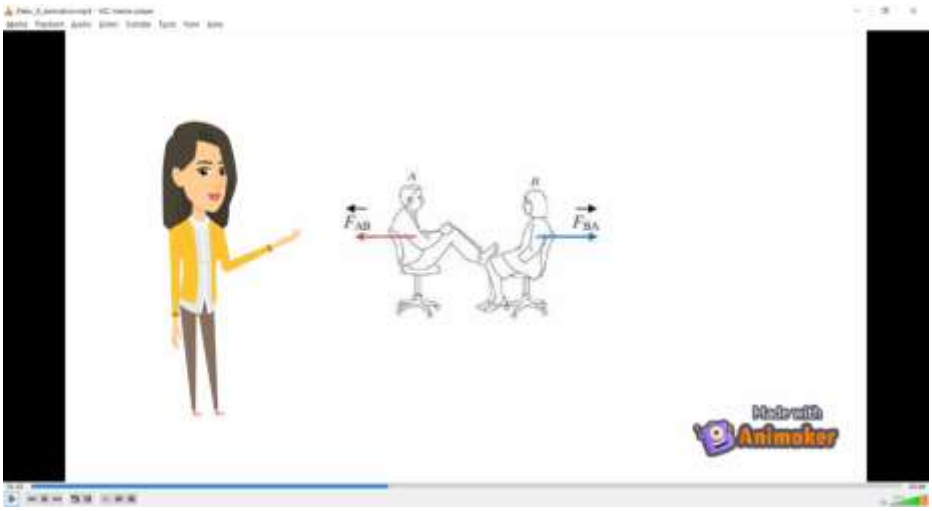
The methods/tools used in the course modernisation

The course is intended for future physics teachers in schools. Given that demonstration experiments represent a very important segment of physics teaching, the modernized version of the course includes training students to create educational video material. They are trained to use Camtasia and Edpuzzle tools. Also, presenting short content or homework through Edpuzzle and Animaker can be particularly interesting and meaningful for students in elementary school.


LearningKey Teacher
Home Calendar Students
Applied Methodology of teaching Physics
Edit
Content > Physics > Applied Methodology of teaching Physics
Name of the subject: Applied Methodology of teaching Physics
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: elective
ECTS: 6
Number of students: 3-6
Professor in charge: Andrijana Zekic
E-mail of professor in charge: andrijana@ff.bg.ac.rs
Name of the lecture that is/will be modernized: Method has been implemented in whole course.
Discussion:
Activate Windows


TechSmith
MADE WITH CAMTASIA FREE TRIAL


Sabirno sočivo
P
F
Kakav je lik koji se formira?
Submit


A
B
$\vec{F}_{AB}$
$\vec{F}_{BA}$
Made with Animaker


l = (30,00 ± 0,05) mm

P02-11. Modern Teaching Tools, 2021/22

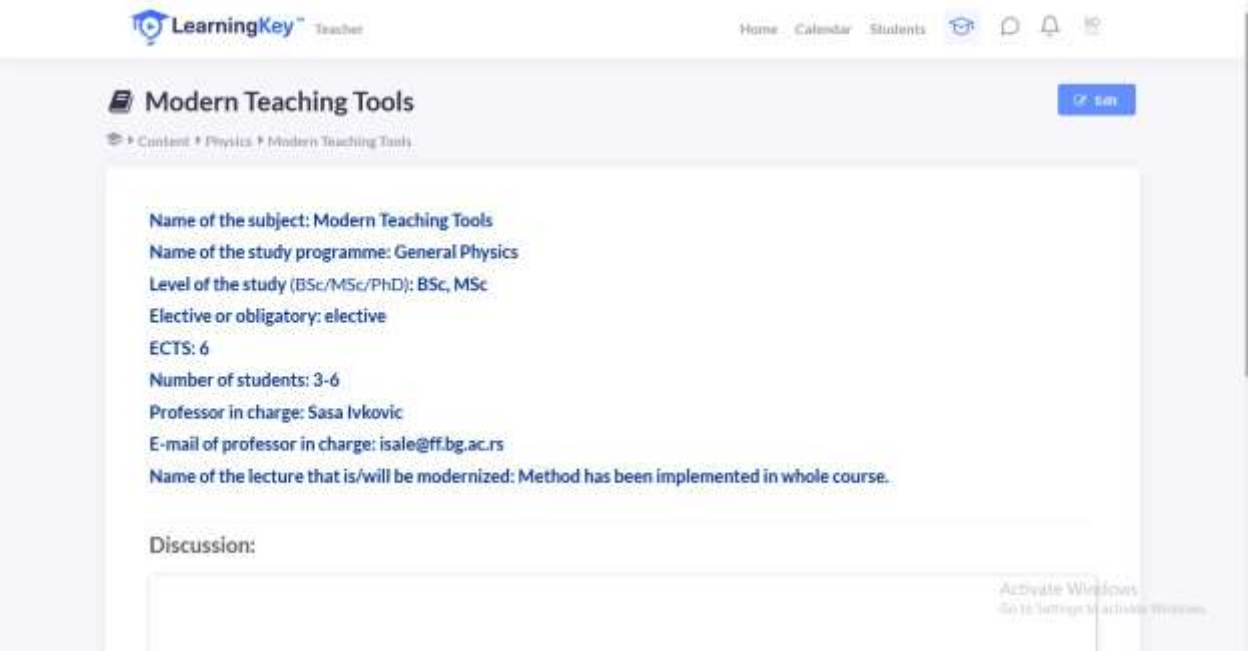
REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc and MSc course is modified by implementation of new equipment and distance lab work.**

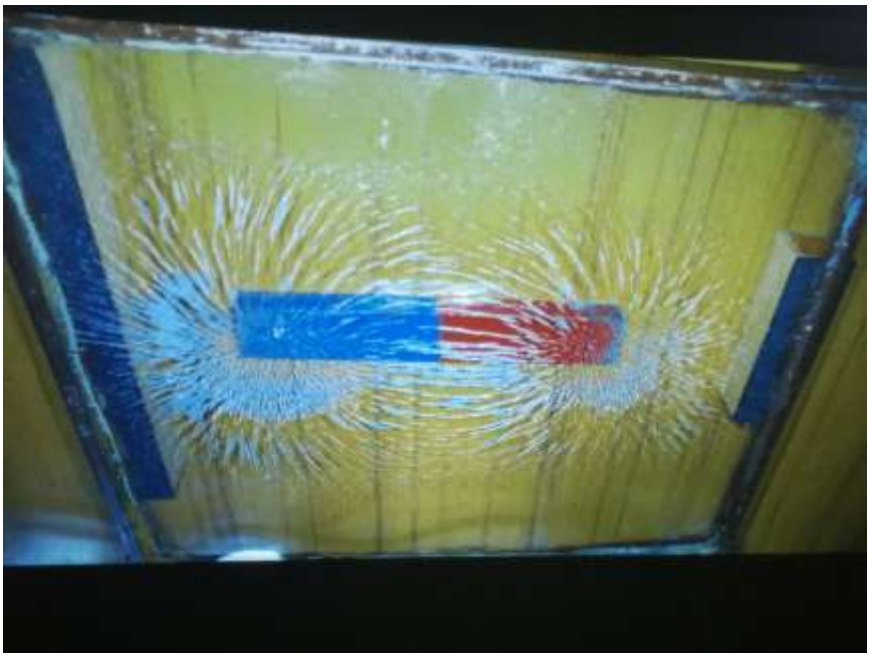
Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Modern Teaching Tools**
Level of the study	**BSc, MSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Saša Ivković**
E-mail of the professor in charge	**isale@ff.bg.ac.rs**
Methods which are used in the course	**New equipment and remote control in lab work**
Name of modernised teaching units	**Method has been implemented in whole course.**
Number of students	**3-6**

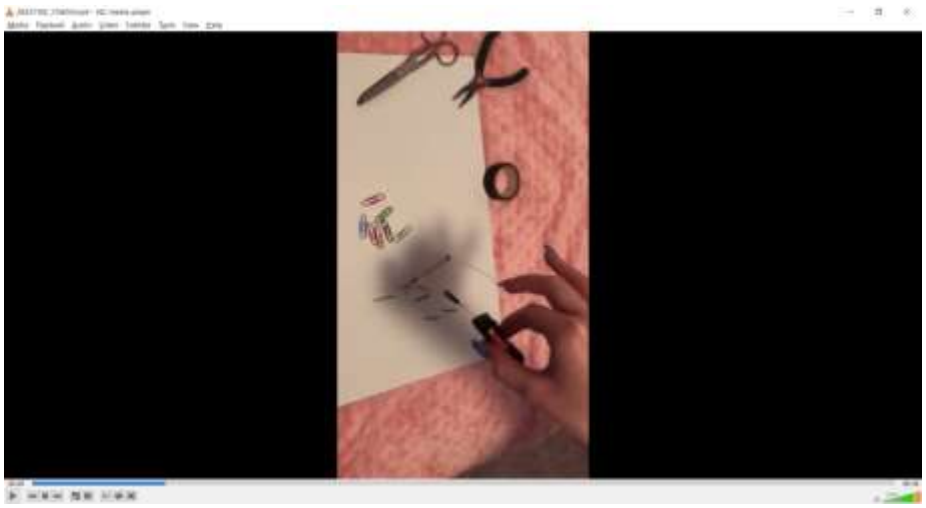
The methods/tools used in the course modernisation

Remote control of the experiment has become very important in the conditions of the impossibility of teaching live. The course is intended for future physics teachers in schools, so it was necessary to educate them about the use of modern teaching tools both in the classroom and remotely. The camera with the possibilities of projecting material, but also recording and permanent recording, proved to be a good teaching tool.


LearningKey
Teacher
Home
Calendar
Students
Modern Teaching Tools
Edit
Content • Physics • Modern Teaching Tools
Name of the subject: Modern Teaching Tools
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): BSc, MSc
Elective or obligatory: elective
ECTS: 6
Number of students: 3-6
Professor in charge: Sasa Ivkovic
E-mail of professor in charge: isale@ff.bg.ac.rs
Name of the lecture that is/will be modernized: Method has been implemented in whole course.
Discussion:


EPSON





P02-12. Educational Standards, 2021/22

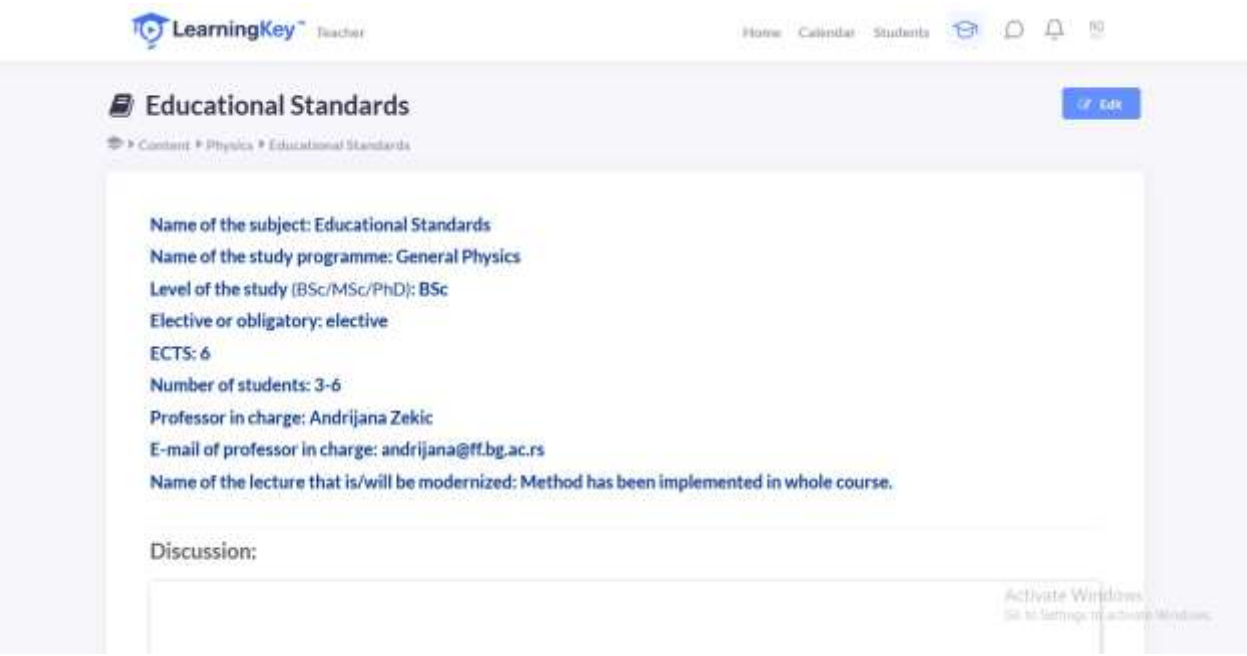
REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using redevelopment of question/task.**

Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Educational Standards**
Level of the study	**BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Andrijana Žekić**
E-mail of the professor in charge	**andrijana@ff.bg.ac.rs**
Methods which are used in the course	**Redevelopment of question/task at a higher explicitly indicated level**
Name of modernised teaching units	**Method has been implemented in whole course.**
Number of students	**3-6**

The methods/tools used in the course modernisation

Standards in physics teaching play an important role, especially in preparing students for the next level of education. Creating tasks in accordance with those standards is a big challenge, so clearly defining learning objectives, task development according to Bloom's taxonomy and feedback are important new elements in this course intended for future physics teachers in schools.


LearningKey Teacher
Home Calendar Students
Educational Standards
Edit
Content ▸ Physics ▸ Educational Standards
Name of the subject: Educational Standards
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: elective
ECTS: 6
Number of students: 3-6
Professor in charge: Andrijana Zekic
E-mail of professor in charge: andrijana@ff.bg.ac.rs
Name of the lecture that is/will be modernized: Method has been implemented in whole course.
Discussion:
Activate Windows


ЧЕТВРТИ ЗАДАТАК ИЗ ПРЕДМЕТА ОБРАЗОВНИ СТАНДАРДИ

P02-13. Distance Learning, 2021/22

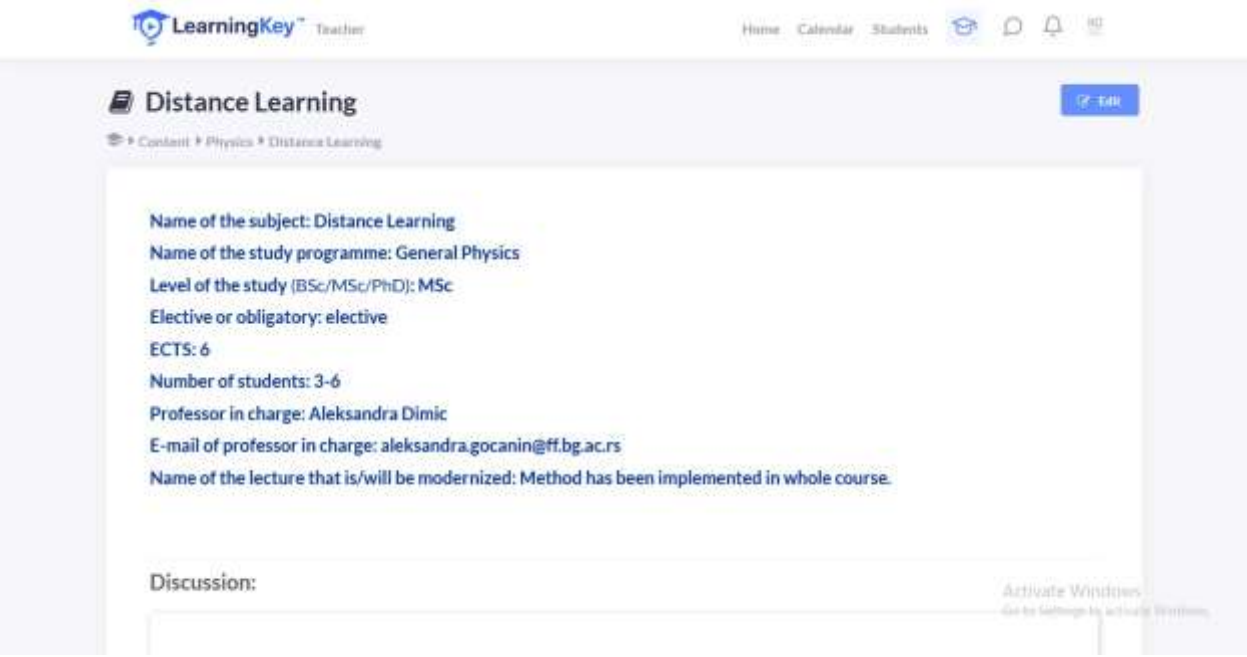
REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this MSc **course is newly accredited, using Google Classroom, Microsoft Teams, CamScanner, PowerPoint Presentation, Canva, posters, quizzes.**

Name of the University	**University of Belgrade**
Name of the study programme	**General Physics**
Name of the course	**Distance Learning**
Level of the study	**MSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Aleksandra Dimić**
E-mail of the professor in charge	**aleksandra.gocanin@ff.bg.ac.rs**
Methods which are used in the course	**Google Classroom, Microsoft Teams, CamScanner, PowerPoint Presentation, Canva, posters, quizzes.**
Name of modernised teaching units	**Method has been implemented in whole course.**
Number of students	**3-6**

The methods/tools used in the course modernisation

The education of physics teachers showed weaknesses in the elements of using modern platforms and tools. The selection and presentation of teaching content is important for students, and therefore this course was created with the aim of educating future physics teachers for the correct use of different tools in the teaching process. One of the ways is to present the content in the form of a poster with a clear control of the presented concepts.

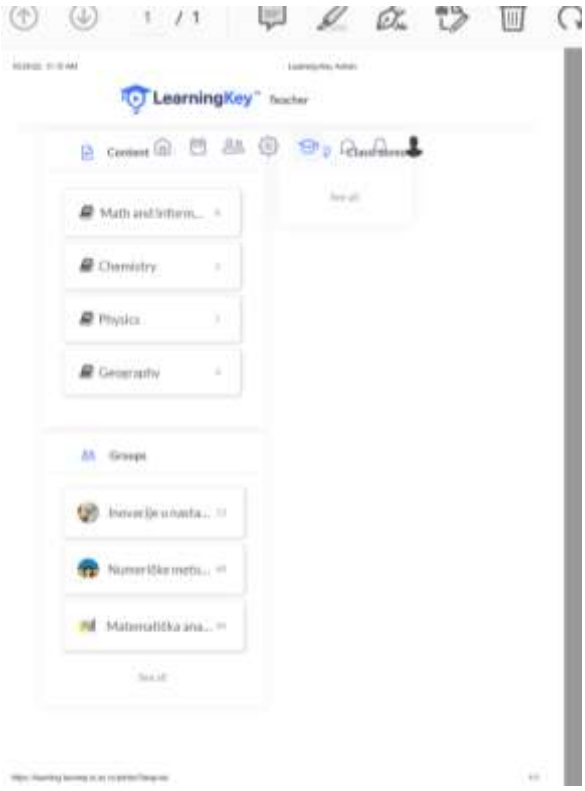

LearningKey Teacher
Home Calendar Students
Distance Learning
Edit
Content ▸ Physics ▸ Distance Learning
Name of the subject: Distance Learning
Name of the study programme: General Physics
Level of the study (BSc/MSc/PhD): MSc
Elective or obligatory: elective
ECTS: 6
Number of students: 3-6
Professor in charge: Aleksandra Dimic
E-mail of professor in charge: aleksandra.gocanin@ff.bg.ac.rs
Name of the lecture that is/will be modernized: Method has been implemented in whole course.
Discussion:
Activate Windows


СКЕНИРАЈУЋА ЕЛЕКТРОНСКА МИКРОСКОПИЈА

Report on the modernized courses at the University of Novi Sad

New teaching materials related to selected lectures are published on LearningKey platform for the following modernized BSc and MSc courses at the University of Novi Sad

P3-1	Mathematical Analysis I	Ivana Štajner Papuga
P3-2	Mathematical Analysis II	Ivana Štajner Papuga
P3-3	Decision Theory	Ivana Štajner Papuga
P3-4	Seminar paper – Mathematical Modelling	Ivana Štajner Papuga
P3-5	Numerical methods and optimization	Goran Radojev
P3-6	Financial mathematics 1	Goran Radojev
P3-7	Innovation in teaching geography	Andjelija Ivkov Dzigurski
P3-8	Geographic basis of special ethnology	Andjelija Ivkov Dzigurski
P3-9	Boolean algebra and optimization	Andreja Tepavčević



P03-1. Mathematical Analysis I 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Computer Science**
Name of the course	**Mathematical Analysis I**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Ivana Štajner-Papuga**
E-mail of the professor in charge	**ivana.stajner-papuga@dmi.uns.ac.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions**
Tools* which are used in the course	**GeoGebra, Wolframalpha**
Name of modernised teaching units	**Real functions, ODJ**
Number of students	**38**

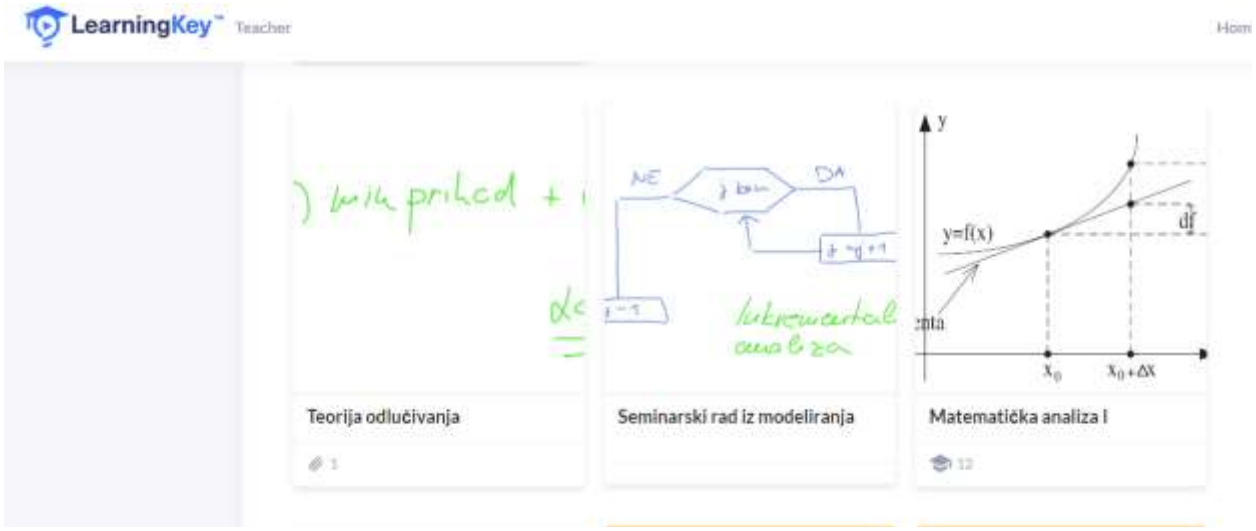
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

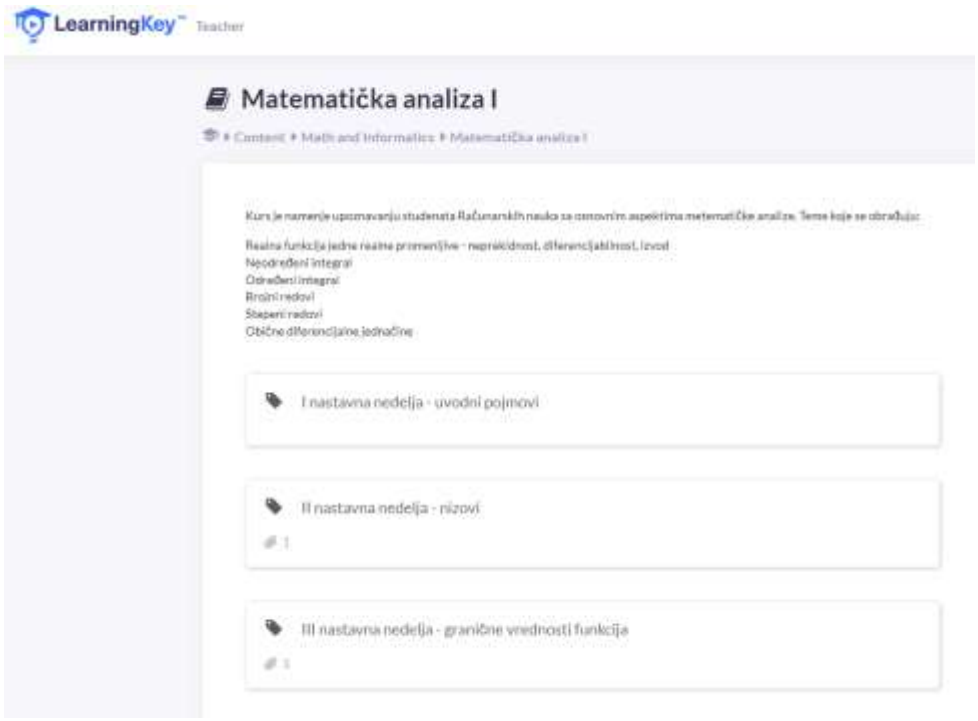
The methods/tools used in the course modernisation

In its core, Mathematical Analysis I is a classical mathematical course that is intended for students of Computer Science. Over the years it become clear that new generations of students, especially students that are not purely mathematically orientated, need more interactive approach. Mathematical knowledge they seek is of the operational form, a tool for modeling problems from some other practical area. The focus is not on mathematical theory for the sake of theory, but on what can be done with it. Also, the period of Covid-19 restrictions showed us that contemporary techniques can elevate classical teaching methods to a form that new generations that live and bread high speed internet highly appreciate.

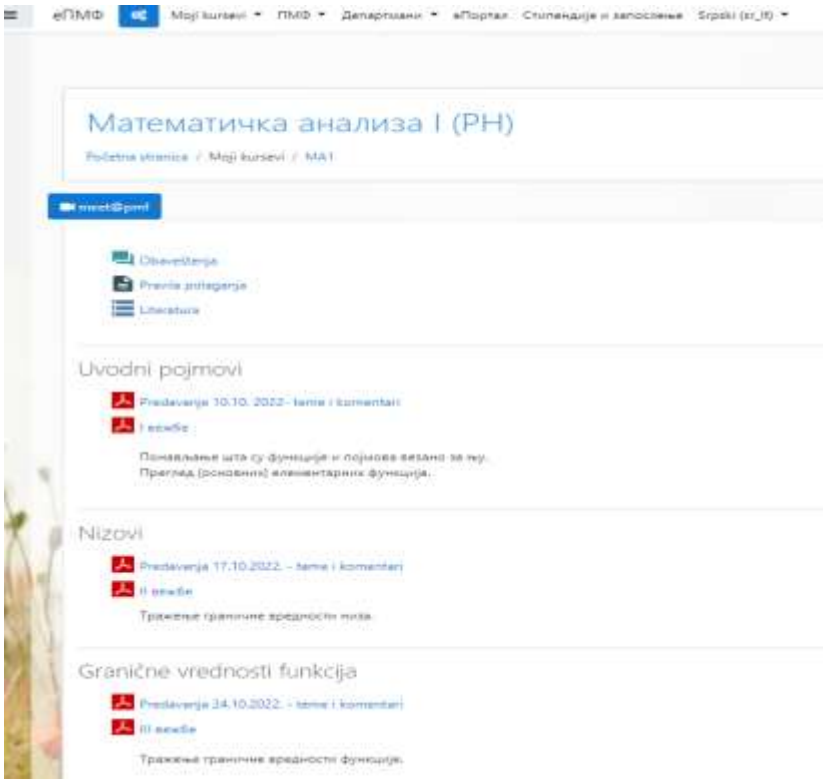
Having all previous in minded, the whole course was modernized in such manner that students can benefit from modern technologies and teaching techniques. All topics of the course were clearly listed on the learning platform (two platform are being used, LearningKey from University of Niš, and Moodle for University of Novi Sad). The precise weekly time line was given, so that students can have clear perception of topics and workload that they can expect. All lessons were streamed live from the classroom, so a student had a possibility to choose whether to join the lecture in person or via webex platform. After each lesson, highlights with comments directed to the practical aspect of the topic, in pdf form, were made available on

LearningKey and Moodle, and they remained available until the end of the last examination period. Students were encouraged to take active part in lectures through discussions of some independent work. Each student was assigned a problem from Real Functions and one from ODJ for the creative independent work that involved research and using different software applications. This creative independent work was a significant part of the final mark. Additional homework, that allowed and encouraged team work, for some extra credits was also assigned. Submission of homework and independent work, and feedback for students was organized through Moodle platform.




LearningKey Teacher
Matematička analiza I
Content ▸ Math and Informatics ▸ Matematička analiza I
Kurs je namenjen upoznavanju studenata Računarskih nauka sa osnovnim aspektima matematičke analize. Teme koje se obrađuju:
Realna funkcija jedne realne promenljive - neprekidnost, diferencijabilnost, izvod
Neodređeni integral
Određeni integral
Brojni redovi
Stepeni redovi
Obične diferencijalne jednačine
I nastavna nedelja - uvodni pojmovi
II nastavna nedelja - nizovi
III nastavna nedelja - granične vrednosti funkcija


LearningKey Teacher
I nastavna nedelja - uvodni pojmovi
Content ▸ Math and Informatics ▸ Matematička analiza I ▸ I nastavna nedelja - uvodni pojmovi
Dobar dan svima. :D
Ovo je kratka pregled tema o kojima smo pričali u ponedeljak.
Prodiskutovali smo malo o iskazima i logičkim operacijama i tautologijama, te kako se sve to uklapa u formu definicija bavili. Pomenuli smo zakon kontrapozicije i isključenja trećeg, ali sve je bilo na informativnom nivou.
Podsetili smo se i kvantifikatora iz predikatskog računa:
∀- za svako
∃- postoj
jer će nam se pojavljivati u zapisima.
Zatim smo se podsetili šta je funkcija (preslikavanje).
Definicija. Neka su A i B dva neprazna skupa. Svako pridruživanje f koje svakom elementu skupa A dodeljuje jedan funkcija skupa A u skup B.
Pišemo:
$f: A \to B$
Ovde treba primetiti da su svi elementi skupa A iskorišćeni, tj. da su svi poslužili kao originali, ali da ne moraju svi elementi može se desiti da jedan original ima više slika.
Ako dodatno tražimo da su svi elemeti skupa B slike, tj. ako za svaki element iz skupa B postoji original u A, funkcija je su da su svi elementi iz A originali, a svi elementi iz B slike.
Ako je dodatan uslov da dva različita originala moraju imati različite slike, funkcija je injekcija (ili „1-1").
Naravno, ako je funkcija i sirjektivno i injektivno preslikavanje, ona je bijekcija. Suštinski to znači da su svi elementi iz B sl broju slika. Tada je moguće formirati i inverznu funkciju, tj. na neki način vratiti elemente iz B u A.



Predmetni izveštaj

Naziv predmeta:	Matematička analiza 1
Šifra predmeta:	CS151
Školska godina:	2021/2022. zimski semestar
Nastavnik:	Ivana Štajner-Papuga
Asistenti:	Anika Njamcul
Don:	-

Ocene	Odgovora	Srednja	Odstupanje
Ocena predmeta	35	9.42	0.79
Ocena nastavnika	37	9.68	0.47
Ocena asistenta - Anika Njamcul	37	9.54	0.93

Navedite komentare u vezi sa procesom organizacije i izvođenja nastave, bodovanja i ocenjivanja.

Departman za matematiku i informatiku
Predmet je zahtevan ali i zanimljiv, način bodovanja objektivan, a organizacija nastave je adekvatna.
Ne bi bilo zgoreg da je možda gradivo raspoređeno na više predmeta, to jest, mislim da su obrađivane velike teme (funkcije, integrali...) koje zahtevaju više vremena i prostora da bi se...
Sve je bilo u redu
Rezultati kolokvijuma budu objavljeni kroz jedan dan najviše što se može ceni.
Sve je odlično organizovano!
Odlična organizacija i rad.
Dobra organizacija. Bilo bi korisno imati predavanja snimljena u slučaju ko ne može da prisustvuje. Bodovanja su adekvatna i fer.
Odlično izvođenje nastave.
Nastava je dobro organizovana,količina izloženog gradiva je odgovarajuća,ocenjivanje i bodovanje se sprovodi na odgovarajući način.
Nikakve zamerke.

Navedite komentare u vezi sa radom nastavnika i njegovim odnosom prema studentima.

Departman za matematiku i informatiku
Profesorka je korektna prema svim studentima i odgovarajuće vodi predavanja. Takođe, uvek izlazi u susret studentima, u vidu konsultacija, predavanja, popravnih kolokvijuma i odabiranja.
Vrhunski predavači tako su predavanja bila uživo, postojao je stream, gde je profesorka uvek pazila da i mi koji pratimo onlajn možemo lepo da vidimo, čujemo, i učestvujemo. Posle svakog predavanja smo imali sate na po nekoliko strana gde je sve fenomenalno objašnjeno, i formalno, a potom i prostim jezikom. Neverovatan trud od strane profesorke! Jedino što voleo da su postojali i snimci predavanja, ali osim toga bez zamerki. Hvala!
Sve je bilo u redu
Uvek spremna da pomogne
Odličan odnos!
Odličan odnos sa studentima.
Odlican nastavnik. Spremna da objasni sve i vrlo strpljiva. Ima vrlo lep odnos sa studentima. Sve pohvale
Odlican odnos
Nastavnik gradivo izlaže jasno i razumljivo,na zanimljiv način,ima korektan odnos prema studentima.
Nastavnik je ažuran, korektan i odlican u svom poslu. Ume da prenese znanje, ako je i najbitnije. Odnos prema studentima je odlican, uvek je tu kada je pomoć potrebna.

Navedite komentare u vezi sa radom asistenta i njegovim odnosom prema studentima.

Departman za matematiku i informatiku
Asistentkinja je takođe ažurna i spremna da pomogne i odgovori na pitanja studenata.
Odlična asistentkinja, materijali svi dostupni i sjajno pripremljeni, odlična inicijativa sa domaćim zadacima koji podstiču na redovan rad, uz povratne informacije koje su brze i jasne. Super!
Sve je bilo u redu.
jako korektna i fina, odgovorna i tačna, rezultati domaćih, seminarskih i kolokvijuma se neverovatno brzo objave.
Odličan odnos!
Nemam primedbi.
Odlican asistent. Uvek dostupan da pojasni sve. Ima vrlo lep odnos sa studentima.
Odnos odlican
Asistent gradivo izlaže jasno i razumljivo. Podstiče aktivno uključivanje i učestvovanje studenata na vežbama,ima korektan odnos prema studentima.
Odlican nastavnik/asistent. Licno, zaista, nemam ni jednu zamerku. Uvek je tu za pomoc, odlicno predaje, objasnjava. Ukratko, uloksa predmet.

P03-2. Mathematical Analysis II, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Computer Science**
Name of the course	**Mathematical Analysis II**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Ivana Štajner-Papuga**
E-mail of the professor in charge	**ivana.stajner-papuga@dmi.uns.ac.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions**
Tools* which are used in the course	**GeoGebra, Wolframalpha**
Name of modernised teaching units	**Multivariable calculus**
Number of students	**33**

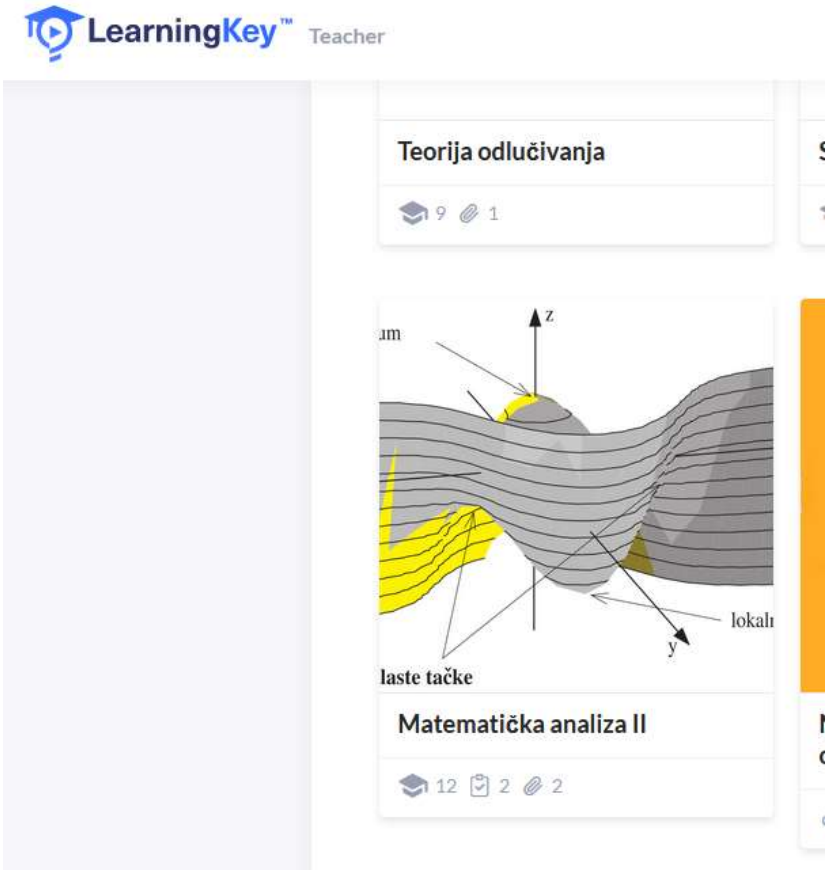
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

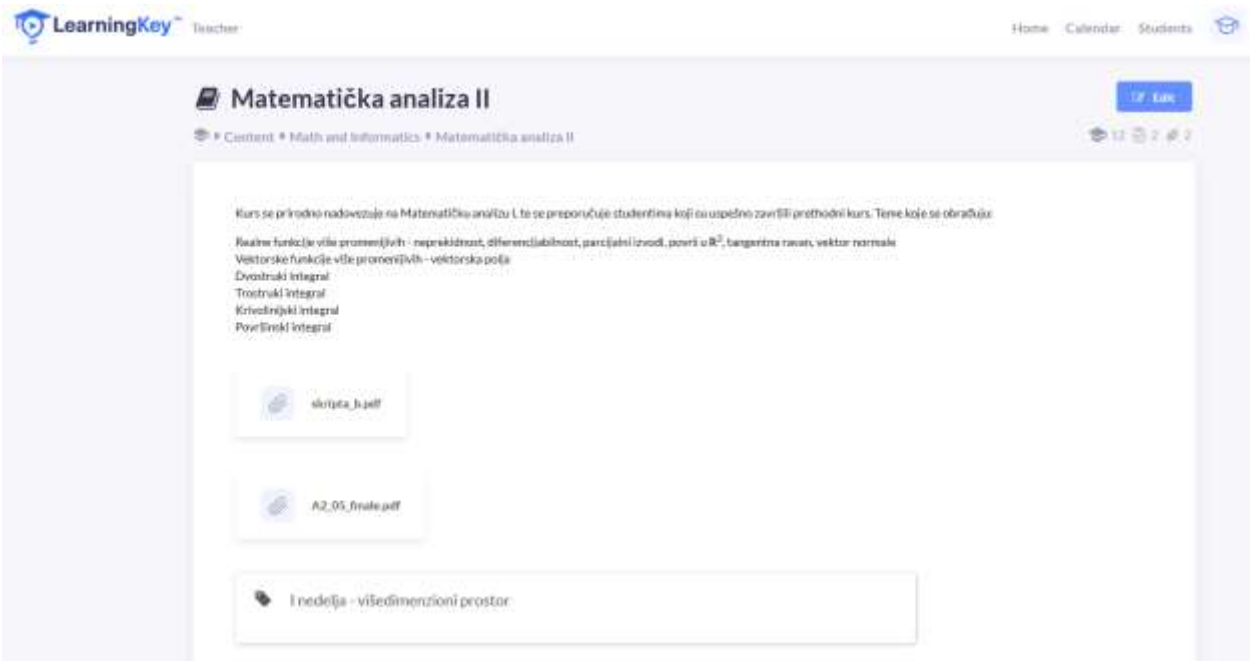
The methods/tools used in the course modernisation

The course Mathematical Analysis II is the natural continuation of the course Mathematical Analysis I from the first semester. Again, it is a classical mathematical course that is intended for students of Computer Science. It is intended for the same group of students; therefore all issues concerning the style of teaching remained, i.e., students react extremely well to a approach that combines classical teaching techniques and modern technologies, with freedom to do creative individual work.

As for the previous course, all topics of the course were clearly listed on the learning platform (two platform are being used, LearningKey from University of Niš, and Moodle for University of Novi Sad). The precise weekly time line was given, so that students can have clear perception of topics and workload that they can expect. All lessons were streamed live from the classroom, so a student had a possibility to choose whether to join the lecture in person or via webex platform. After each lesson, highlights with comments directed to the practical aspect of the topic, in pdf form, were made available on LearningKey and Moodle, and they remained available until the end of the last examination period. Additional homework, that allowed and

encouraged team work, for some extra credits was also assigned. Submission of homework and independent work, and feedback for students was organized through Moodle platform. Students were encouraged to take active part in lectures through discussions of some independent work that involved using software applications to present some interesting notions from multivariable analysis. The novelty for this course was posting self-assessment tests that were made available to students through learning platforms. Students reacted extremely well to this option, and it helped them to achieve better results at the final test. Since students had possibility to use two learning platform, they were very eager to discuss and compare both, which provided valuable feedback.

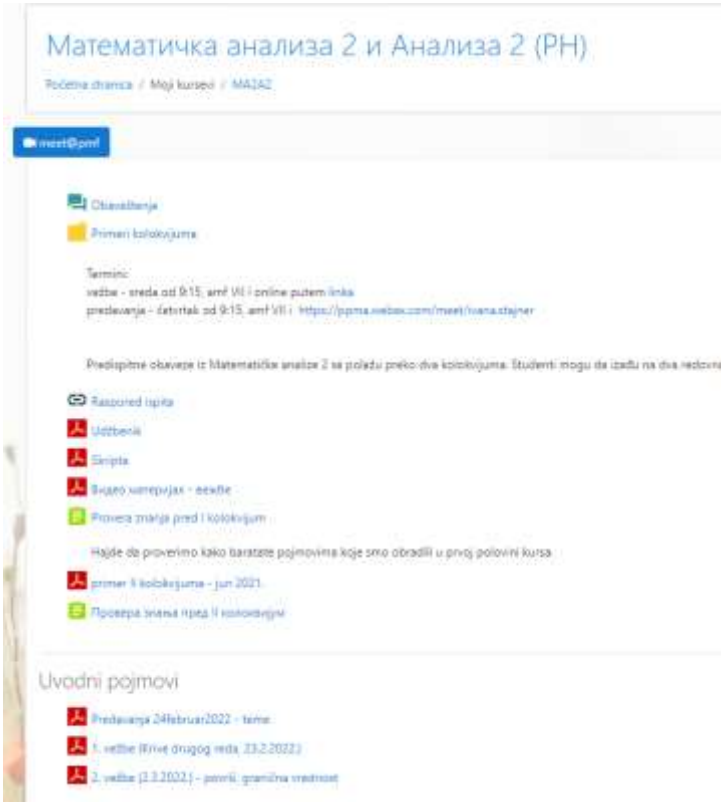



LearningKey
Teacher
Home
Calendar
Students
Matematička analiza II
Edit
Content • Math and Informatics • Matematička analiza II
Kurs se prirodno nadovezuje na Matematičku analizu I, te se preporučuje studentima koji su uspešno završili prethodni kurs. Teme koje se obrađuju:
Realne funkcije više promenljivih - neprekidnost, diferencijabilnost, parcijalni izvodi, površ u R^3, tangentna ravan, vektor normale
Vektorske funkcije više promenljivih - vektorska polja
Dvostruki integral
Trostruki integral
Krivolinijski integral
Površinski integral
skripta_b.pdf
A2_05_finale.pdf
I nedelja - višedimenzioni prostor


LearningKey
Teacher
Home
Calendar
Students
III nedelja - tangentna ravan, diferencijabilnost, totalni diferencijal, Tejlorova formula
Edit
Content • Math and Informatics • Matematička analiza II • III nedelja - tangentna ravan, diferencijabilnost, totalni diferencijal, Tejlorova formula
Dobar dan svima!
Evo teme koje su danas na redu:
1. Tangentna ravan
2. Diferencijabilnost
3. Totalni diferencijal
4. Tejlorova formula
Sve navedeno je obuhvaćeno trećim poglavljem skripte, odnosno, poglavljima 4.2 i 4.5 iz udžbenika.
Hajde da redom pogledamo na šta treba obratiti pažnju.
Tangentna ravan
U prošlom semestru smo se bavili realnom funkcijom jedne realne promenljive i tom prilikom videli kako da dođemo do tangente na krivu koja leži u ravni.
Interesuje nas prirodan nadogradnja. Sada posmatramo površ u prostoru i tangentnu ravan, tj. dodali smo jednu dimenziju.


VI nedelja - uslovni ekstremi, vektorsko polje
Test samoprocene I
2023-01-31 00:00:00
30
10
VII nedelja - dvostruki integral


Test
Test samoprocene I



Математичка анализа 2 и Анализа 2 (PH)

Početna stranica / Moji kursevi / MA1A2

meet@pmf

Obaveštenja

Primeri kolokvijuma

Termini:
vežbe - sreda od 9:15, amf VII i online putem linka
predavanja - četvrtak od 9:15, amf VII i https://pmfns.webex.com/meet/ivana.stajner

Predispitne obaveze iz Matematičke analize 2 se polažu preko dva kolokvijuma. Studenti mogu da izađu na dva redovni

Raspored ispita

Udžbenik

Skripta

Video uvrnjak - vežbe

Provera znanja pred I kolokvijum

Hajde da proverimo kako baratate pojmovima koje smo obradili u prvoj polovini kursa

primer II kolokvijuma - jun 2021.

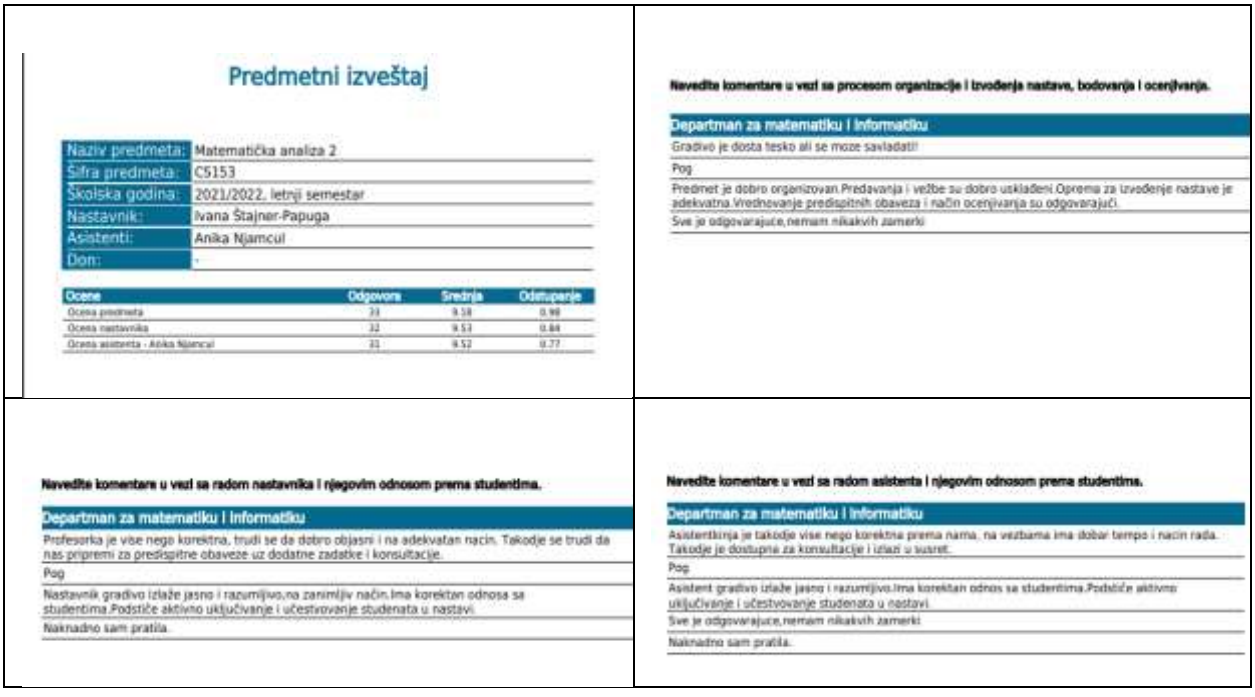
Provera znanja pred II kolokvijum

Uvodni pojmovi

Predavanja 24februar2022 - tema

1. vežbe (Ktive drugog reda, 23.2.2022.)

2. vežbe (2.3.2022.) - ponovi: granična vrednost



Predmetni izveštaj

Naziv predmeta:	Matematička analiza 2
Šifra predmeta:	C5153
Školska godina:	2021/2022. letnji semestar
Nastavnik:	Ivana Štajner-Papuga
Asistenti:	Anika Njamcul
Don:	-

Ocene	Odgovori	Srednja	Odstupanje
Ocena predmeta	33	9.58	0.98
Ocena nastavnika	32	9.53	0.84
Ocena asistenta - Anika Njamcul	31	9.52	0.77

Navedite komentare u vezi sa procesom organizacije i izvođenja nastave, bodovanja i ocenjivanja.

Departman za matematiku i informatiku
Gradivo je dosta teško ali se može savladati!
Pog
Predmet je dobro organizovan.Predavanja i vežbe su dobro usklađeni.Oprema za izvođenje nastave je adekvatna.Vrednovanje predispitnih obaveza i način ocenjivanja su odgovarajući.
Sve je odgovarajuće,nemam nikakvih zamerki

Navedite komentare u vezi sa radom nastavnika i njegovim odnosom prema studentima.

Departman za matematiku i informatiku
Profesorka je više nego korektna, trudi se da dobro objasni i na adekvatan način. Takođe se trudi da nas pripremi za predispitne obaveze uz dodatne zadatke i konsultacije.
Pog
Nastavnik gradivo izlaže jasno i razumljivo,na zanimljiv način.Ima korektan odnosa sa studentima.Podstiče aktivno uključivanje i učestvovanje studenata u nastavi.
Naknadno sam pratila.

Navedite komentare u vezi sa radom asistenta i njegovim odnosom prema studentima.

Departman za matematiku i informatiku
Asistentkinja je takođe više nego korektna prema nama, na vežbama ima dobar tempo i način rada. Takođe je dostupna za konsultacije i izlazi u susret.
Pog
Asistent gradivo izlaže jasno i razumljivo.Ima korektan odnos sa studentima.Podstiče aktivno uključivanje i učestvovanje studenata u nastavi.
Sve je odgovarajuće,nemam nikakvih zamerki
Naknadno sam pratila.

P03-3. Decision Theory 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **MSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Mathematics, Applied Mathematics**
Name of the course	**Decision Theory**
Level of the study	**2nd semester, Master**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Ivana Štajner-Papuga**
E-mail of the professor in charge	**ivana.stajner-papuga@dmi.uns.ac.rs**
Methods * which are used in the course	**Group work, students presentations, peer discussions**
Tools* which are used in the course	**Fuzzy calculator, Choquet Integral Calculating System**
Name of modernised teaching units	**Aggregation operators, fuzzy sets**
Number of students	**5**

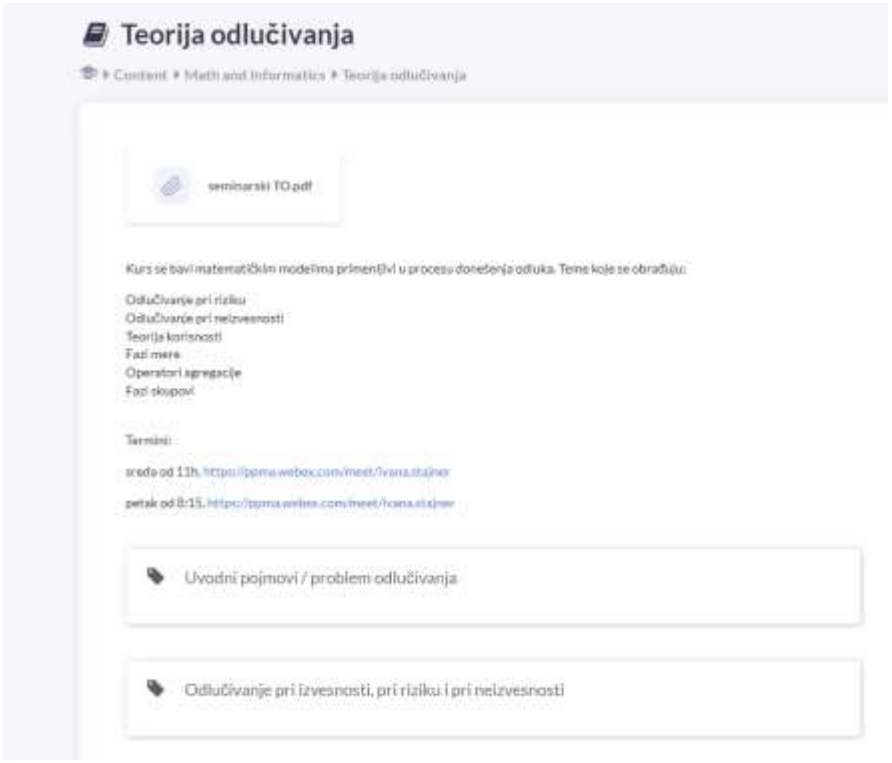
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

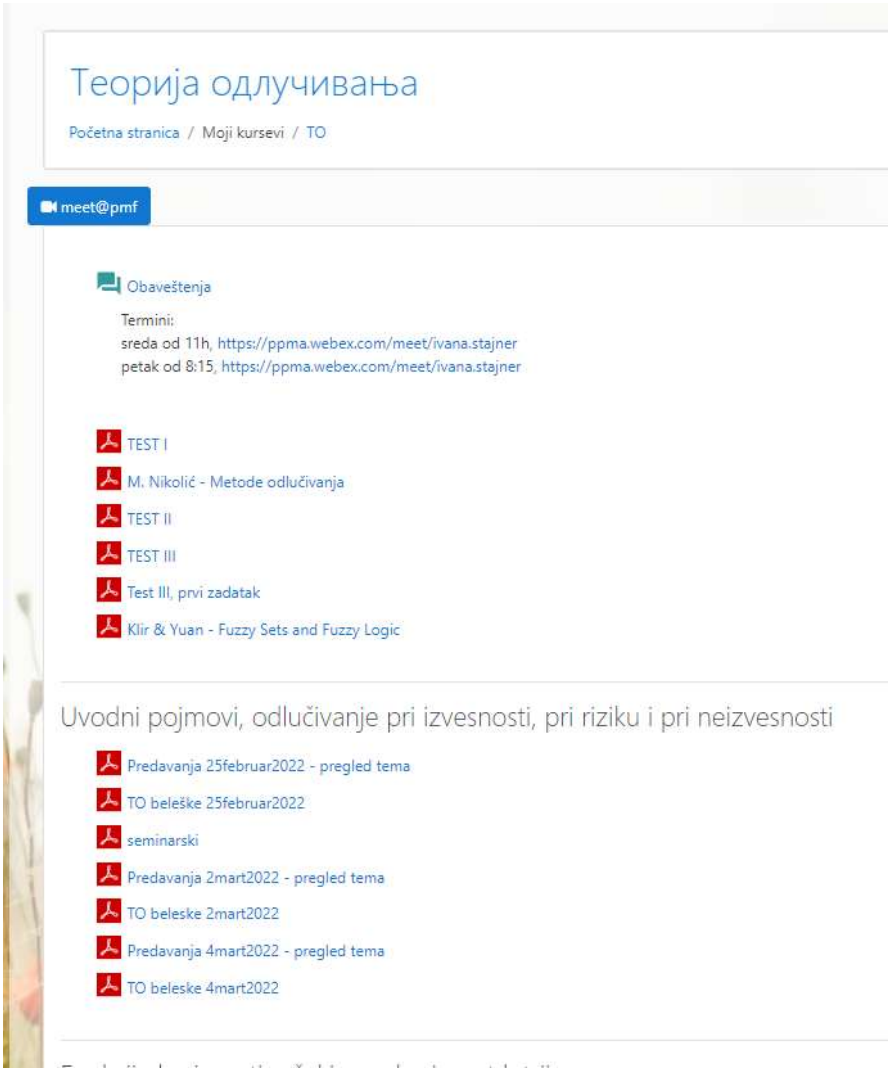
The course Decision Theory is a course on nonstandard mathematical methods applicable in decision making. It is intended for students of Mathematics and Applied Mathematics at the master level of studies. While the introductory part of the course covers some classical techniques of decision making, the main focus of the course is on contemporary non standard methods that are currently highly investigated by numerous researchers worldwide.

All topics of the course were clearly listed on the learning platform (two platform are being used, LearningKey from University of Niš, and Moodle for University of Novi Sad). The precise weekly time line was given, so that students can have clear perception of topics and workload that they can expect. All lessons were streamed live via Webex platform. After each lesson, highlights with comments directed to the practical aspect of the topic, in pdf form, were made available on LearningKey and Moodle, and they remained available until the end of the last examination period.

For the final term paper, students were divided into groups. A specific topic was assigned to each group, and students were instructed how to conduct joint research work on the given subject. The novelty that was well received with students was that presentations had to be made as interactive as possible, and all groups were supposed to be present at presentations and take part in discussions All presentations were streamed live from the classroom, so a student had a possibility to choose whether to join in person or via Webex platform. Since students had possibility to use two learning platform, they were very eager to discuss and compare both, which provided valuable feedback.


Teorija odlučivanja
Content ▸ Math and Informatics ▸ Teorija odlučivanja
seminarski TO.pdf
Kurs se bavi matematičkim modelima primenjivi u procesu donošenja odluka. Teme koje se obrađuju:
Odlučivanje pri riziku
Odlučivanje pri nelzvesnosti
Teorija korisnosti
Fazi mere
Operatori agregacije
Fazi skupovi
Termini:
sreda od 11h.
petak od 8:15.
Uvodni pojmovi / problem odlučivanja
Odlučivanje pri izvesnosti, pri riziku i pri nelzvesnosti


Uvodni pojmovi / problem odlučivanja
Content ▸ Math and Informatics ▸ Teorija odlučivanja ▸ Uvodni pojmovi / problem odlučivanja
Dobar dan svima!
Evo pregleda tema koje smo obradili:
1. Šta je problem odlučivanja
2. Tabele plaćanja i žaljenja
3. Relacija preferencije
4. Podela problema odlučivanja
5. Odlučivanje pri izvesnosti, riziku i nelzvesnosti
Sve navedeno možete pronaći u priloženom seminarskom radu, u prvih 15 strana. Pomenuli smo i funkciju korisnosti, ali njom se detaljno bavimo nešto kasnije. U ovom trenutku akcenat je na novčanim iznosima kao ishodima u tabelama plaćanja (žaljenja).
U sredu nastavljamo s odlučivanjem pri nelzvesnosti, a zatim se upoznajemo sa još dva specifična metoda odlučivanja pri riziku
Srdačan pozdrav!



Predmetni izveštaj

Naziv predmeta:	Teorija odlučivanja
Šifra predmeta:	M4-36
Školska godina:	2021/2022, letnji semestar
Nastavnik:	Ivana Štajner-Papuga
Asistenti:	Ivana Štajner-Papuga
Don:	-

Ocene	Odgovora	Srednja	Odstupanje
Ocena predmeta	3	10.00	0.00
Ocena nastavnika	2	10.00	0.00
Ocena asistenta - Ivana Štajner-Papuga	2	10.00	0.00

Predmetni izveštaj

Naziv predmeta:	Teorija odlučivanja
Šifra predmeta:	MB45
Školska godina:	2021/2022, letnji semestar
Nastavnik:	Ivana Štajner-Papuga
Asistenti:	Ivana Štajner-Papuga
Don:	-

Ocene	Odgovora	Srednja	Odstupanje
Ocena predmeta	2	10.00	0.00
Ocena nastavnika	1	10.00	0.00
Ocena asistenta - Ivana Štajner-Papuga	2	10.00	0.00

P03-4. Seminar paper – Mathematical Modelling 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Applied Mathematics**
Name of the course	**Seminar paper – Mathematical Modelling**
Level of the study	**3rd semester, Bachelor**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Ivana Štajner-Papuga**
E-mail of the professor in charge	**ivana.stajner-papuga@dmi.uns.ac.rs**
Methods * which are used in the course	**Group work, problem solving methods, peer discussions**
Tools* which are used in the course	**GeoGebra, Wolframalpha, Fuzzy calculator, Choquet Integral Calculating System**
Name of modernised teaching units	**Differential equations, exponential growth, population models, gradient, decision problems**
Number of students	**5**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

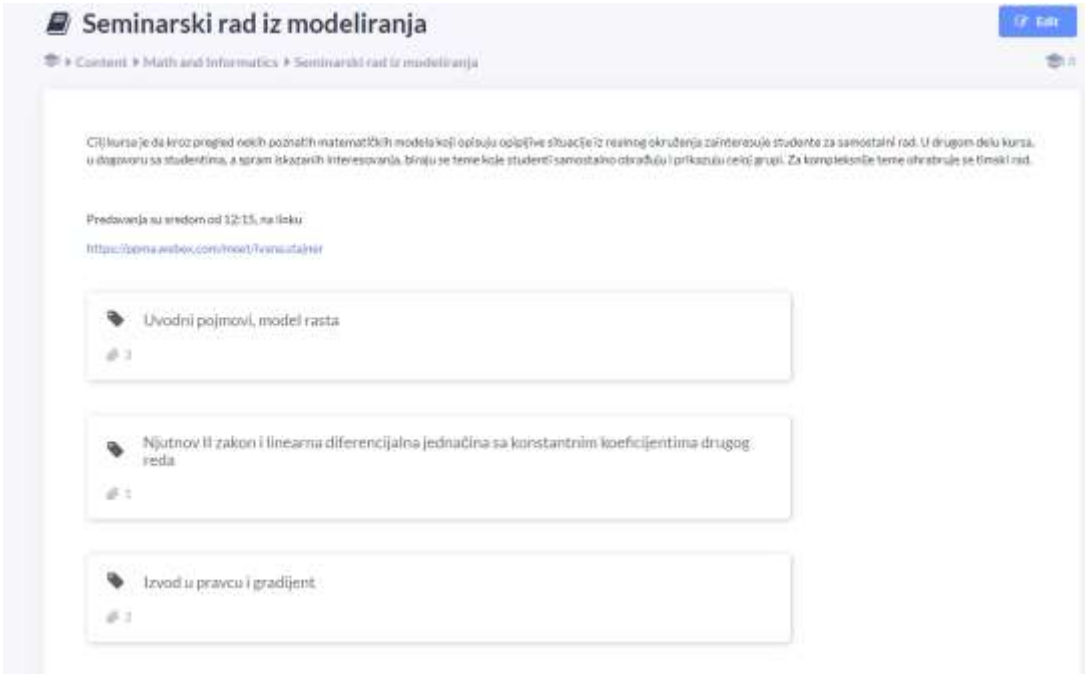
The methods/tools used in the course modernisation

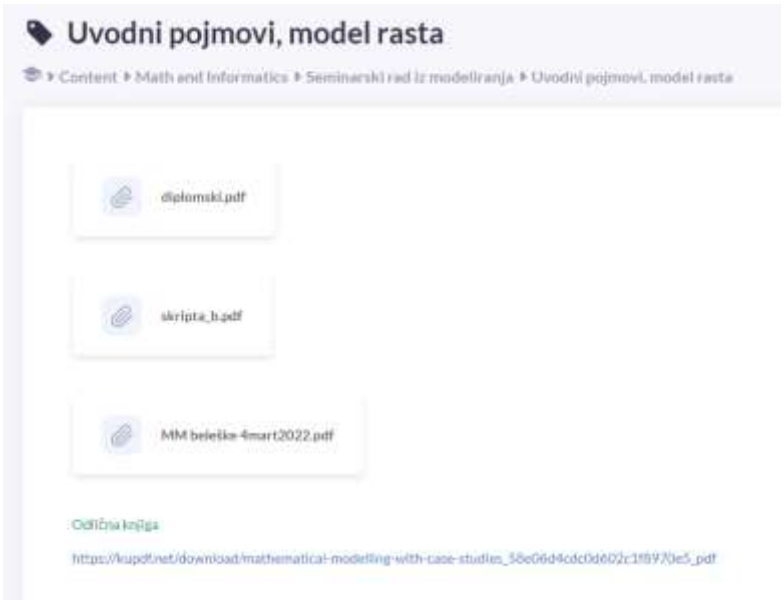
The course Seminar paper – Mathematical Modeling is a new course for students of Applied Mathematics. Organizational concept of this new course is similar to one of Decision Theory; however this course is designed for younger students. Therefore, mathematical aspects are somewhat less complex. Besides providing students with some new mathematical knowledge, the aim of this course is to develop beginner research skills, team work abilities, and knack for presentations.

All introductory topics of the course were clearly listed on the learning platform (two platform are being used, LearningKey from University of Niš, and Moodle for University of Novi Sad). The precise weekly time line was given, so that students can have clear perception of topics and workload that they can expect. All

lessons were streamed live via Webex platform. After each lesson, highlights with comments directed to the practical aspect of the topic, in pdf form, were made available on LearningKey and Moodle, and they remained available until the end of the last examination period.

For the final term paper, students were divided into groups. A specific topic was assigned to each group, and students were instructed how to conduct joint research work on the given subject. The novelty that was well received with students was that presentations had to be made as interactive as possible, and all groups were supposed to be present at presentations and take part in discussions. All presentations were streamed live from the classroom, so a student had a possibility to choose whether to join in person or via Webex platform. Since students had possibility to use two learning platform, they were very eager to discuss and compare both, which provided valuable feedback.


Seminarski rad iz modeliranja
Edit
Content ▸ Math and Informatics ▸ Seminarski rad iz modeliranja
Ciljkursa je da kroz pregled nekih poznatih matematičkih modela koji opisuju oplijive situacije iz realnog okruženja zainteresuje studente za samostalni rad. U drugom delu kursa, u dogovoru sa studentima, a spram iskazanih interesovanja, biraju se teme koje studenti samostalno obrađuju i prikazuju celoj grupi. Za kompleksnije teme ohrabruje se timski rad.
Predavanja su sredom od 12:15, na linku
https://pema.webex.com/meet/ivana.stajner
Uvodni pojmovi, model rasta
Njutnov II zakon i linearna diferencijalna jednačina sa konstantnim koeficijentima drugog reda
Izvod u pravcu i gradijent


Uvodni pojmovi, model rasta
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MM beleške 4mart2022.pdf
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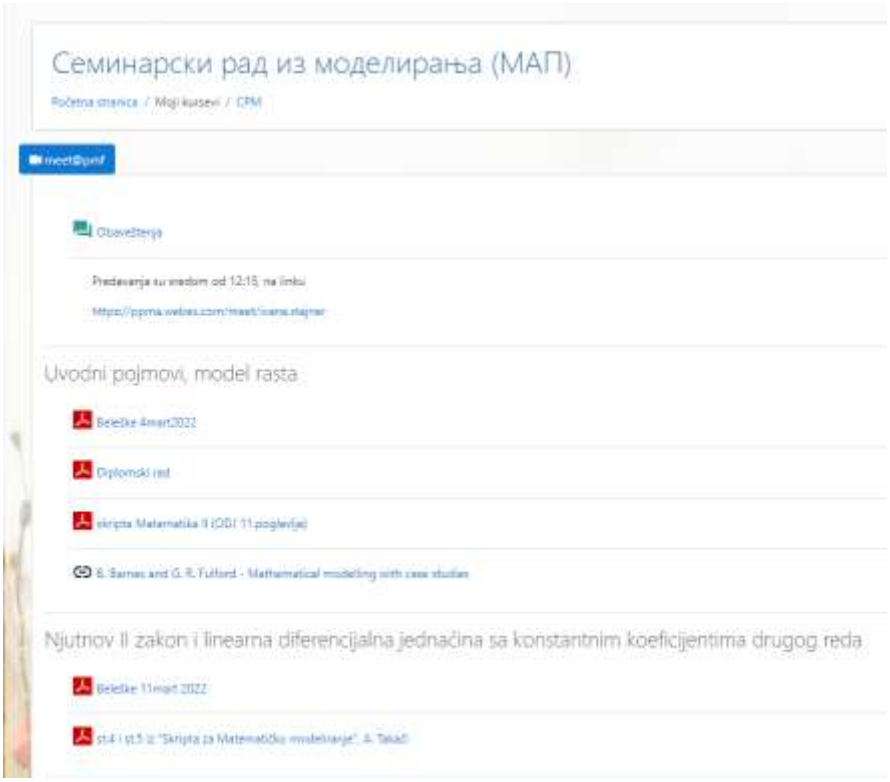


Predmetni izveštaj

Naziv predmeta:	Seminarski rad iz modeliranja
Šifra predmeta:	P404
Školska godina:	2021/2022, letnji semestar
Nastavnik:	Ivana Štajner-Papuga
Asistenti:	-
Don:	-

Ocene	Odgovora	Srednja	Odstupanje
Ocena predmeta	5	9.80	0.45
Ocena nastavnika	5	10.00	0.00

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P03-5. Numerical methods and optimization 2021/22

REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Computer Science**
Name of the course	**Numerical methods and optimization**
Level of the study	**4th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Goran Radojev**
E-mail of the professor in charge	**goran.radojev@dmi.uns.ac.rs**
Methods * which are used in the course	**Dynamic and interactive environment, quizzes, videos, feedback**
Tools* which are used in the course	**Microsoft Teams, GeoGebra, Moodle platform**
Name of modernised teaching units	**Numerical integration, Newton's method**
Number of students	**48**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Interactive materials are included in this course. Numerical integration methods are presented using the GeoGebra applets.

LearningKey™ Teacher

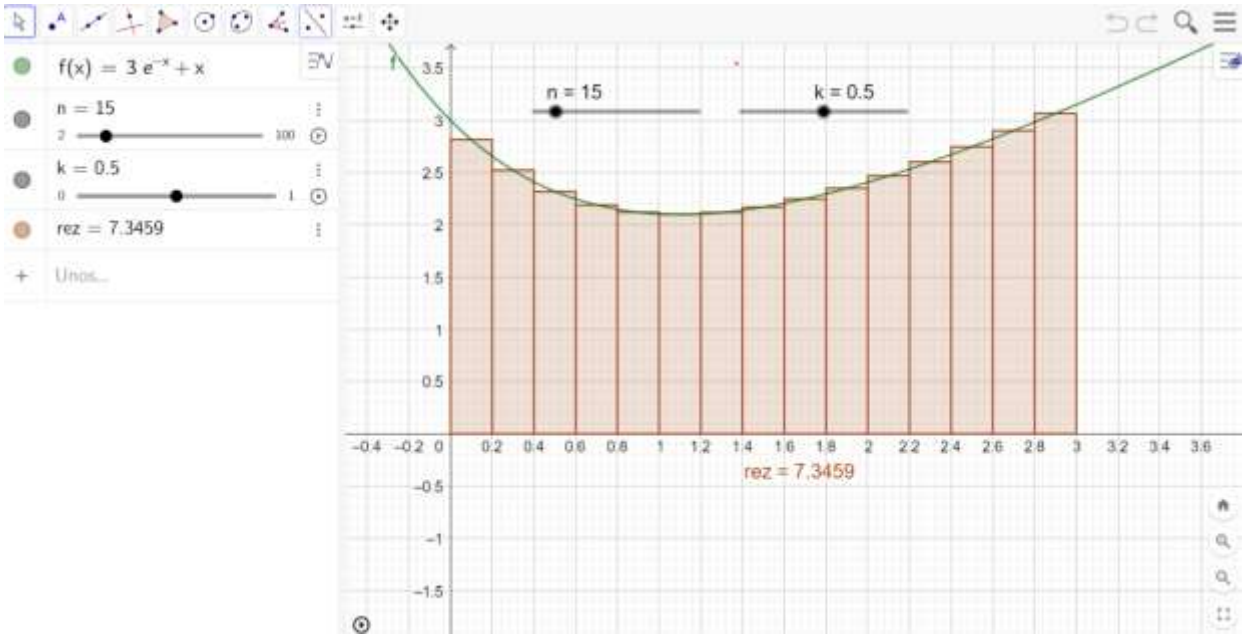
Numeričke metode i optimizacija

Content ▸ Math and Informatics ▸ Numeričke metode i optimizacija

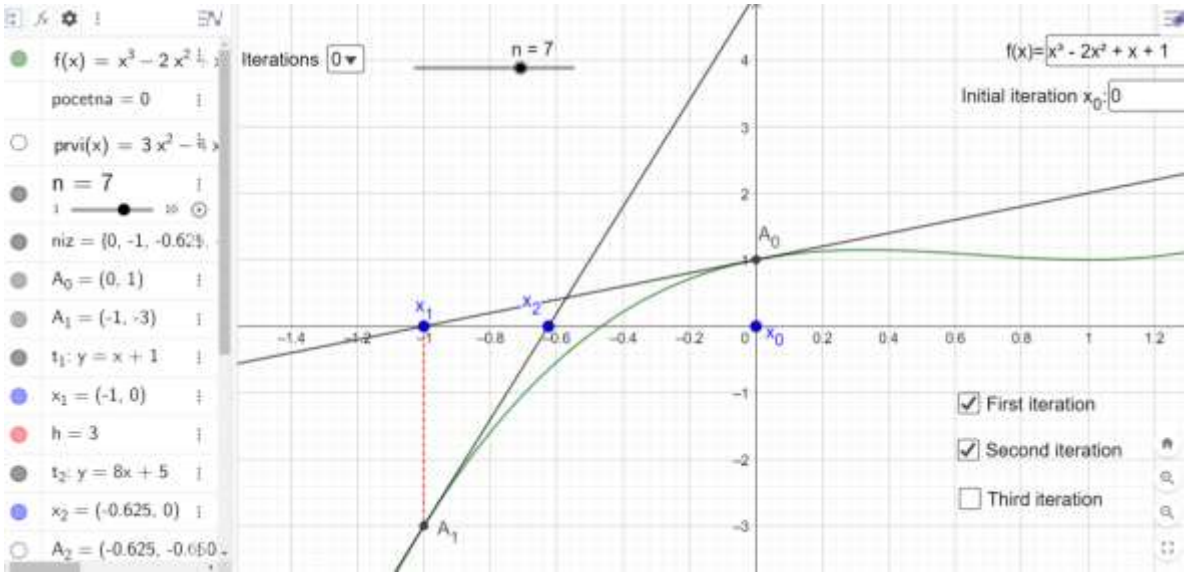
Name of the subject: Numeričke metode i optimizacija
Name of the study programme: Computational science
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: obligatory
ECTS: 7
Number of students: 48
Professor in charge: Goran Radojev
E-mail of professor in charge: goran.radojev@dmi.uns.ac.rs
Name of the lecture that is/will be modernized: Numerical integration, Newton's method

Rimanova suma.ggb

Njutnov postupak.ggb



Also, the geometric interpretation of Newton's method is shown using GeoGebra. Students can change the number of iterations, the initial iteration, the function whose zeros are found...



Furthermore, the short videos with theoretical background were available to all students. Finally, the short quizzes with feedbacks were shared with students with the aim of self-evaluation.

P03-6. Financial mathematics 1, 2021/22

REPORT

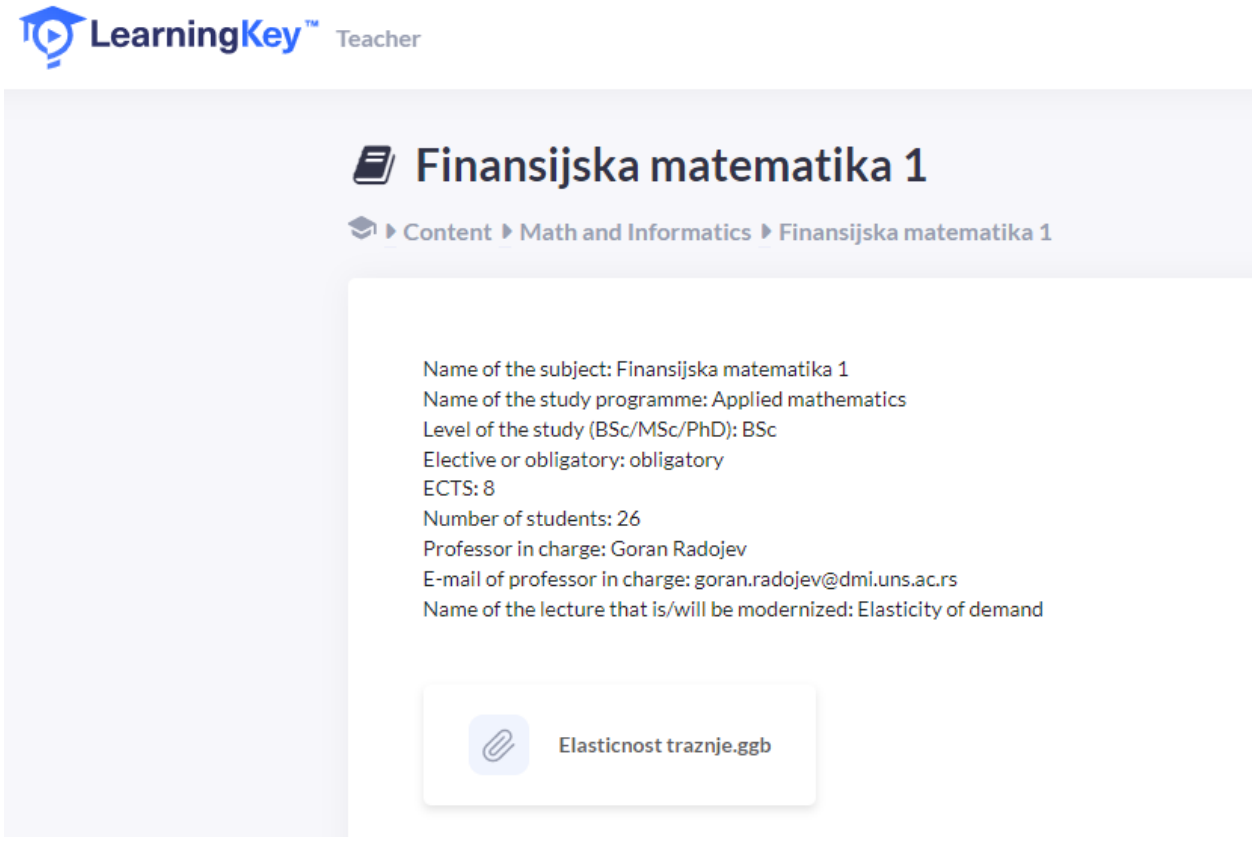
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Applied mathematics**
Name of the course	**Financial mathematics 1**
Level of the study	**4th semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory (elective for other study programs)**
Professor in charge	**Goran Radojev**
E-mail of the professor in charge	**goran.radojev©dmi.uns.ac.rs**
Methods * which are used in the course	**Dynamic and interactive environment, quizzes, videos, feedback**
Tools* which are used in the course	**Microsoft Teams, GeoGebra, Moodle platform**
Name of modernised teaching units	**Elasticity of demand**
Number of students	**26**

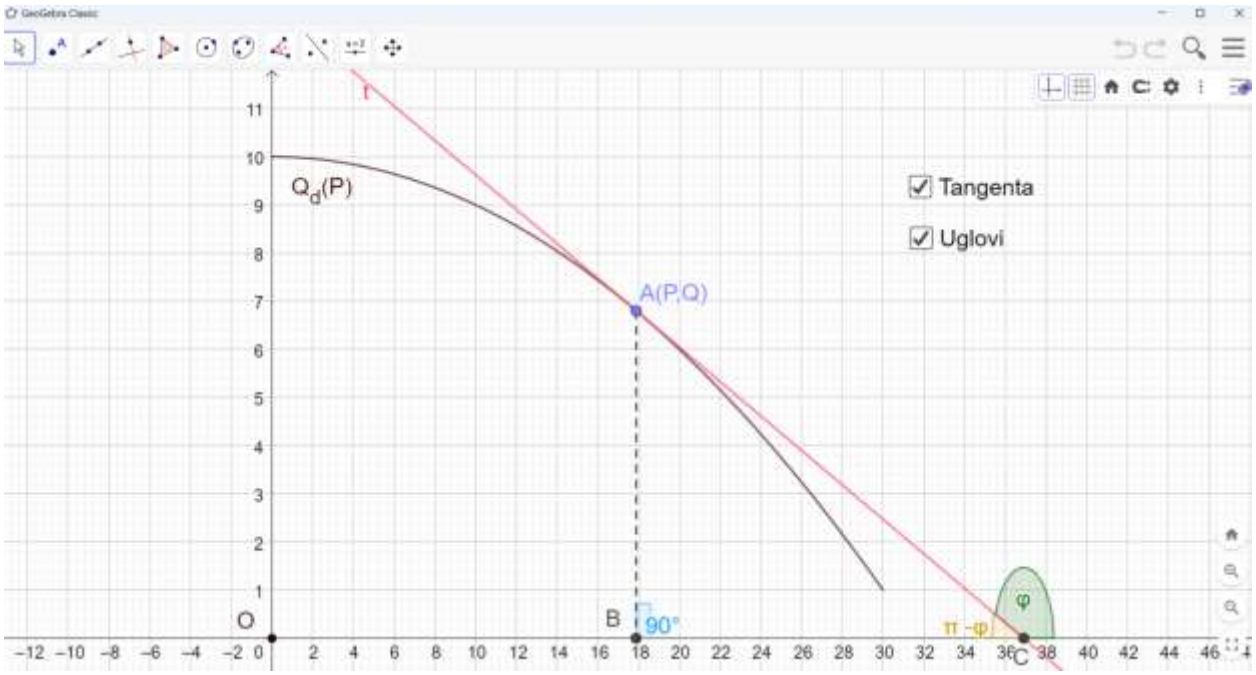
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Applets created in GeoGebra are included in this course. A geometric interpretation of elasticity of demand is presented using GeoGebra.



Furthermore, the short videos with theoretical background were available to all students. Finally, the short quizzes with feedbacks were shared with students with the aim of self-evaluation.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Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P03-7. Innovation in teaching geography 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Science in Teaching Geography**
Name of the course	**Innovation in teaching geography**
Level of the study	**8th semester**, Bachelor of Science in Teaching Geography (4 years, 240 ECTS)
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Andjelija Ivkov Dzigurski**
E-mail of the professor in charge	**ivkova@gmail.com**
Methods * which are used in the course	Frontal, indirect forms, specific types of work in geography teaching. Method of oral presentation, method of talking, text method, illustrative-demonstrative methods and others.
Tools* which are used in the course	PowerPoint, mind maps, Collaboration and sharing tools (Google disc, OneDrive, Linoit, ZOOM, Teams, QR code), Learning management systems (Linoit, Mentimetar, Sokrativ, Gogle questionnaire), VR reality applications, different types of applications for quizzes
Name of modernised teaching units	Collaboration and sharing tools, Learning management systems, AR and VR in teaching
Number of students	**15**

The methods/tools used in the course modernisation

In this course (subject) I modernized almost all teaching units.

Creating Power Point presentations and Prezi for teaching time processing of new materials and the recurrence time and determination. The work relating to the interactive classes will be organized in combination of lectures and practical work of the students themselves, which would be organized creative

workshops. After giving a theoretical and practical information, crossed to the practical work in groups, to the students themselves have the possibility of active work. Students will be organized 3 workshops related to different geographical content, using different models of interactive teaching. Practical work on developing a case of tasks for the implementation of the game in teaching geography.

Students have the task of creating Mind Maps in two ways: by drawing by hands and in a program for creating Mind Maps on the computer. The part of the course where students are introduced to Collaboration and sharing tools, Learning management systems, AR and VR in teaching has been especially modernized. Students for each element of Collaboration and sharing tools (Google disc, OneDrive, Linoit, ZOOM, Teams, QR code), Learning management systems (Linoit, Mentimetar, Sokrativ, Google questionnaire) are tasked with making their own examples that are applicable in elementary school classes or high school in geography. They use either tablets or computers. To apply AR or VR, they use VR glasses and mobile phones.

P03-8. Geographic basis of special ethnology , 2021/22

REPORT

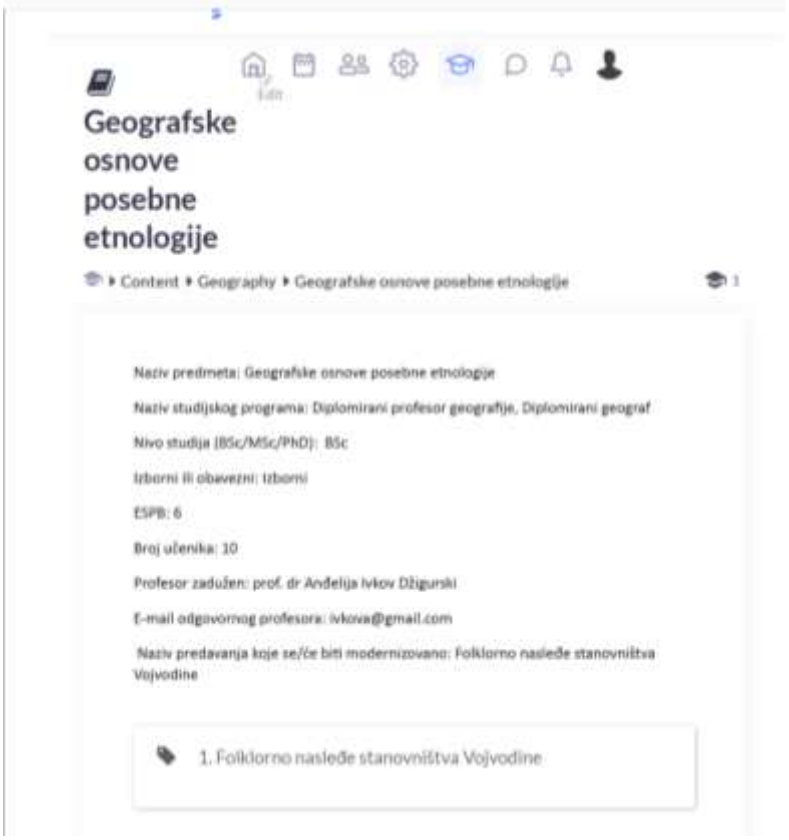
In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Novi Sad**
Name of the study programme	**Science in Teaching Geography**
Name of the course	Geographic basis of special ethnology
Level of the study	2nd, 4th, 6th **semester**, Bachelor of Science in Teaching Geography (4 years, 240 ECTS), Bachelor of Science in Geography (4 years, 240 ECTS)
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Andjelija Ivkov Dzigurski**
E-mail of the professor in charge	**ivkova@gmail.com**
Methods * which are used in the course	Frontal, indirect forms, specific types of work. The method of oral presentation, talk method, a text method, illustrative- demonstrative methods, methods of mapping and others. Lectures are combined with communicative, interactive exercises, and students are expected to actively participate in teaching and critical thinking.
Tools* which are used in the course	Microsoft Office (PowerPoint), Video, Different applications for Quizzes, Mentimetar, Sokrativ
Name of modernised teaching units	Folklore heritage of the population of Vojvodina 1, Folklore heritage of the population of Vojvodina 2
Number of students	**30**

The methods/tools used in the course modernisation

In this course (subject) I involved new methods of teaching and learning in all teaching units.

Getting to know the specific folklore heritage of the peoples living in Vojvodina and Serbia in general (folk architecture, museums, galleries and ethnological, material, spiritual and technical culture). Reports on the data collected on the ground in the form of seminar.
Students are preparing workshops for primary school students where, with modern tools and applications, they will learn about the number and structure of the population: Serbs, Hungarians, Croats, Bunjevci, Sokci, Slovaks, Montenegrins, Romanians, Roma, Ruthenians, Ukrainians and others.
Also, through practical work, using modern methods, they will get to know the costume, customs, song, dance, culinary characteristics of the people of the Balkans, comparing them with the peoples of Europe, Africa, North, Central and South America, Asia and Australia. Videos will be used to bring them closer to languages, food, clothing, types of economic activity, customs and specifics analyzed by continent.


Geografske osnove posebne etnologije
Content ▸ Geography ▸ Geografske osnove posebne etnologije
Naziv predmeta: Geografske osnove posebne etnologije
Naziv studijskog programa: Diplomirani profesor geografije, Diplomirani geograf
Nivo studija (BSc/MSc/PhD): BSc
Izborni ili obavezni: Izborni
ESPB: 6
Broj učenika: 10
Profesor zadužen: prof. dr Anđelija Ivkov Džigurski
E-mail odgovornog profesora: ivkova@gmail.com
Naziv predavanja koje se/će biti modernizovano: Folklorno nasleđe stanovništva Vojvodine
1. Folklorno nasleđe stanovništva Vojvodine

P03-9. Boolean algebra and optimization, 2021/22

REPORT

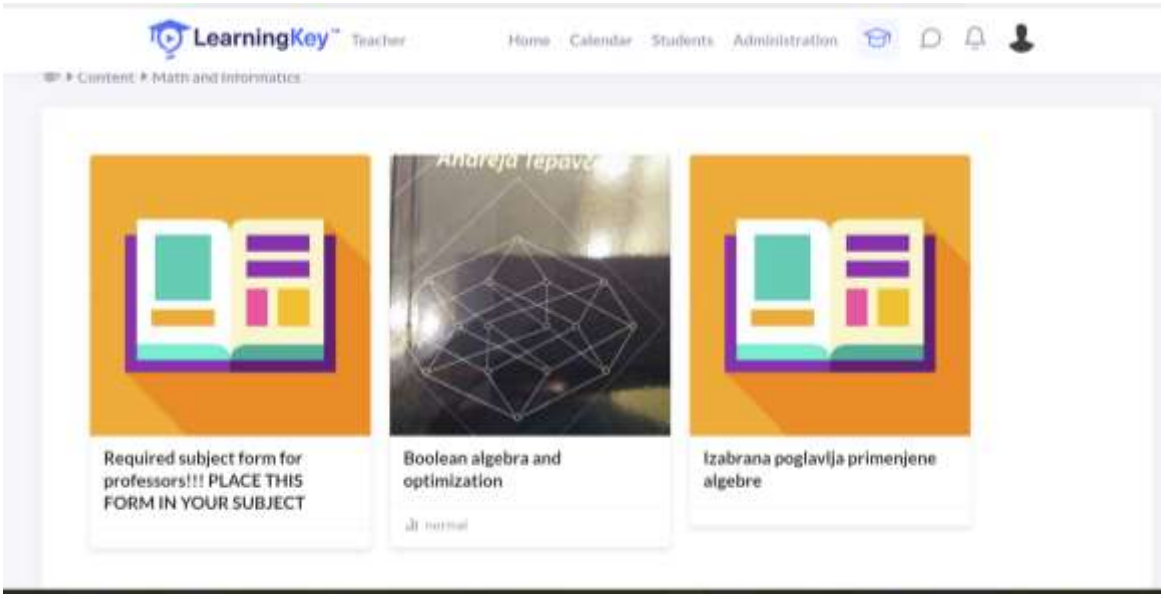
In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

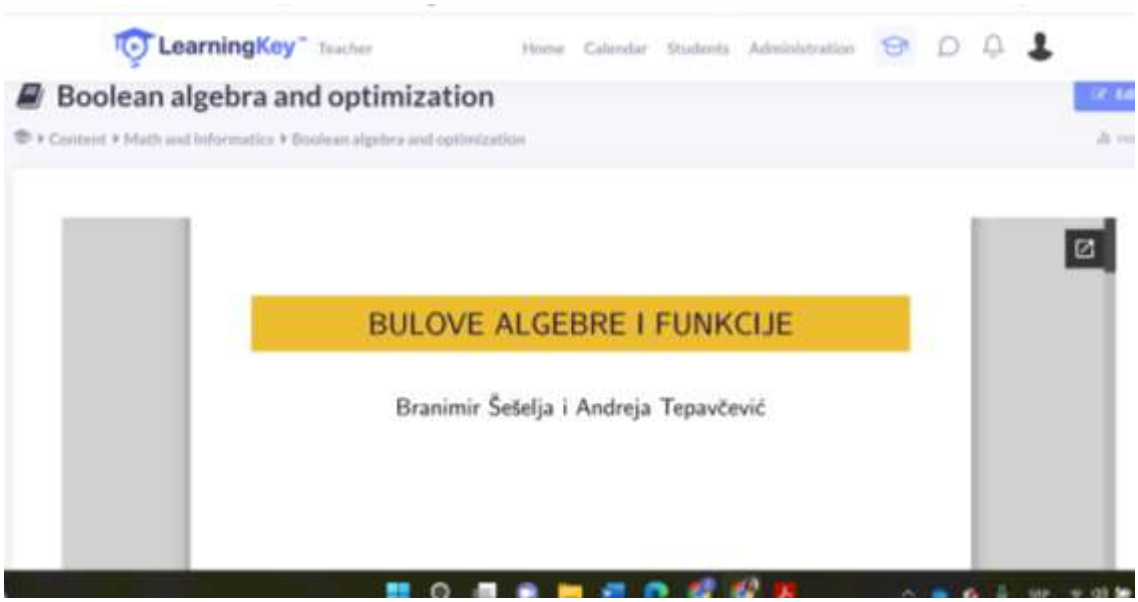
Name of the University	**University of Novi Sad**
Name of the study programme	**Mathematics, Applied mathematics, Teacher of Mathematics**
Name of the course	**Boolean algebra and optimization**
Level of the study	**3rd or 5th semester, Bachelor**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Andreja Tepavčević**
E-mail of the professor in charge	**andreja©dmi.uns.ac.rs**
Methods * which are used in the course	**Online presentations, Online communication. Online knowledge verification methods, Recording of lectures, Online homeworks**
Tools* which are used in the course	**Moodle platform, Webex, LearningKey platform**
Name of modernised teaching units	**Ordered sets, Lattices, Boolean lattices and Boolean algebra, Karnaugh maps, Boolean circuits, Minimization of Boolean functions**
Number of students	**26**

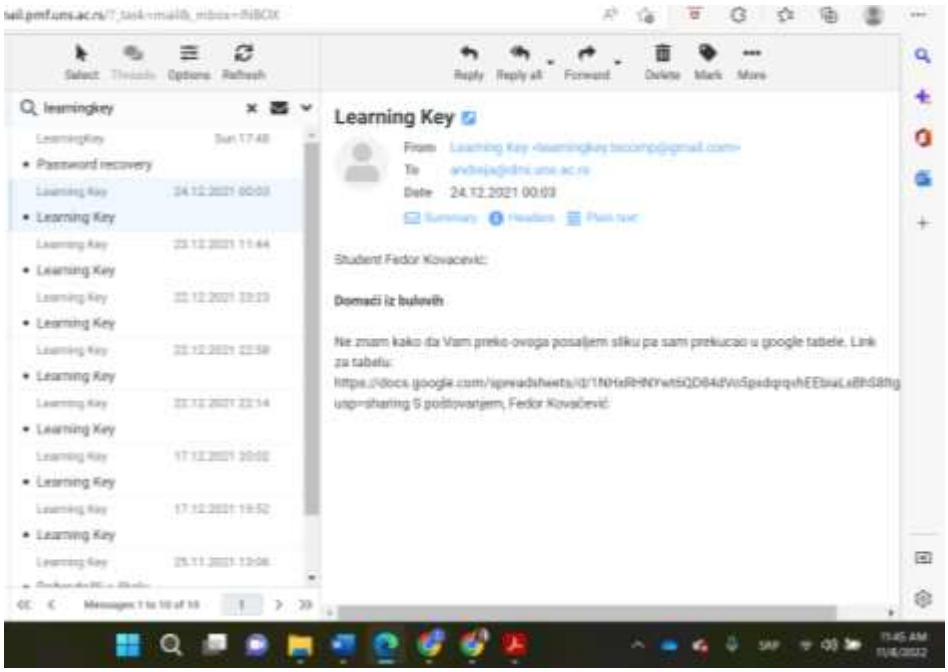
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

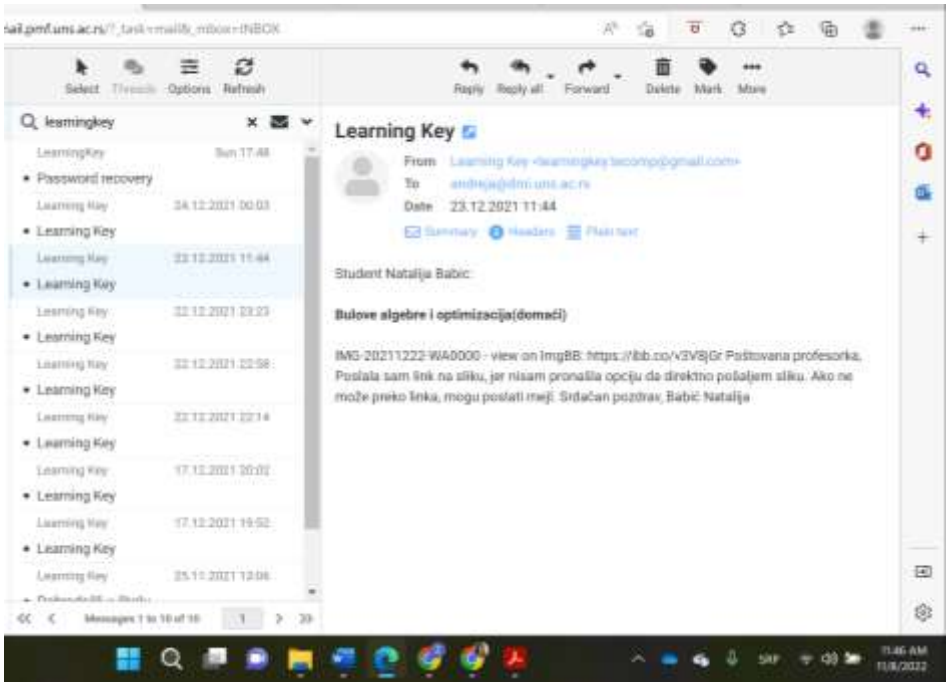
The methods/tools used in the course modernisation

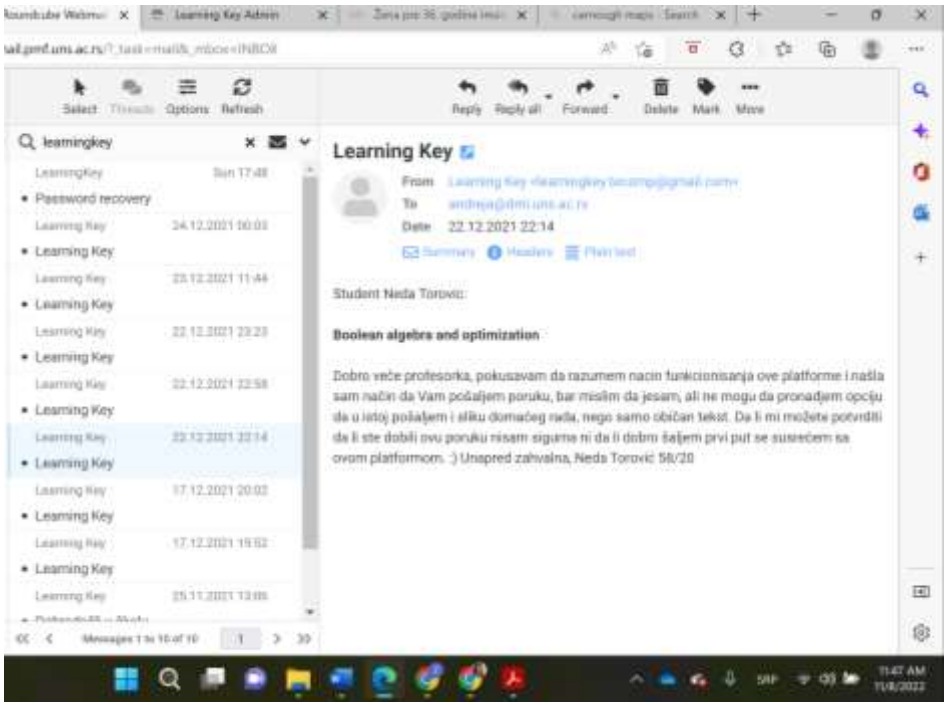
This course is completely held online for the first time. The presentation is prepared and adjusted for teaching online. Webex platform is used in teaching and learning and all the lectures are recorded. The teaching is held using OneNote platform and an electronic pencil. Students were submitting homework using the LearningKey platform. The knowledge verification is used online as a pilot project.


LearningKey
Teacher
Home
Calendar
Students
Administration
Content ▸ Math and Informatics
Required subject form for professors!!! PLACE THIS FORM IN YOUR SUBJECT
Boolean algebra and optimization
Izabrana poglavlja primenjene algebre


LearningKey
Teacher
Home
Calendar
Students
Administration
Boolean algebra and optimization
Content ▸ Math and Informatics ▸ Boolean algebra and optimization
BULOVE ALGEBRE I FUNKCIJE
Branimir Šešelja i Andreja Tepavčević


Learning Key
Date 24.12.2021 00:03
Student Fedor Kovacevic:
Domaći iz bulovih
Ne znam kako da Vam preko ovoga posaljem sliku pa sam prekucao u google tabele. Link za tabelu:
https://docs.google.com/spreadsheets/d/1N0xRHNYwtiSQD64dVoSpadqqvhEEbiwLxBhG8fg/edit?usp=sharing S poštovanjem, Fedor Kovačević


Learning Key
Date 23.12.2021 11:44
Student Natalija Babic
Bulove algebre i optimizacija(domaći)
IMG-20211222-WA0000 - view on ImgBB: https://ibb.co/v3VBjGr Poštovana profesorka, Poslala sam link na sliku, jer nisam pronašla opciju da direktno pošaljem sliku. Ako ne može preko linka, mogu poslati mejl. Srdačan pozdrav, Babic Natalija


Select
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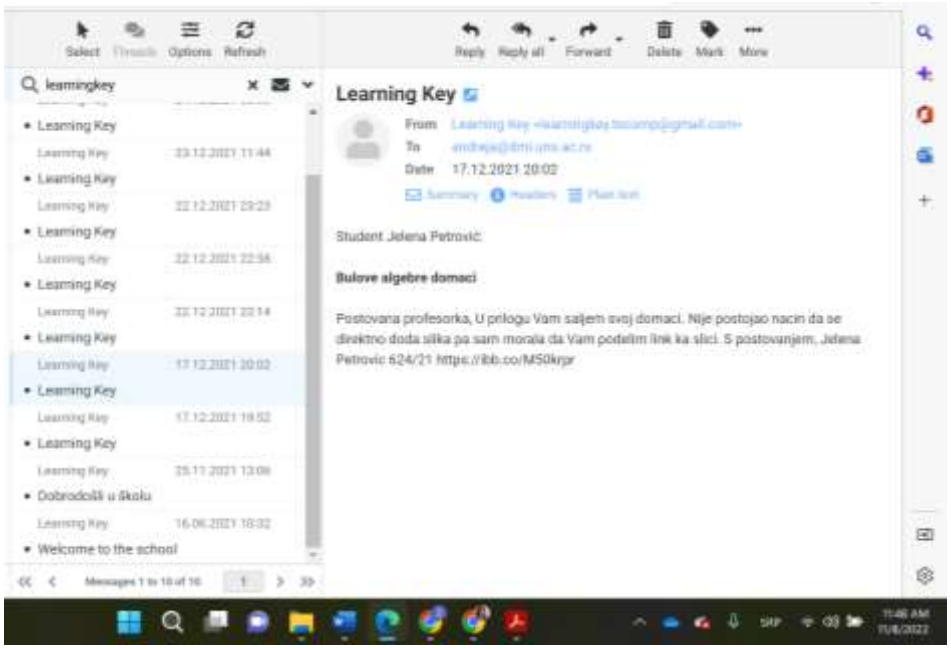
Student Neda Torovic:
Boolean algebra and optimization
Dobro veče profesorka, pokusavam da razumem nacin funkcionisanja ove platforme i našla sam načini da Vam pošaljem poruku, bar mislim da jesam, ali ne mogu da pronađem opciju da u istoj pošaljem i sliku domaćeg rada, nego samo običan tekst. Da li mi možete potvrditi da li ste dobili ovu poruku nisam sigurna ni da li dobro šaljem prvi put se susrećem sa ovom platformom. :) Unapred zahvalna, Neda Torovic 58/20


Select
Options
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learningkey
Learning Key
Dobrodošli u školu
Welcome to the school
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To
Date
17.12.2021 20:02
Student Jelena Petrović:
Bulove algebre domaci
Postovana profesorka, U prilogu Vam saljem svoj domaci. Nije postojao nacin da se direktno doda slika pa sam morala da Vam podelim link ka slici. S postovanjem, Jelena Petrovic 624/21 https://ibb.co/MS0krjr

Report on the modernized courses at the University of Kragujevac

New teaching materials related to selected lectures are published at LearningKey platform for the following modernized BSc and MSc courses at the University of Kragujevac.

P01-1. Probability and statistics 1;
P01-2. Probability and statistics;
P01-3. Educational software;
P01-4. Selected chapters of statistics;
P01-5. Introduction to programming;
P01-6. Practicum in programming 3;
P01-7. Mathematics 2;
P01-8. Introduction to analysis and algebra;
P01-9. Methodology of geometry teaching;
P01-10. Probability and statistics 2;
P01-11. History and philosophy of mathematics;
P01-12. Discrete mathematics;
P01-13. Mathematical physics 2;
P01-14. Microbial ecology;
P01-15. Biochemical and microbiological principles;
P01-16. Organic chemistry didactics.

P04-1. Probability and statistics 1 2021/22

REPORT

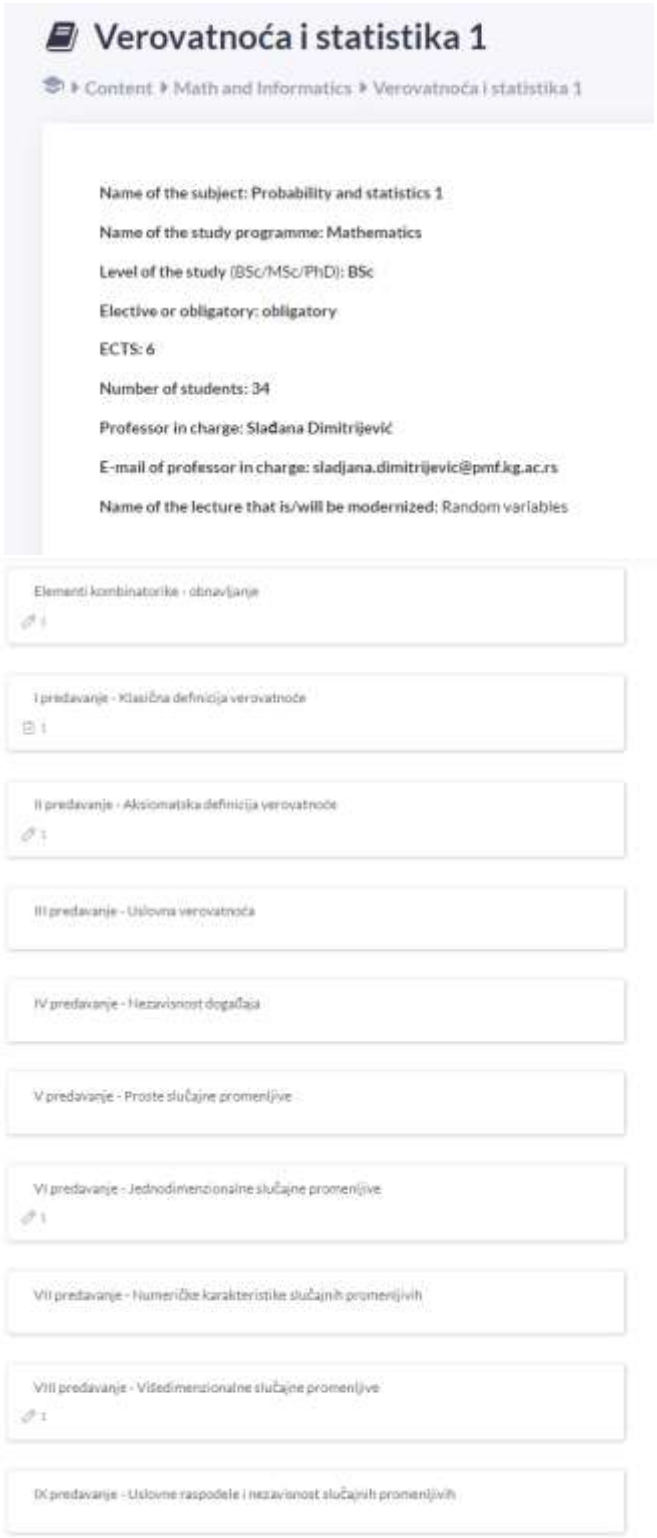
In the framework of project: "Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

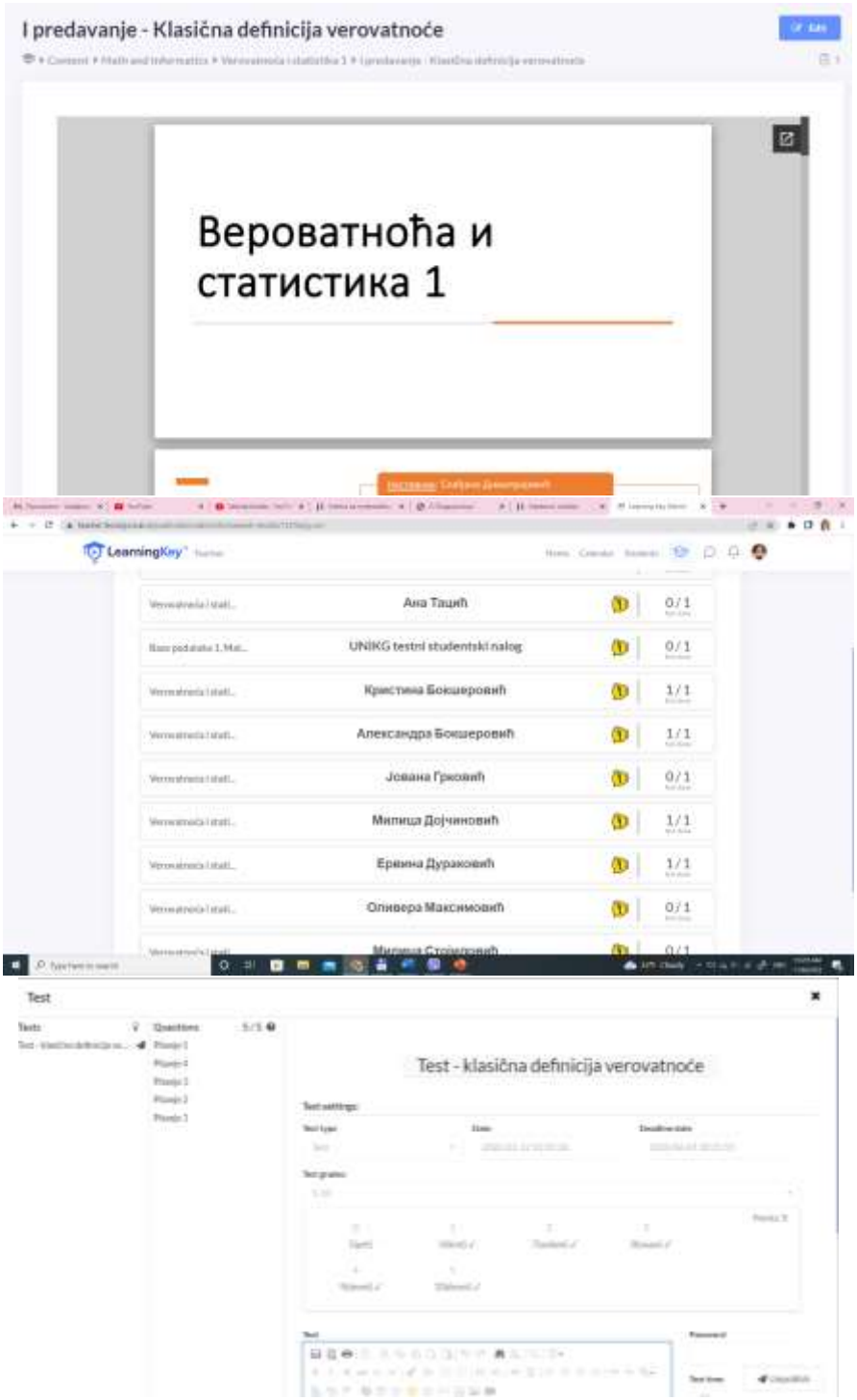
Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Probability and statistics 1**
Level of the study	**7th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Slađana Dimitrijević**
E-mail of the professor in charge	**sladjana.dimitrijevic@pmf.kg.ac.rs**
Methods * which are used in the course	**students' discussions, flipped classroom, online assessment**
Tools* which are used in the course	**PPT presentation, video materials, homework posted in LearningKey platform, tests**
Name of modernised teaching units	**Random variables**
Number of students	**34**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Probability and statistics 1, I modernized most of the teaching units. I created PPT presentations and videos for students and posted them online for the students to use them in accordance with the pace that suits students. I created online tests in order to give students opportunity to make self-evaluation of their knowledge and their achievements when it comes to predicted probability contents. During this course, I used the flipped classroom concept as well. For that purpose, I created assignments for students and gave them homework using LearningKey platform in order for students to get informed about the given contents before the class.


Verovatnoća i statistika 1
Content ▸ Math and Informatics ▸ Verovatnoća i statistika 1
Name of the subject: Probability and statistics 1
Name of the study programme: Mathematics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: obligatory
ECTS: 6
Number of students: 34
Professor in charge: Slađana Dimitrijević
E-mail of professor in charge: sladjana.dimitrijevic@pmf.kg.ac.rs
Name of the lecture that is/will be modernized: Random variables
Elementi kombinatorike - obnavljanje
I predavanje - Klasična definicija verovatnoće
II predavanje - Aksiomatska definicija verovatnoće
III predavanje - Uslovna verovatnoća
IV predavanje - Nezavisnost događaja
V predavanje - Proste slučajne promenljive
VI predavanje - Jednodimenzionalne slučajne promenljive
VII predavanje - Numeričke karakteristike slučajnih promenljivih
VIII predavanje - Višedimenzionalne slučajne promenljive
IX predavanje - Uslovne raspodele i nezavisnost slučajnih promenljivih


I predavanje - Klasična definicija verovatnoće
Вероватноћа и статистика 1
LearningKey
Ана Тацић
UNIKG testni studentski nalog
Кристина Бокшеровић
Александра Бокшеровић
Јована Грковић
Милица Дојчиновић
Ерина Дураковић
Оливера Максимовић
Test
Test - klasična definicija verovatnoće

P04-2. Probability and statistics, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Informatics**
Name of the course	**Probability and statistics**
Level of the study	**1st semester, MSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Slađana Dimitrijević**
E-mail of the professor in charge	**sladjana.dimitrijevic@pmf.kg.ac.rs**
Methods * which are used in the course	**students' discussions, flipped classroom, online assessment**
Tools* which are used in the course	**PPT presentation, video materials, homework posted in LearningKey platform**
Name of modernised teaching units	**Probability space**
Number of students	**20**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Probability and statistics (for students from the Informatics study programme) I modernized the teaching units in manner that I created PPT presentations and videos for students and posted them online. Students could use them in accordance with the pace that suits their individual needs. During the course, I also used the flipped classroom concepts. I created assignments for students and gave them homework. Homework was posted on LearningKey platform in order for students to get informed for the next class and to make some conclusions before generalizing the appropriate concepts.

Verovatnoća i statistika

Content ▸ Math and Informatics ▸ Verovatnoća i statistika

Name of the subject: Probability and statistics

Name of the study programme: Informatics

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: obligatory

ECTS: 6

Number of students: 20

Professor in charge: Slađana Dimitrijević

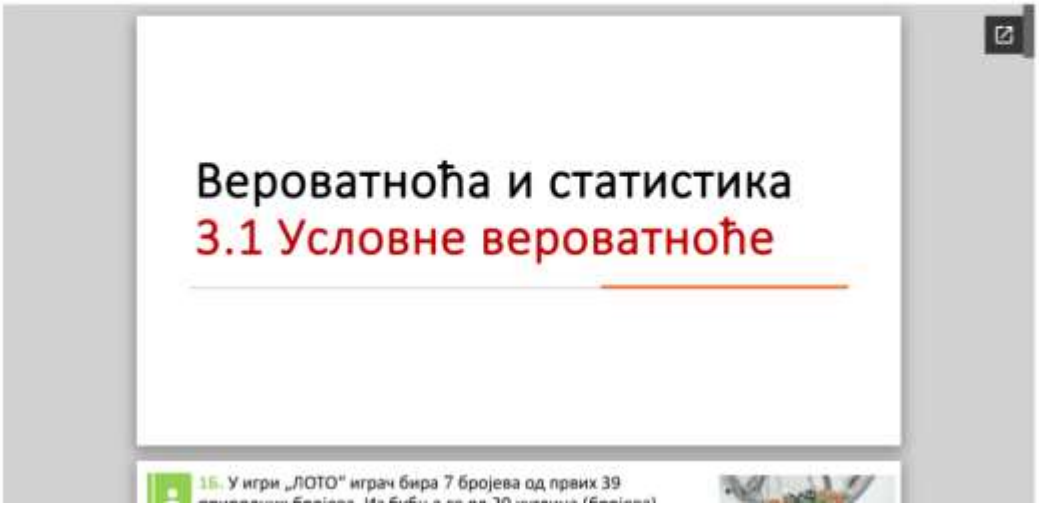
E-mail of professor in charge: sladjana.dimitrijevic@pmf.kg.ac.rs

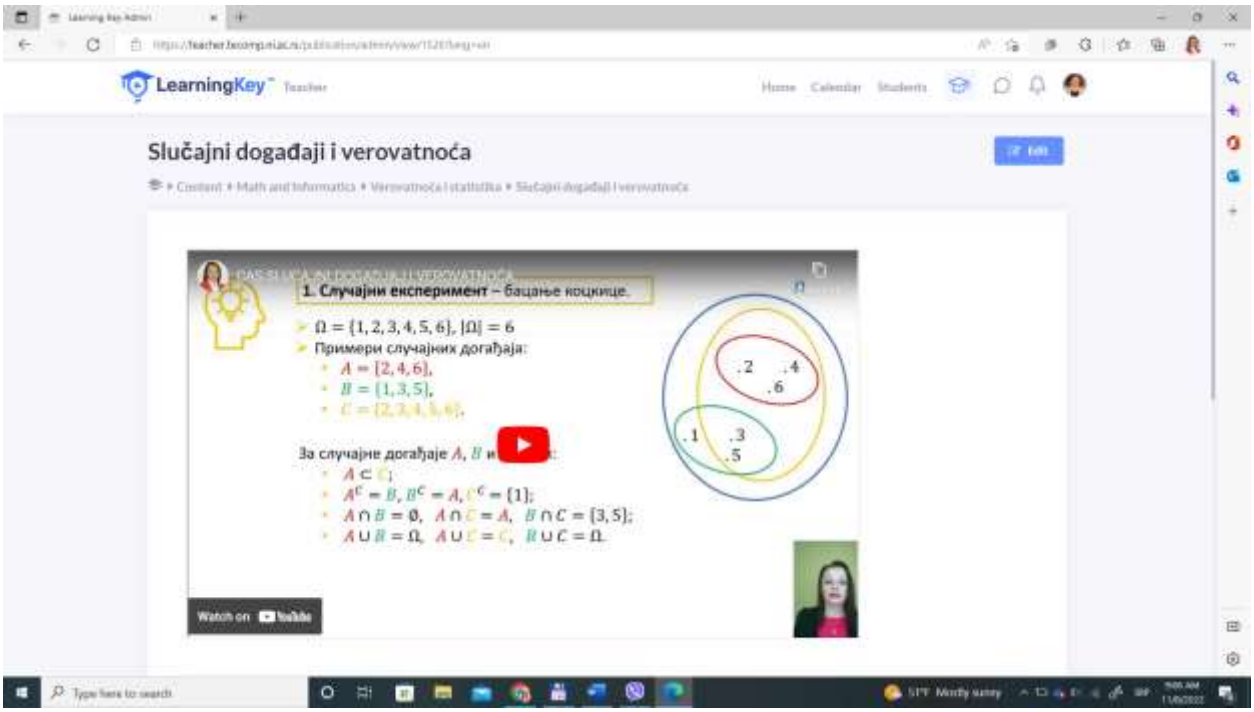
Name of the lecture that is/will be modernized: Probability space

Uslovne verovatnoće i nezavisnost događaja

Edit

Content ▸ Math and Informatics ▸ Verovatnoća i statistika ▸ Uslovne verovatnoće i nezavisnost događaja




LearningKey
Home
Calendar
Students
Slučajni događaji i verovatnoća
Edit
1. Случајни експеримент – бацање коцкице.
Ω = {1, 2, 3, 4, 5, 6}, |Ω| = 6
Примери случајних догађаја:
A = [2, 4, 6],
B = {1, 3, 5},
.2
.4
.6
.1
.3
.5
Watch on

P04-3. Educational software, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Educational software**
Level of the study	**5th semester, BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Tatjana Tomović Mladenović, Aleksandar Milenković, Marko Dabić**
E-mail of the professor in charge	**tatjana.tomovic@pmf.kg.ac.rs aleksandar.milenkovic@pmf.kg.ac.rs marko.dabic@pmf.kg.ac.rs**
Methods * which are used in the course	**Peer evaluation, peer feedback, Using dynamic software**
Tools* which are used in the course	**Rubrics, GeoGebra, Wolfram Mathematica, Google Forms, Edpuzzle, Forms for peer feedback**
Name of modernised teaching units	**Designing knowledge clips by students, Creating interactive video lesson – after creating the knowledge clips students will create interactive video, after uploading it to the adequate platform**
Number of students	**13**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In this course we implemented a couple of new ideas. First of all, we decided that students should create the interactive teaching materials using GeoGebra that could be used for teaching in elementary school or in high school for the mathematics classes. Using those materials students also created PPT presentations and presented their work online. After that, teachers provided them forms for giving feedback to other colleagues in order for students to develop critical thinking and higher cognitive level skills. Later, students had the obligation to create learning video using the software packages as GeoGebra

and Wolfram Mathematica on the given topic and to put those videos on the Edpuzzle platform. During that process, students made the videos interactive with introducing the multiple-choice and/or open-ended questions. At the end of the course, students' work was assessed using rubrics created by teachers for this course.

Obrazovni softver 1

Content ▸ Math and Informatics ▸ Obrazovni softver 1

Name of the subject: Educational software

Name of the study programme: Mathematics

Level of the study (BSc/MSc/PhD)**: BSc**

Elective or obligatory: elective

ECTS: 4

Number of students: 13

Professor in charge: Tatjana Tomović Mladenović, Aleksandar Milenković, Marko Dabić

E-mail of professor in charge: tatjana.tomovic@pmf.kg.ac.rs aleksandar.milenkovic@pmf.kg.ac.rs

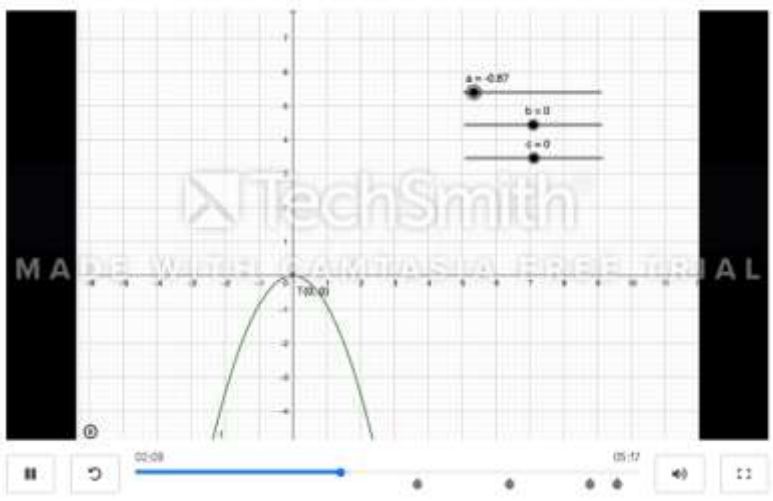
marko.dabic@pmf.kg.ac.rs

Name of the lecture that is/will be modernized:

1. Designing knowledge clips by students:

creating digital content on the given math subject by using dynamic software (GeoGebra or Wolfram Mathematica)
creating video materials with usage of screen recording software;
using software for designing multimedia presentations;
using software for video editing.

2. Creating interactive video lesson – after creating the knowledge clips students will create interactive video, after uploading it to the adequate platform.



P04-4. Selected chapters of statistics, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Informatics**
Name of the course	**Selected chapters of statistics**
Level of the study	**1st semester, Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Slađana Dimitrijević**
E-mail of the professor in charge	**sladjana.dimitrijevic@pmf.kg.ac.rs**
Methods * which are used in the course	**students' discussions, flipped classroom, online assessment**
Tools* which are used in the course	**PPT presentation, video materials, homework posted in LearningKey platform**
Name of modernised teaching units	**Selected topics for combinatorics**
Number of students	**8**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Selected chapters of statistics (for students from the Informatics master study programme) I modernized the teaching units in manner that I created PPT presentations and videos for students and posted them online. Students could use them in accordance with the pace that suits their individual needs. During the course, I also used the flipped classroom concepts. I created assignments for students and gave them homework. Homework was posted on LearningKey platform in order for students to get informed for the next class and to make some conclusions before generalizing the appropriate concepts.

Odabrana poglavlja statistike

Content ▸ Math and Informatics ▸ Odabrana poglavlja statistike

Name of the subject: Selected chapters of statistics

Name of the study programme: Informatics

Level of the study (BSc/MSc/PhD): MSc

Elective or obligatory: obligatory

ECTS: 6

Number of students: 8

Professor in charge: Slađana Dimitrijević

E-mail of professor in charge: sladjana.dimitrijevic@pmf.kg.ac.rs

Name of the lecture that is/will be modernized: Selected topics for combinatorics

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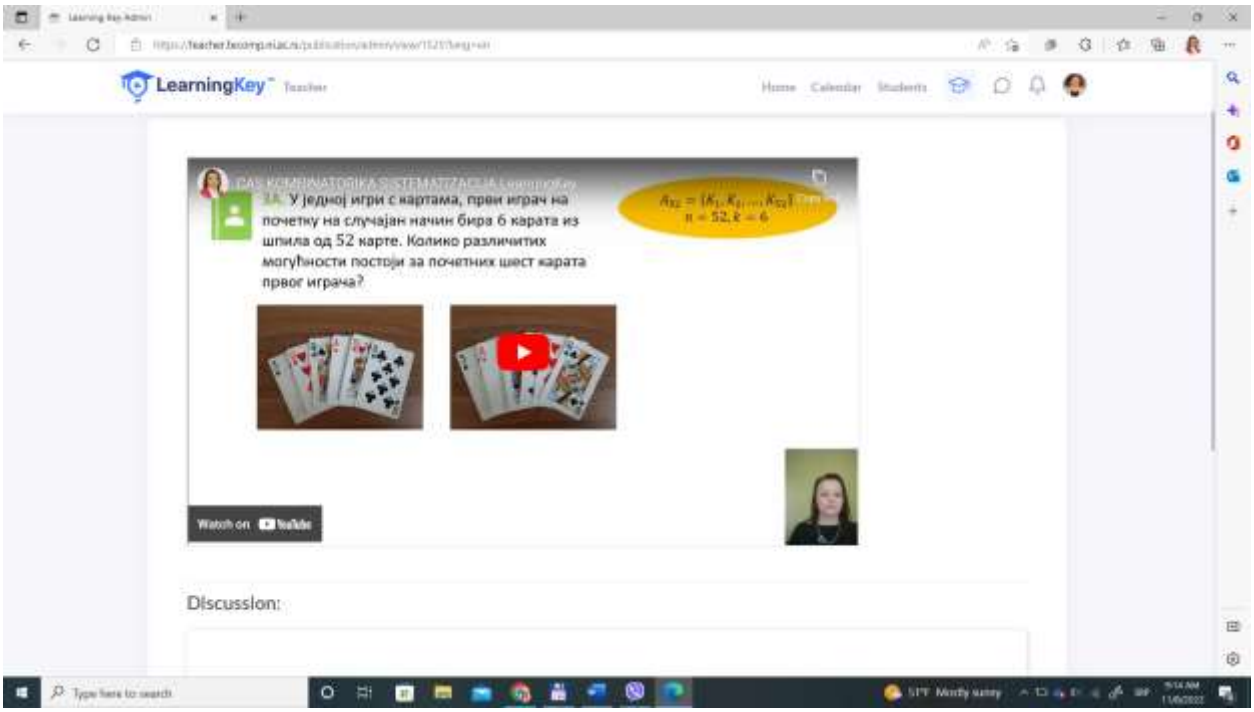



I predavanja - Klasična definicija verovatnoće
Edit
Content ▸ Math and Informatics ▸ Odabrana poglavlja statistike ▸ I predavanja - Klasična definicija verovatnoće
Вероватноћа
Могућност да ће бити падавина је 60%.
9°C
Коначно су погодили!
Опет су погрешили!

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P04-5. Introduction to programming, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Introduction to programming**
Level of the study	**2nd semester, BSc**
Type of the course (elective/obligatory)	**obligatory**
Professor in charge	**Marina Svičević**
E-mail of the professor in charge	**marina.svicevic@pmf.kg.ac.rs**
Methods * which are used in the course	**Problem solving methods, videos, feedback**
Tools* which are used in the course	**Edpuzzle, Idle, Camtasia**
Name of modernised teaching units	**Introduction to Python**
Number of students	**39**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

As part of the Introduction to Programming course, students of the first year of bachelor mathematics studies had the opportunity to get acquainted with the basics of programming and the Python programming language. Teaching material were presented through PPT presentations. Students programmed in the Idle development environment. A selected part of the content was presented through short videos. Using Edpuzzle, I created an interactive video in which the students had to answer the questions in order to assess their current knowledge on the given topic. Within the LearningKey platform, homework was created, within which the students were obligated to submit a file with solutions, within the time limit there were given. After that, I had an insight into all submitted solutions.

Uvod u programiranje

Content ▸ Math and Informatics ▸ Uvod u programiranje

Name of the subject: Introduction to programming

Name of the study programme: Mathematics

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: obligatory

ECTS: 6

Number of students: 40

Professor in charge: Marina Svičević

E-mail of professor in charge: marina.svicevic@pmf.kg.ac.rs

Name of the lecture that is/will be modernized: Introduction to Python

Predavanja 17.03.2022.

Predavanja 24.03.2022.

Predavanja 7.04.2022.

Rekurzija

2022-04-16 23:30:00 3

Predavanja 14.04.2022.

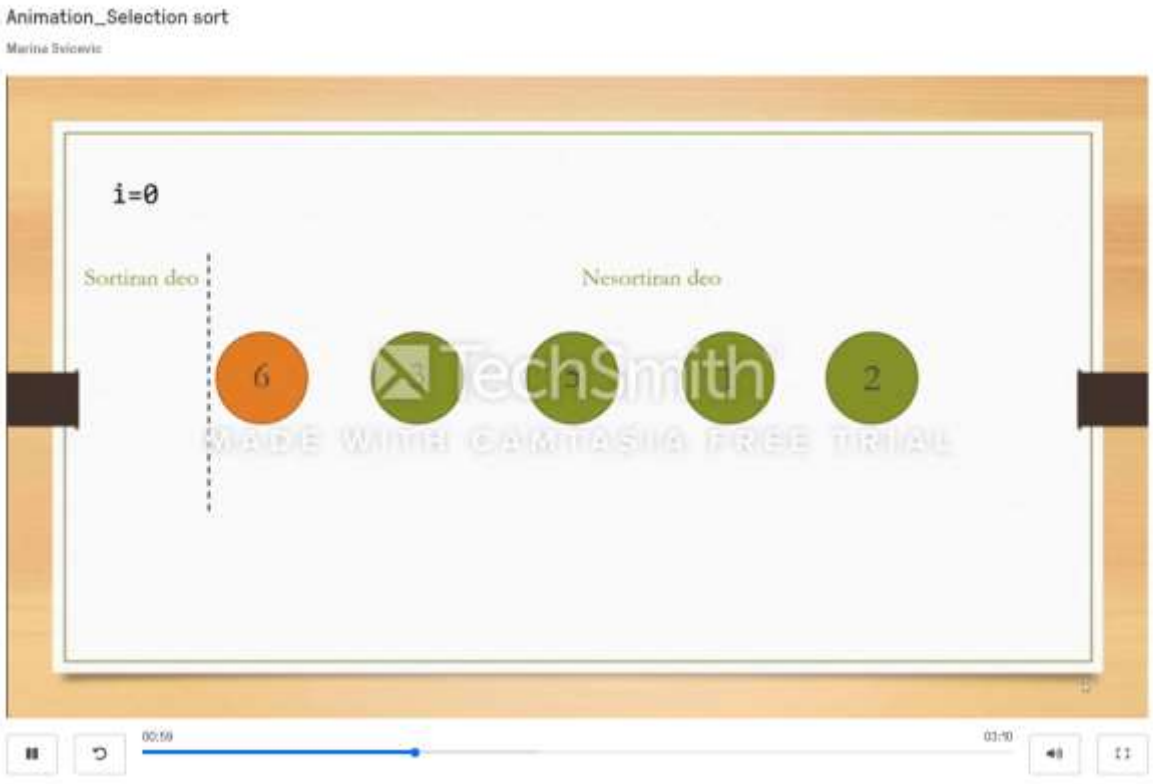
Lista listi - obavezan domaći za sve studente!

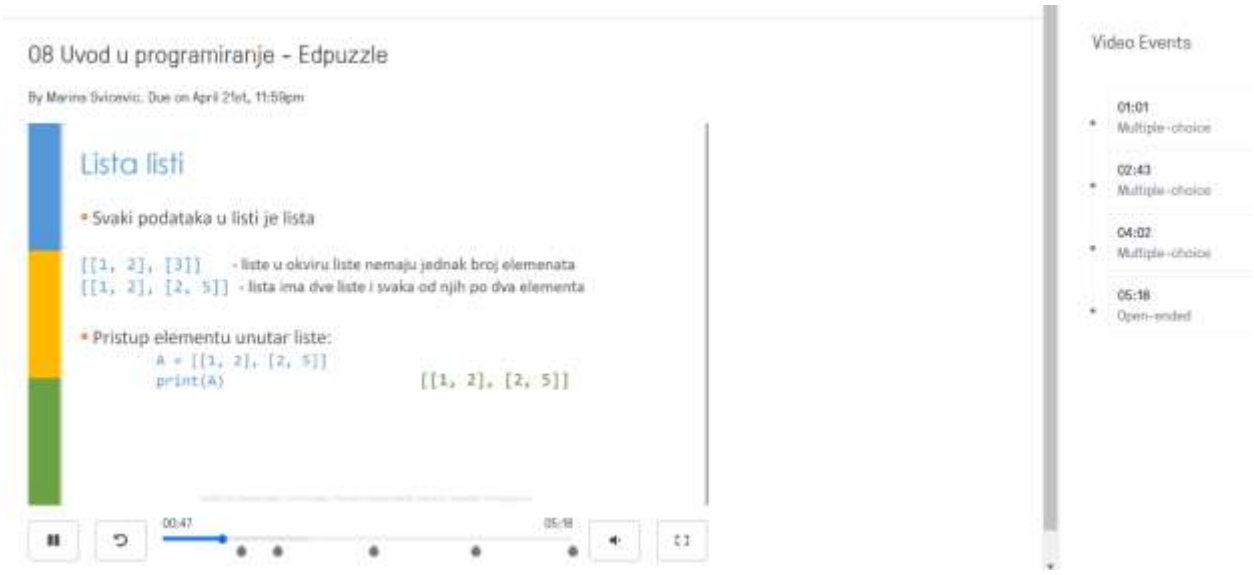
Na datom linku nalazi vam se Video vezan za rad sa matricama u programskom jeziku Python.

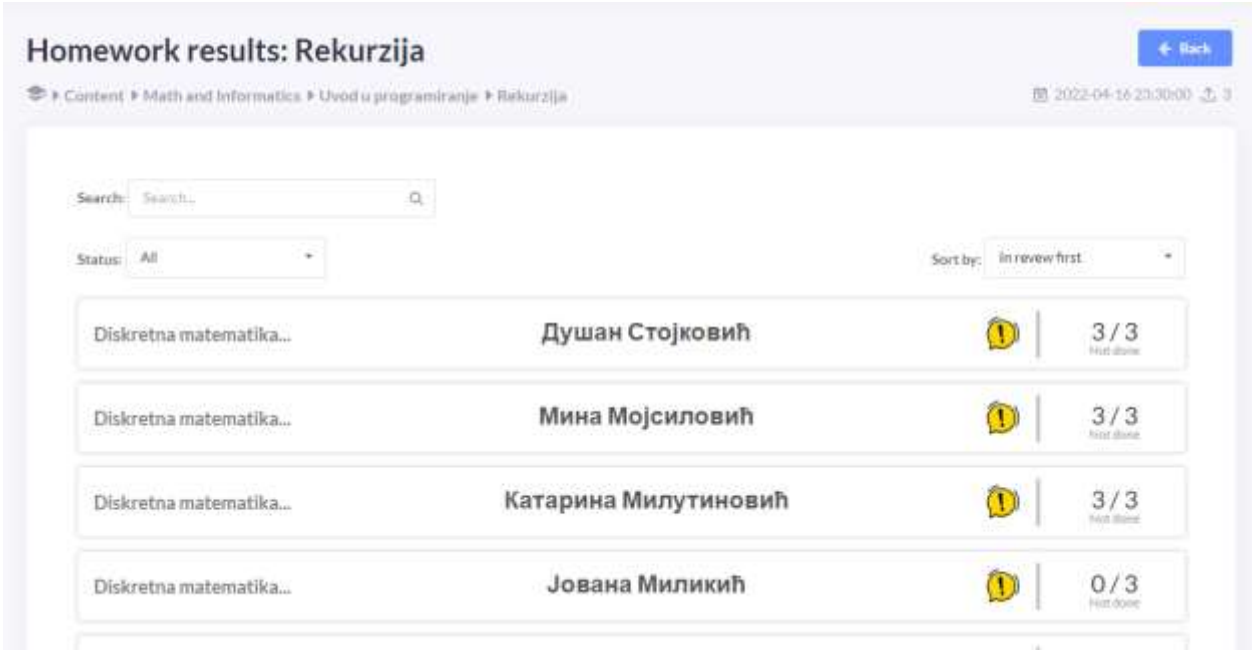
Da bi ste odgledali video potrebno je da se logujete sa svojim Microsoft nalozima (koristite ih na vašim portalima), ili svojim privatnim gmail nalozima, svejedno je, bitno je da se vidi vaše ime i prezime. Tokom video neophodno je odgovoriti na postavljena pitanja.

Rok je 20.4.2022.


Predavanja 14.04.2022.
Edit
Content ▸ Math and Informatics ▸ Uvod u programiranje ▸ Predavanja 14.04.2022.
Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
Uvod u programiranje
2021/22


Animation_Selection sort
Marina Svicevic
i=0
Sortiran deo
Nesortiran deo
6
2
TechSmith
MADE WITH CAMTASIA FREE TRIAL


08 Uvod u programiranje - Edpuzzle
By Marina Svicevic. Due on April 21st, 11:59pm
Lista listi
Svaki podataka u listi je lista
[[1, 2], [3]] - liste u okviru liste nemaju jednak broj elemenata
[[1, 2], [2, 5]] - lista ima dve liste i svaka od njih po dva elementa
Pristup elementu unutar liste:
A = [[1, 2], [2, 5]]
print(A)
[[1, 2], [2, 5]]
00:47
05:18
Video Events
01:01
Multiple-choice
02:43
Multiple-choice
04:02
Multiple-choice
05:18
Open-ended


Homework results: Rekurzija
Back
Content ▸ Math and Informatics ▸ Uvod u programiranje ▸ Rekurzija
Search:
Status: All
Sort by: In review first
Diskretna matematika... Душан Стојковић 3 / 3
Diskretna matematika... Мина Мојсиловић 3 / 3
Diskretna matematika... Катарина Милутиновић 3 / 3
Diskretna matematika... Јована Миликић 0 / 3

P04-6. Practicum in programming 3, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Informatics**
Name of the course	**Practicum in programming 3**
Level of the study	**2nd semester, BSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Marina Svičević**
E-mail of the professor in charge	**marina.svicevic@pmf.kg.ac.rs**
Methods * which are used in the course	**Problem solving methods, peer discussions,**
Tools* which are used in the course	**Idle, PyCharm, Edpuzzle, Forms**
Name of modernised teaching units	**Advanced level - Python**
Number of students	**53**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

As part of the Practicum in Programming 3 course, students were introduced with appropriate usage of different libraries within the Python programming language. IDLE was used as the primary development environment, although the students could also use some other development environments, for example PyCharm. The theoretical part of the teaching was presented through PPT presentations that were uploaded within the LearningKey platform. The students had the opportunity to deliver their homework, which they received in the form of problem, with the aim of establishing and deepening their knowledge within the aforementioned platform.

Praktikum iz programiranja 3

Content ▸ Math and Informatics ▸ Praktikum iz programiranja 3

Name of the subject: Practicum in programming 3

Name of the study programme: Informatics

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: Elective

ECTS: 4

Number of students: 53

Professor in charge: Marina Svičević

E-mail of professor in charge: marina.svicevic@pmf.kg.ac.rs

Name of the lecture that is/will be modernized: Advanced level - Python

Homework is finished. Give grade to your students attempt

Dat je pravougaonik ABCD čije su stranice paralelne sa koordinatnim osama i tačke P, Q van njega. Odrediti dužinu najkraće linije koja povezuje tačke P i Q i ne sadrži unutrašnje tačke pravougaonika.

•Ulaz

•U prvom redu koordinate temena jedne dijagonale pravougaonika (ukupno 4 broja).

•U drugom redu koordinate tačke P.

•U trećem redu koordinate tačke Q.

•U svakom redu brojevi su realni i razdvojeni po jednim razmakom.

•Izlaz

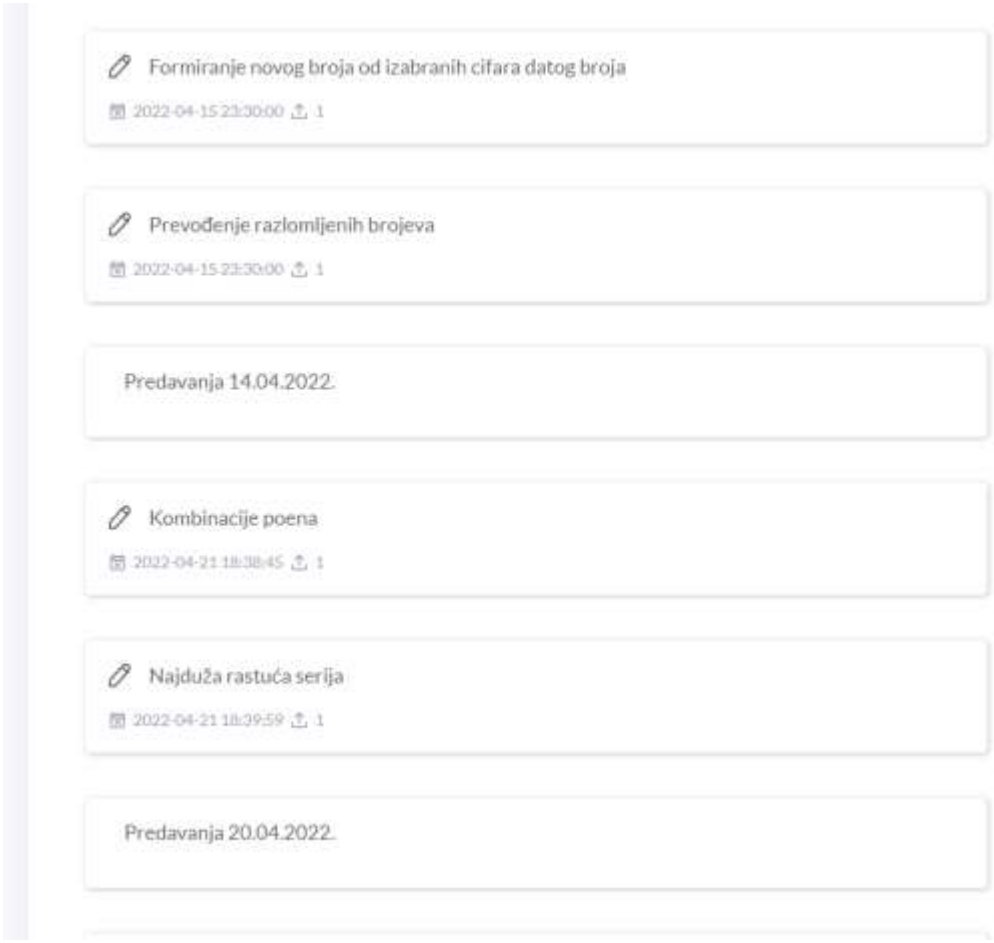
•Jedan realan broj zaokružen na 5 decimala, koji predstavlja najmanju moguću dužinu opisane linije.

Ulaz	Izlaz
5 1 2 2 5 3 4 -2	5.16228

User upload

Student uploaded files:

Total files submitted: 7 Review


Formiranje novog broja od izabranih cifara datog broja
2022-04-15 23:30:00 1
Prevođenje razlomljenih brojeva
2022-04-15 23:30:00 1
Predavanja 14.04.2022.
Kombinacije poena
2022-04-21 18:38:45 1
Najduža rastuća serija
2022-04-21 18:39:59 1
Predavanja 20.04.2022.

P04-7. Mathematics 2, 2021/22

REPORT

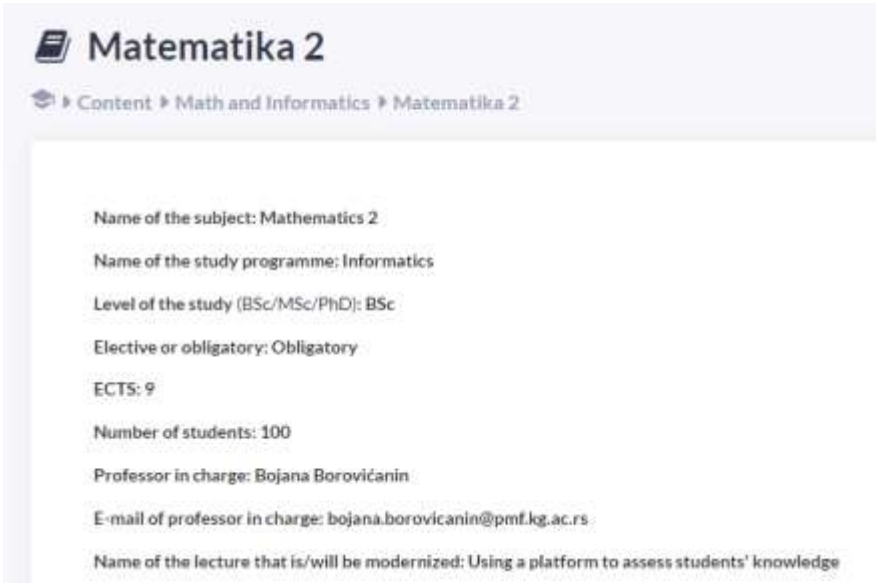
In the framework of project :" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

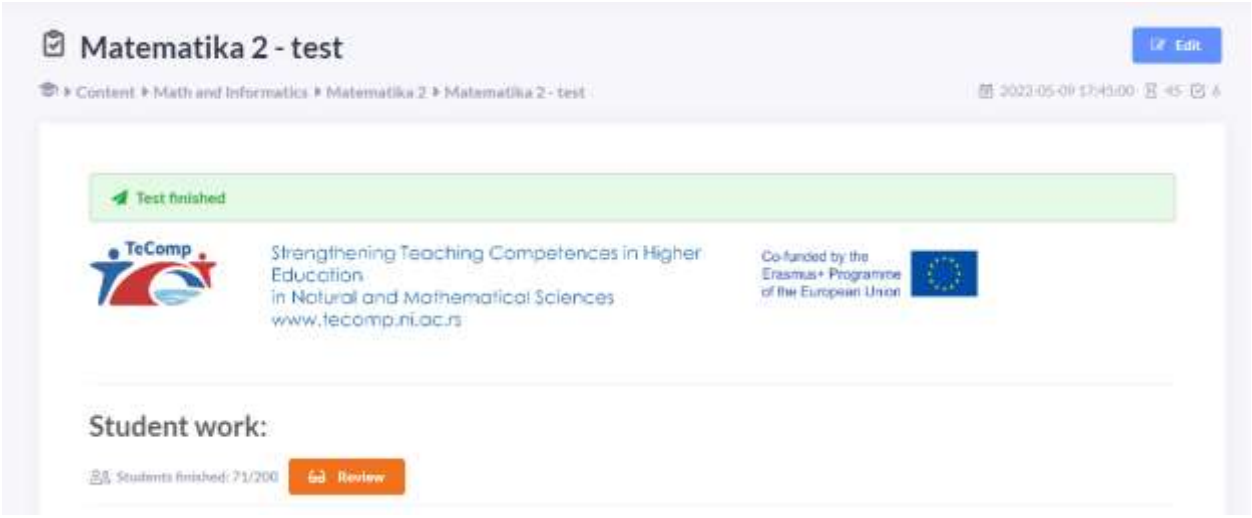
Name of the University	**University of Kragujevac**
Name of the study programme	**Informatics**
Name of the course	**Mathematics 2**
Level of the study	**2nd semester, BSc**
Type of the course (elective/obligatory)	**0bligatory**
Professor in charge	**Bojana Borovićanin**
E-mail of the professor in charge	**bojana.borovicanin@pmf.kg.ac.rs**
Methods * which are used in the course	**Problem solving methods, testing students**
Tools* which are used in the course	**Tests, teaching materials for problem-solving**
Name of modernised teaching units	**Using a platform to assess students' knowledge**
Number of students	**100**

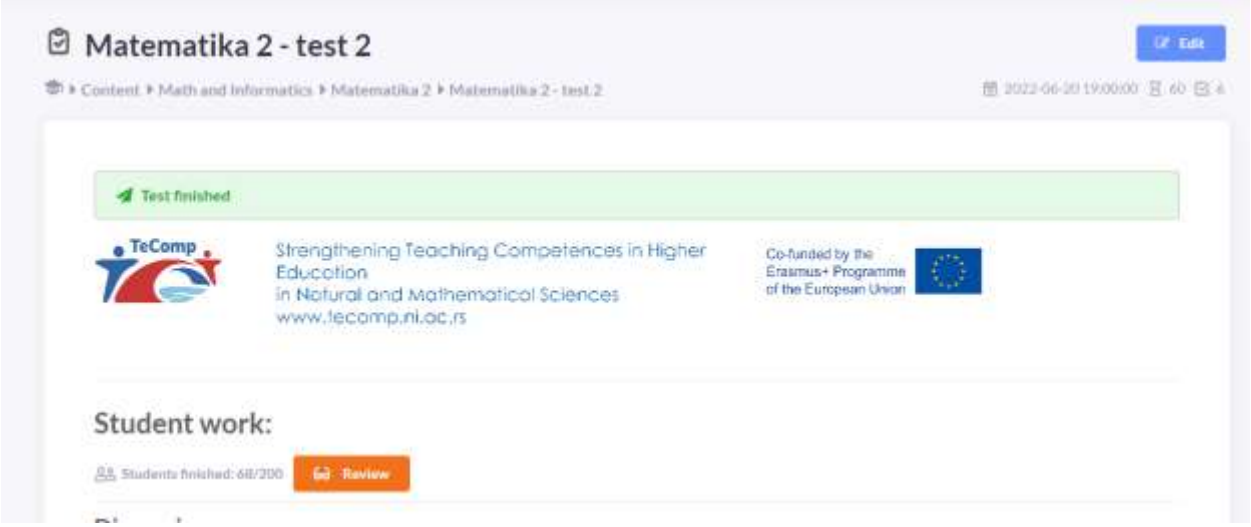
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

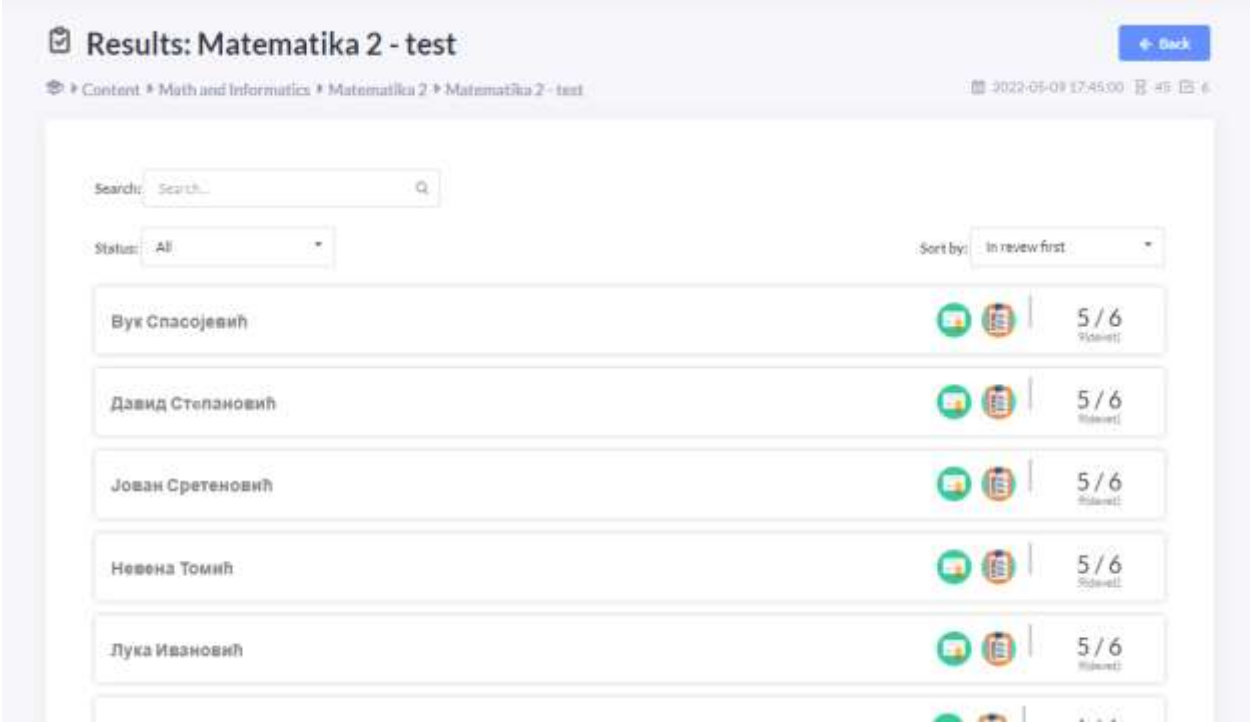
The methods/tools used in the course modernisation

Since the students from the Informatics study programme have some theoretical and practical knowledge regarding teaching contents planned to be realized through Mathematics 2 course, I tried to implement problem-solving approach as much as that was reasonable. Students were informed about a given problem putted in the real context or in the scientific context and their task (by working in groups) was to do some theoretical inquiry and use that theoretical knowledge in order to solve the appropriate problem. Different problems were given to the different groups of students that have same theoretical background and then there was discussion about their solutions. Also, in order for students to practice their theoretical knowledge and solve the appropriate tasks, I created and implemented tests on the LearningKey platform. In that way students could check and self-assess their knowledge.


Matematika 2
Content ▸ Math and Informatics ▸ Matematika 2
Name of the subject: Mathematics 2
Name of the study programme: Informatics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obligatory
ECTS: 9
Number of students: 100
Professor in charge: Bojana Borovićanin
E-mail of professor in charge: bojana.borovicanin@pmf.kg.ac.rs
Name of the lecture that is/will be modernized: Using a platform to assess students' knowledge


Matematika 2 - test
Edit
Content ▸ Math and Informatics ▸ Matematika 2 ▸ Matematika 2 - test
Test finished
TeComp
Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
www.tecomp.ni.ac.rs
Co-funded by the Erasmus+ Programme of the European Union
Student work:
Students finished: 71/200
Review


Matematika 2 - test 2
Edit
Content ▸ Math and Informatics ▸ Matematika 2 ▸ Matematika 2 - test 2
Test finished
TeComp
Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
www.tecomp.ni.ac.rs
Co-funded by the Erasmus+ Programme of the European Union
Student work:
Students finished: 68/200
Review


Results: Matematika 2 - test
Back
Content ▸ Math and Informatics ▸ Matematika 2 ▸ Matematika 2 - test
Search:
Status: All
Sort by: In review first
Вук Спасојевић 5 / 6
Давид Стефановић 5 / 6
Јован Сретеновић 5 / 6
Невена Томић 5 / 6
Лука Ивановић 5 / 6

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

Co-funded by the
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of the European Union

P04-8. Introduction to analysis and algebra, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

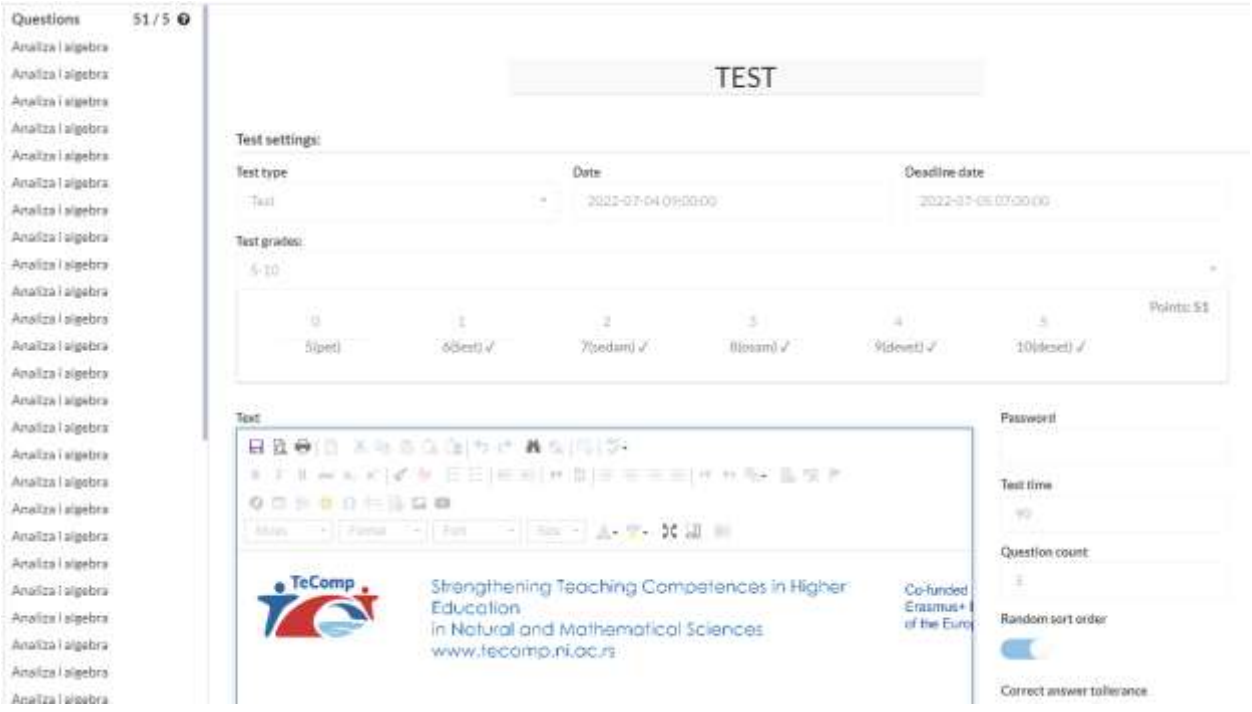
Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Introduction to analysis and algebra**
Level of the study	**1st semester, BSc**
Type of the course (elective/obligatory)	**obligatory**
Professor in charge	**Tatjana Tomović Mladenović**
E-mail of the professor in charge	**tatjana.tomovic@pmf.kg.ac.rs**
Methods * which are used in the course	**Peer discussions, flipped classroom**
Tools* which are used in the course	**Tests for self-evaluation, MSTeams**
Name of modernised teaching units	**Modern form of testing**
Number of students	**27**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Teaching contents from the course Introduction to Analysis and Algebra are to a large extent directly based on the contents that the students were previously acquainted during their high school education. Having that in mind I decided to use the blended learning approach for this course in great extent. For instance, I provided students with instruction to read or watch some materials (with some theoretical explanations and/or with some examples) posted online and then to try to prepare some examples of their own in order to illustrate those ideas and concepts. For instance, when dealing with elementary functions, they had an assignment to analyze some online materials and after that to choose some, different examples of one function, which differed by the values of some parameters in a given function, then to determine the characteristics of that function and to prepare an explanation about how changes in some parameters (in the algebraic representation) of the function affects the geometric properties of those function. Also, I created tests in the LearningKey platform, for students to evaluate their own knowledge and skills.


Uvod u analizu i algebru
Content ▸ Math and Informatics ▸ Uvod u analizu i algebru
Name of the subject: Introduction to analysis and algebra
Name of the study programme: Mathematics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: obligatory
ECTS: 7
Number of students: 27
Professor in charge: Tatjana Tomović Mladenović
E-mail of professor in charge: tatjana.tomovic@pmf.kg.ac.rs
Name of the lecture that is/will be modernized: Modern form of testing


Questions
51 / 5
TEST
Test settings:
Test type
Date
Deadline date
Test grades:
Points: 51
Text
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Test time
Question count
Random sort order
Correct answer tolerance
Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
www.tecomp.pi.ac.rs


Милош Сечивановић
/
Ана Живковић
0 / 5
Бранко Станисављевић
5 / 5
Тијана Рашковић
5 / 5
Илија Николић
5 / 5
Катарина Лазовић
5 / 5

Strengthening Teaching Competences
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in Natural and Mathematical Sciences

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P04-9. Methodology of geometry teaching, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

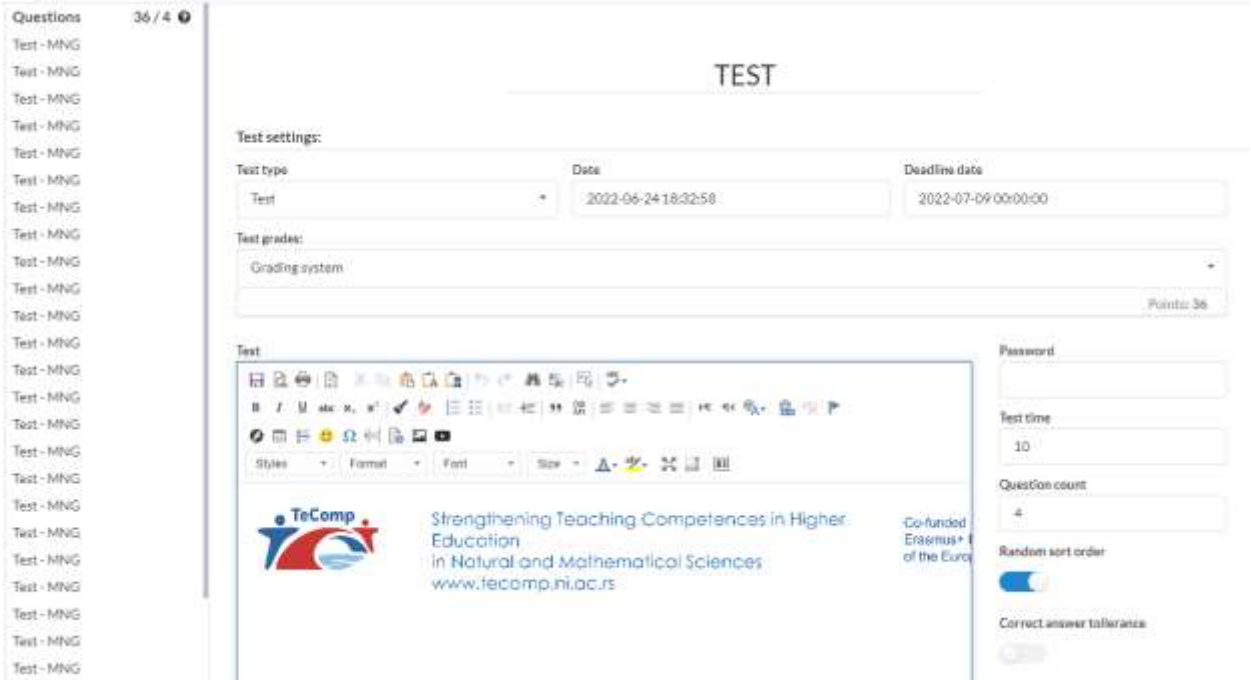
Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Methodology of geometry teaching**
Level of the study	**2nd semester, MSc**
Type of the course (elective/obligatory)	**elective**
Professor in charge	**Aleksandar Milenković**
E-mail of the professor in charge	**aleksandar.milenkovic@pmf.kg.ac.rs**
Methods * which are used in the course	**Problem solving methods, peer discussions, seminars, flipped classroom**
Tools* which are used in the course	**GeoGebra, Wolfram Mathematica, Kahoot, Online tests for self-evaluation, MSTeams**
Name of modernised teaching units	**Using dynamical software in teaching geometry, Using ICT for the assessment of students' knowledge, Constructing assessment in order with Bloom taxonomy.**
Number of students	**5**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

During the Methodology of Geometry Teaching course, students were introduced to different types of definitions and theorems, which involved engaging students in analysing different sources of knowledge. The students were also introduced to the different cognitive processes that are developed by pupils when they deal with mathematics problems (specifically geometry problems). The largest part of the teaching process was realized using the concept of a flipped classroom, so that students received materials online (within a group on the MSTeams platform and some of them on LearningKey platform) that they would examine, and then find appropriate examples on the given topic and present it in the first next lesson, which were followed by a discussion between students, but also with a discussion between teacher and students. When it comes to practical lessons, students had the opportunity to check their practical and

procedural knowledge and perform self-evaluation by solving tests posted on the KeyLearning platform. In the end, the student had a project task related to the writing a seminar paper that required a serious analysis of the mathematics curriculum for elementary and high school mathematics, with the use of critical thinking.


Questions
36 / 4
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Date
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Deadline date
2022-07-09 00:00:00
Test grades:
Grading system
Points: 36
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Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
www.tecomp.ni.ac.rs
Password
Test time
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Question count
4
Random sort order
Correct answer tollerance

P04-10. Probability and statistics 2, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

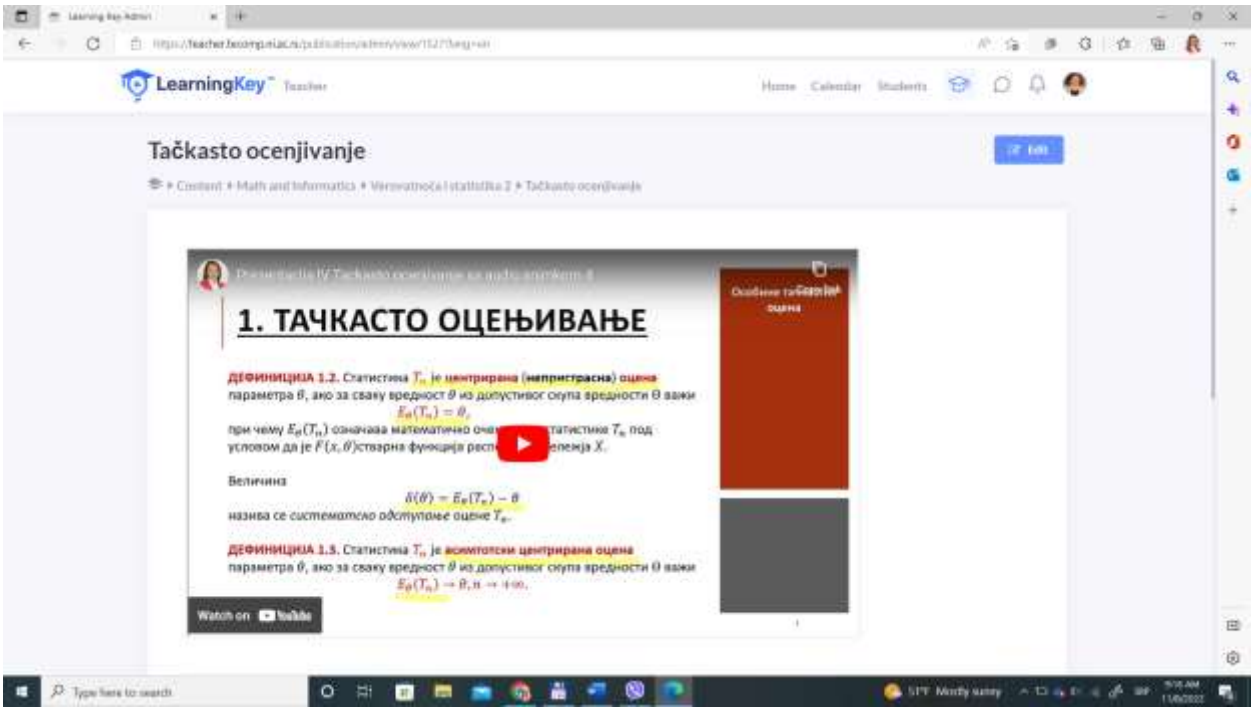
Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Probability and statistics 2**
Level of the study	**8th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Slađana Dimitrijević**
E-mail of the professor in charge	**sladjana.dimitrijevic@pmf.kg.ac.rs**
Methods * which are used in the course	**students' discussions, flipped classroom, online assessment**
Tools* which are used in the course	**PPT presentation, video materials, homework posted in LearningKey platform, tests**
Name of modernised teaching units	**Estimations of unknown distribution parameters**
Number of students	**35**

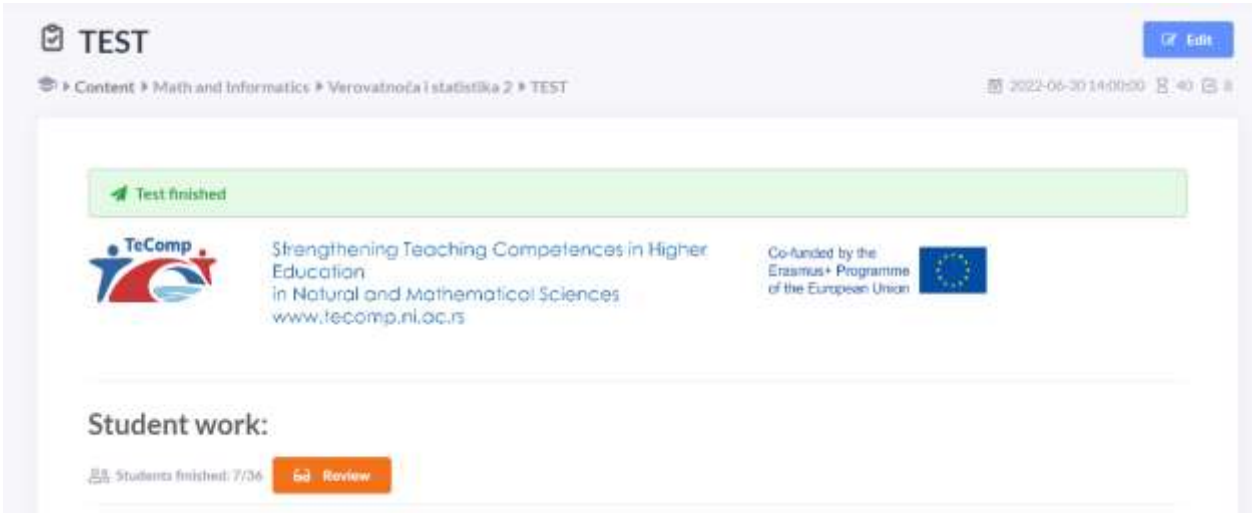
*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Probability and statistics 2 (for students from the Mathematics study programme) I modernized the teaching units in manner that I created PPT presentations and videos for students and posted them online. Students could use them in accordance with the pace that suits their individual needs. During the course, I also used the flipped classroom concepts. I created assignments for students and gave them homework and tests. Assignments were posted on LearningKey platform in order for students to get informed for the next class and to make some conclusions before generalizing the appropriate concepts.


Verovatnoća i statistika 2
Edit
Name of the subject: Probability and statistics 2
Name of the study programme: Mathematics
Elective or obligatory: obligatory
ECTS: 6
Professor in charge: Sladana Dimitrijević
Name of the lecture that is/will be modernized: Estimation of unknown distribution parameters
TEST


LearningKey
Tačkasto ocenjivanje
Edit
1. ТАЧКАСТО ОЦЕЊИВАЊЕ
ДЕФИНИЦИЈА 1.2. Статистика T_n је центрирана (непристрасна) оцена параметра θ, ако за сваку вредност θ из допустивог скупа вредности Θ важи
$E_\theta(T_n) = \theta$,
при чему $E_\theta(T_n)$ означава математичко очекивање статистике T_n под условом да је $F(x,\theta)$ стварна функција расподеле обележја X.
Величина
$\delta(\theta) = E_\theta(T_n) - \theta$
назива се систематско одступање оцене T_n.
ДЕФИНИЦИЈА 1.3. Статистика T_n је асимптотски центрирана оцена параметра θ, ако за сваку вредност θ из допустивог скупа вредности Θ важи
$E_\theta(T_n) \to \theta, n \to +\infty$.
Watch on


TEST
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Content ▸ Math and Informatics ▸ Verovatnoća i statistika 2 ▸ TEST
Test finished
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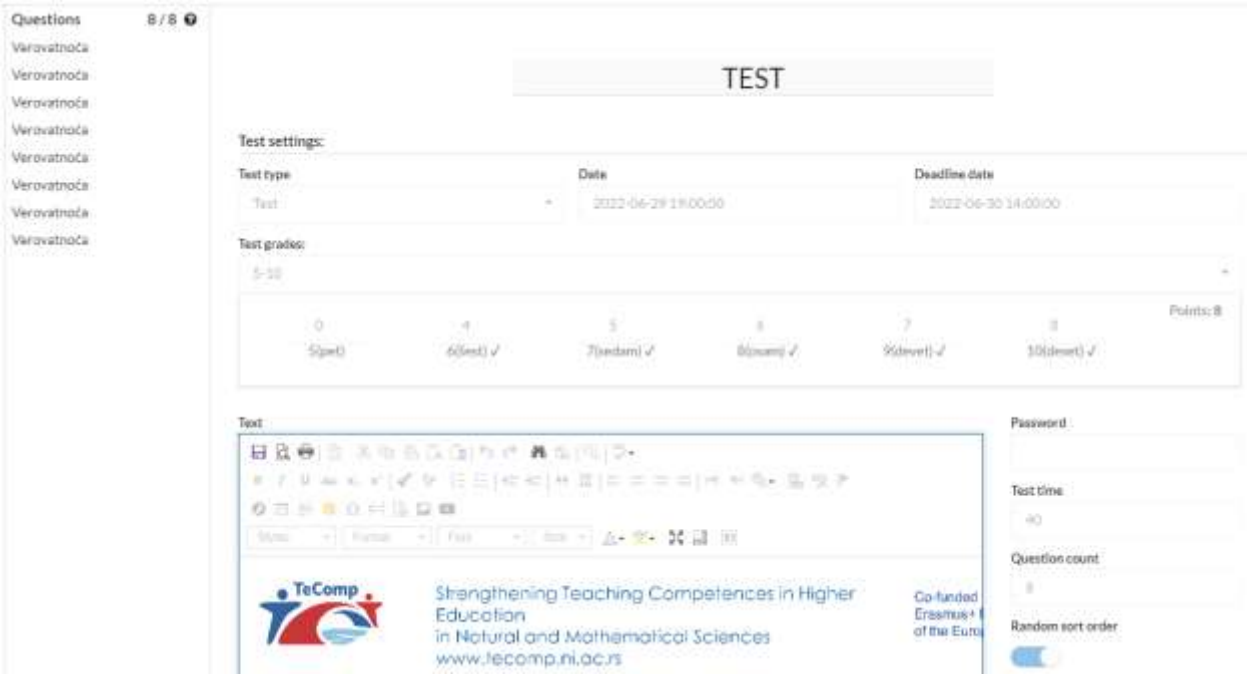
Co-funded by the Erasmus+ Programme of the European Union
Student work:
Review


Questions
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Question count
Random sort order
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P04-11. History and philosophy of mathematics, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**History and philosophy of mathematics**
Level of the study	**7th semester, BSc**
Type of the course (elective/obligatory)	**obligatory**
Professor in charge	**Nenad Stojanović**
E-mail of the professor in charge	**nenad.stojanovic@pmf.kg.ac.rs**
Methods * which are used in the course	**Problem solving methods, peer discussions, flipped classroom**
Tools* which are used in the course	**Online teaching materials, Tests for self-evaluation**
Name of modernised teaching units	**Using ICT for the assessment of students' knowledge**
Number of students	**15**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the History and Philosophy of Mathematics course, I made some modernisation of the course regarding the teaching methods. I introduced the flipped classroom method in the way that I send some interesting materials to students in order for them to start thinking about some mathematical concepts in the context of the historical period they were introduced and invented, an also to get informed about work of some famous mathematicians. After that, we discussed on the class about the given topic, and after the class I posted PPT presentations on the KeyLearning platform which represents the materials for learning. Also, I created tests on the LearningKey platform so that students could answer the given questions in order to check the level of their knowledge about the history of mathematics.

Istorija i filozofija matematike

Content ▸ Math and Informatics ▸ Istorija i filozofija matematike

Name of the subject: History and philosophy of mathematics

Name of the study programme: Mathematics

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: obligatory

ECTS: 6

Number of students: 15

Professor in charge: Nenad Stojanović

E-mail of professor in charge: nenad.stojanovic@pmf.kg.ac.rs

Name of the lecture that is/will be modernized: Using dynamical software in teaching, Using ICT for the assessment of students' knowledge

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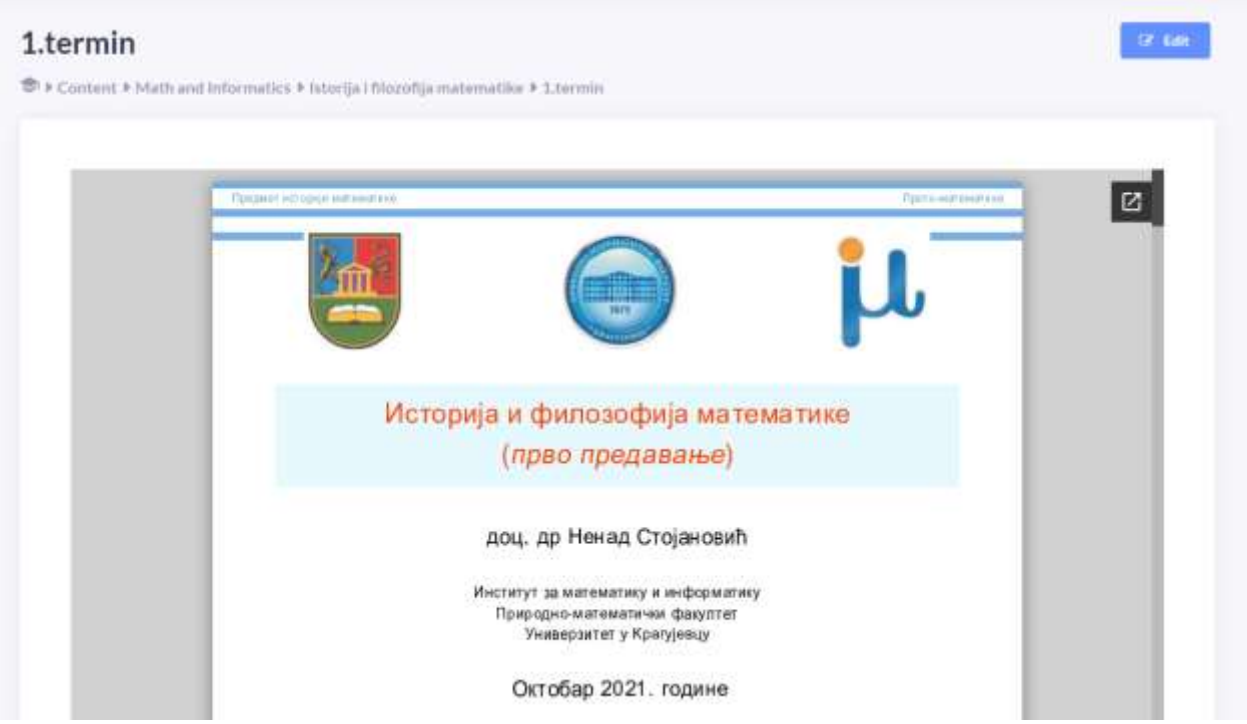
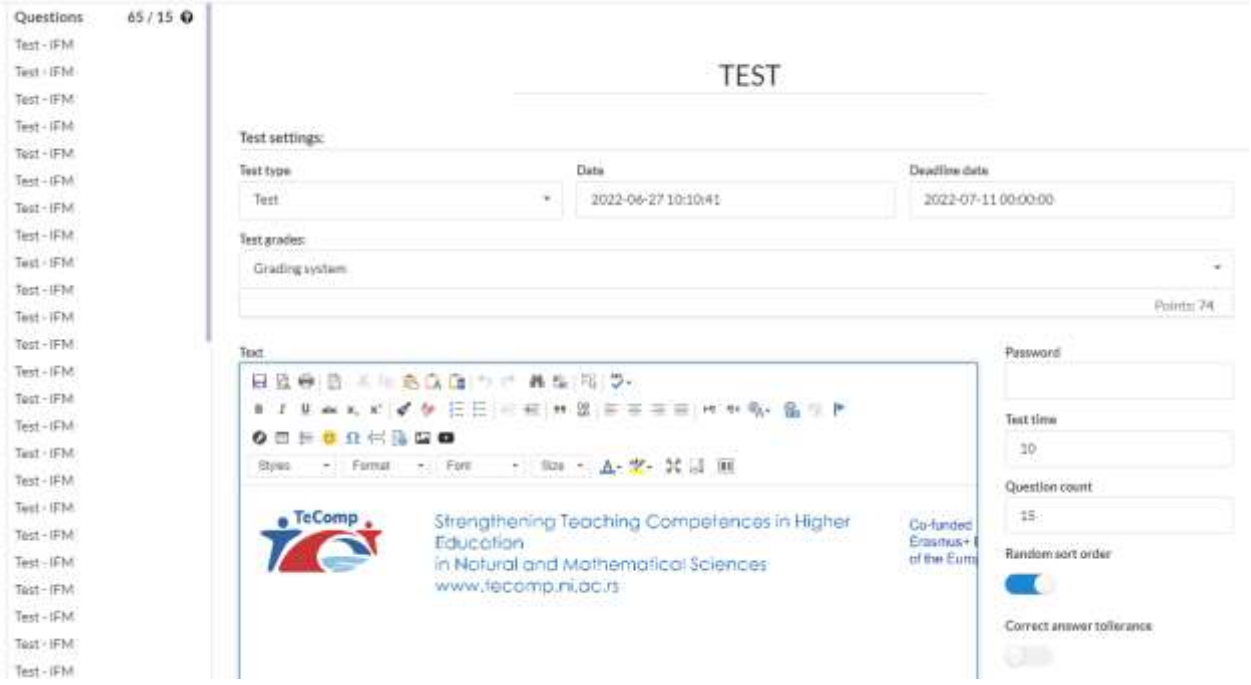

1.termin
Edit
Content ▸ Math and Informatics ▸ Istorija i filozofija matematike ▸ 1.termin
Историја и филозофија математике
(прво предавање)
доц. др Ненад Стојановић
Институт за математику и информатику
Природно-математички факултет
Универзитет у Крагујевцу
Октобар 2021. године


Questions 65 / 15
Test - IFM
TEST
Test settings:
Test type
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Date
2022-06-27 10:10:41
Deadline date
2022-07-11 00:00:00
Test grades:
Grading system
Points: 74
Text
Password
Test time
10
Question count
15
Random sort order
Correct answer tollerance
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P04-12. Discrete mathematics, 2021/22

REPORT

In the framework of project:"Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Mathematics**
Name of the course	**Discrete mathematics**
Level of the study	**2nd semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Bojana Borovićanin**
E-mail of the professor in charge	**bojana.borovicanin@pmf.kg.ac.rs**
Methods * which are used in the course	**Discussion, testing students in form of self-assessment**
Tools* which are used in the course	**Tests posted on LearningKey platform**
Name of modernised teaching units	**Using a platform to assess students' knowledge**
Number of students	**40**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Having in mind that students that are now engaged with the course Discrete mathematics learned about some of the concepts regarding combinatorics and number theory in their high-school education that was conducted online with the break of Covid-19 pandemic (in the spring of 2020) and having in mind that students claim that they didn't have as much practice with these contents as they should have, I decided to give them more opportunity to self-evaluate their knowledge. In other words, I found appropriate to use the LearningKey platform for posting enough different examples and tasks for students' practice and to use the opportunity that this platform provides - for students to get feedback about their achievements. Also, I conducted some of teaching topics using problem solving method. Students were informed about a given problem and their task was to do some theoretical investigation and acquire some theoretical knowledge in order to solve the problem. Discussion between students were followed and discussion between students and teacher as well.

Diskretna matematika

Content ▸ Math and Informatics ▸ Diskretna matematika

Name of the subject: Discrete mathematics

Name of the study programme: Mathematics

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: Obligatory

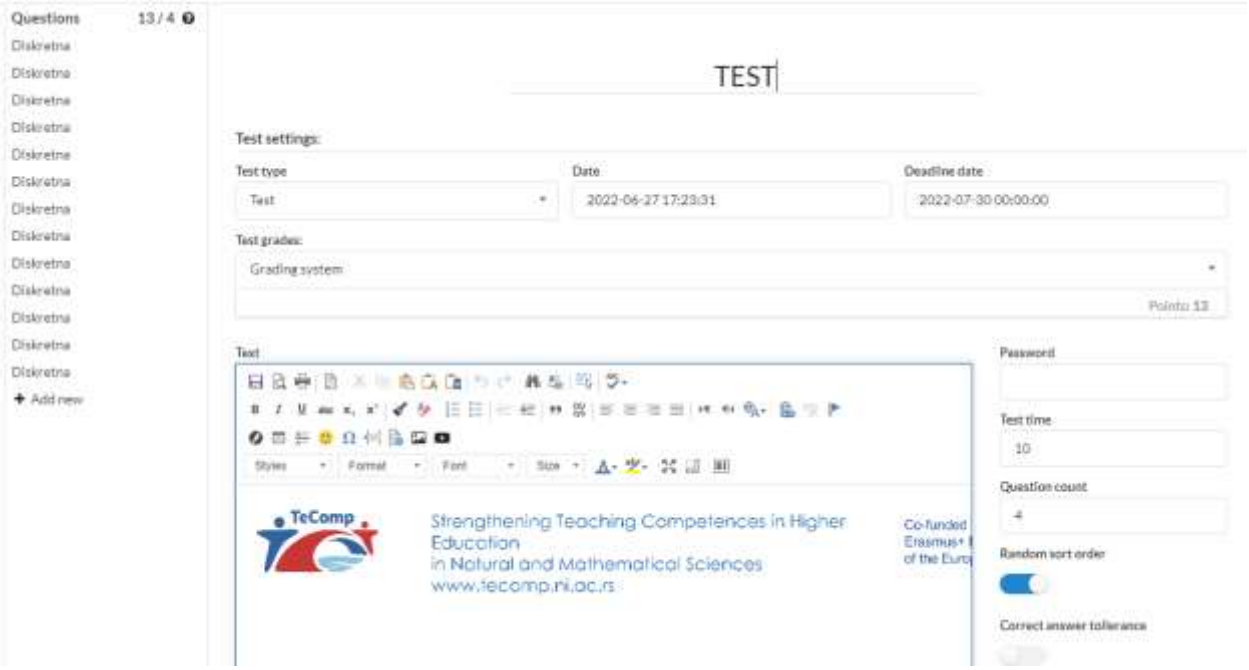
ECTS: 6

Number of students: 40

Professor in charge: Bojana Borovićanin

E-mail of professor in charge: bojana.borovicanin@pmf.kg.ac.rs

Name of the lecture that is/will be modernized: Using a platform to assess students' knowledge



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P04-13. Mathematical physics 2, 2021/22

REPORT

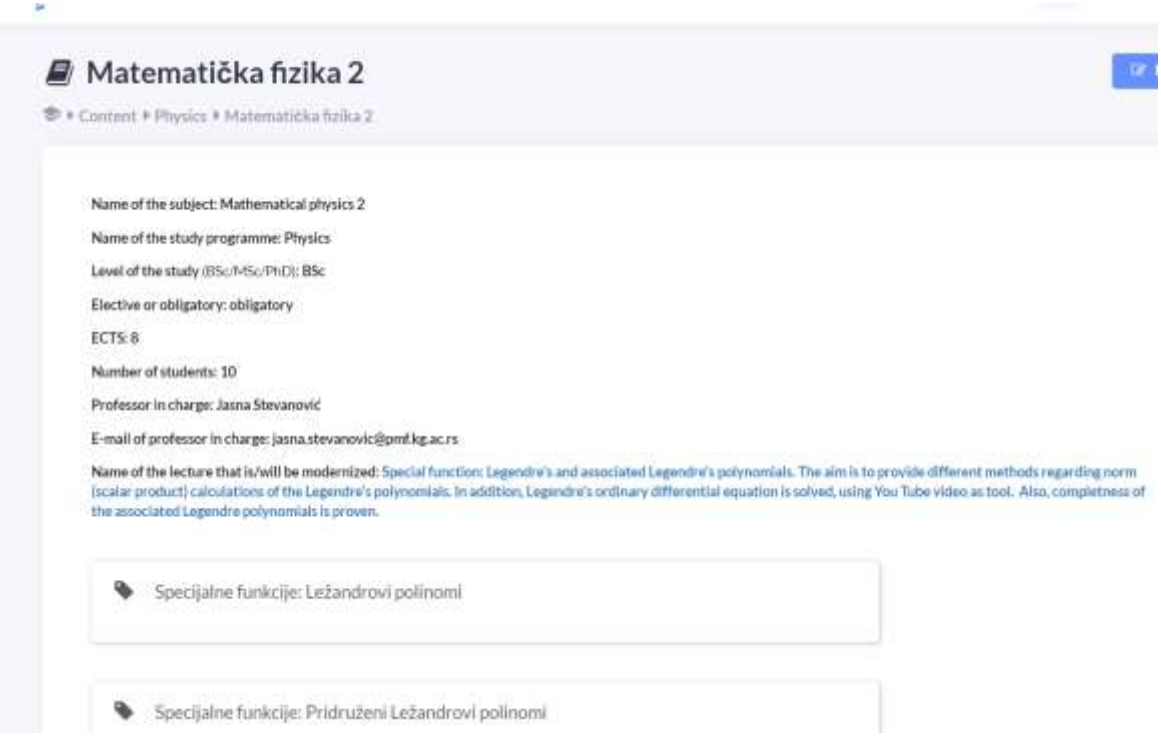
In the framework of project:" Strengthening Teaching Competences in Higher Educationin Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

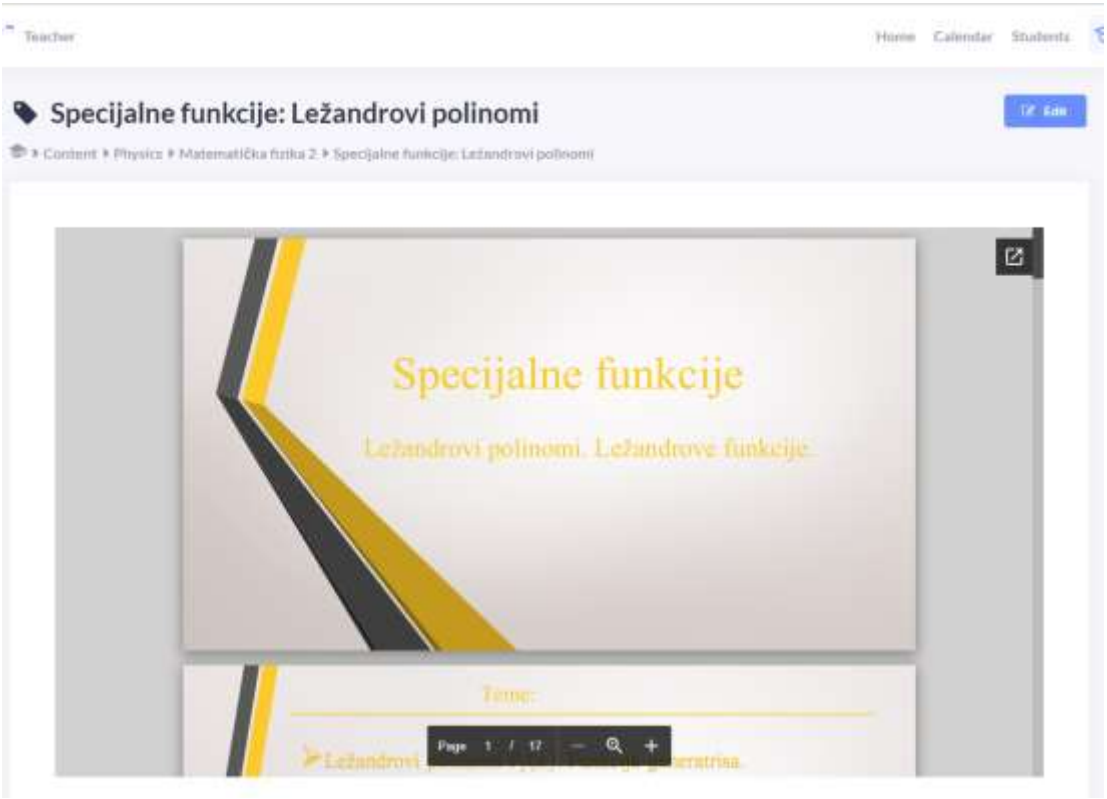
Name of the University	**University of Kragujevac**
Name of the study programme	**Physics**
Name of the course	**Mathematical physics 2**
Level of the study	**5th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jasna Stevanović**
E-mail of the professor in charge	**jasna.stevanovic@pmf.kg.ac.rs**
Methods * which are used in the course	**Online teaching materials, tests for self-evaluation**
Tools* which are used in the course	**PPTX presentation, test posted on LearningKey platform**
Name of modernised teaching units	**Special function: Useful application of Legendre's and associated Legendre's polynomials in physics**
Number of students	**10**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

Having in mind that teaching contents from the course Mathematical Physics 2 are basics and to a large extent corellated with later quantum mechanics course contents, I found it convenient to use the LearningKey platform for posting enough different examples regarding series application and some useful special functions calculations. Therefore, I determined to use the blended learning approach for this course in some extent. Hence, I provided students with instructions to read and watch some online materials (You Tube videos with some theoretical explanations and/or with some useful examples, PPTX presentations) and then to try to analyse and solve some tasks/problems of their own. For instance, by using different methods regarding norm (scalar product) calculations of the Legendre's polynomials, they should be able to understand and explane completness of the associated Legendre functions, to handily calculate diverse wave functions under explicit conditions. Also, I created tests in the LearningKey platform, for students to evaluate their own knowledge and skills related to problems of interest in physics.


Matematička fizika 2
Content ▸ Physics ▸ Matematička fizika 2
Name of the subject: Mathematical physics 2
Name of the study programme: Physics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: obligatory
ECTS: 8
Number of students: 10
Professor in charge: Jasna Stevanović
E-mail of professor in charge: jasna.stevanovic@pmf.kg.ac.rs
Name of the lecture that is/will be modernized: Special function: Legendre's and associated Legendre's polynomials. The aim is to provide different methods regarding norm (scalar product) calculations of the Legendre's polynomials. In addition, Legendre's ordinary differential equation is solved, using You Tube video as tool. Also, completness of the associated Legendre polynomials is proven.
Specijalne funkcije: Ležandrovi polinomi
Specijalne funkcije: Pridruženi Ležandrovi polinomi


Teacher
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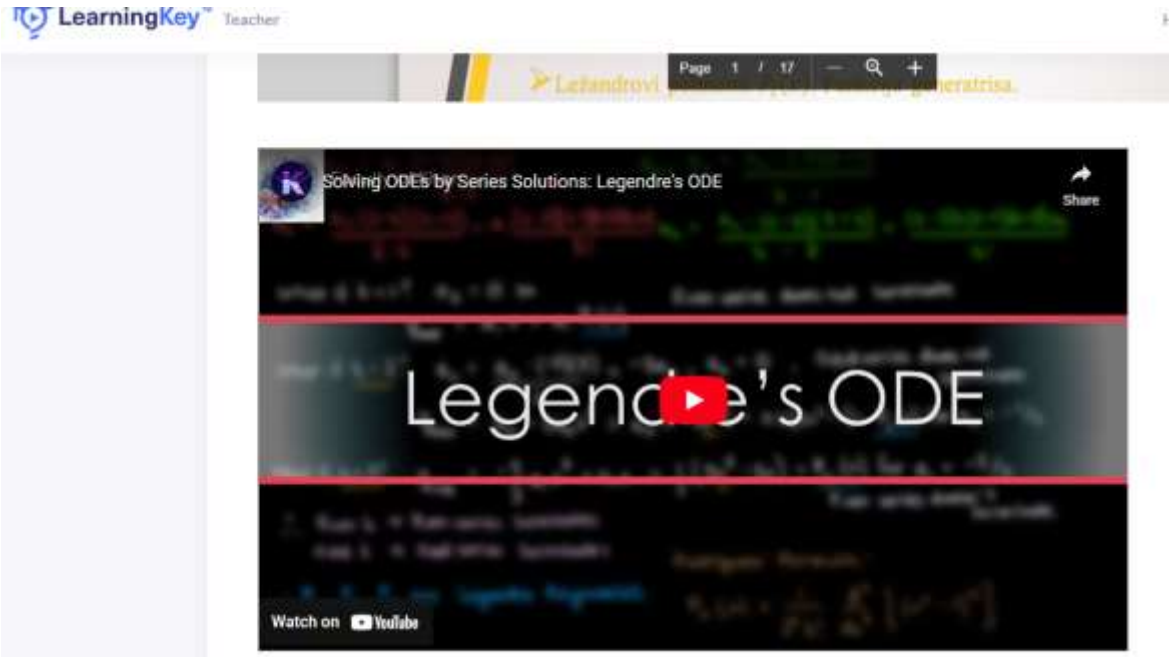
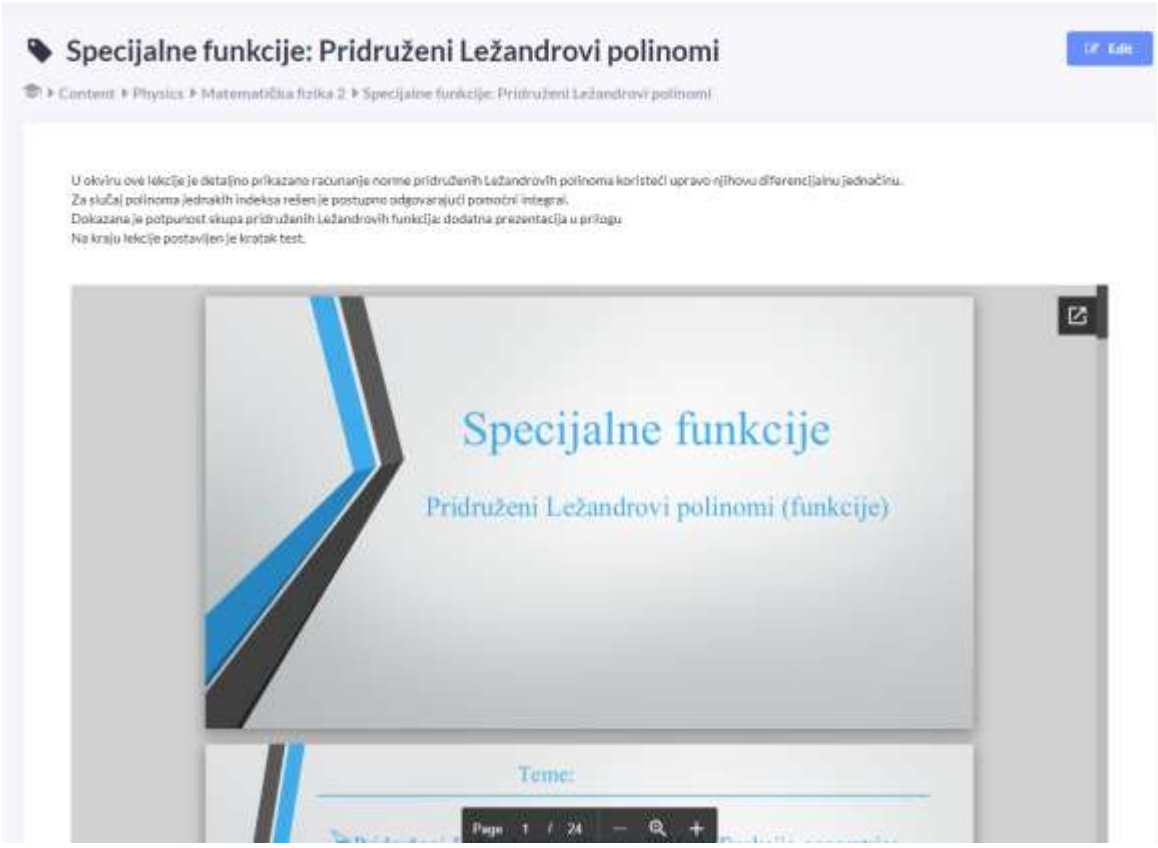
Specijalne funkcije: Ležandrovi polinomi
Edit
Content ▸ Physics ▸ Matematička fizika 2 ▸ Specijalne funkcije: Ležandrovi polinomi
Specijalne funkcije
Ležandrovi polinomi. Ležandrove funkcije
Page 1 / 17


LearningKey
Teacher
Page 1 / 17
Solving ODEs by Series Solutions: Legendre's ODE
Share
Watch on YouTube


Specijalne funkcije: Pridruženi Ležandrovi polinomi
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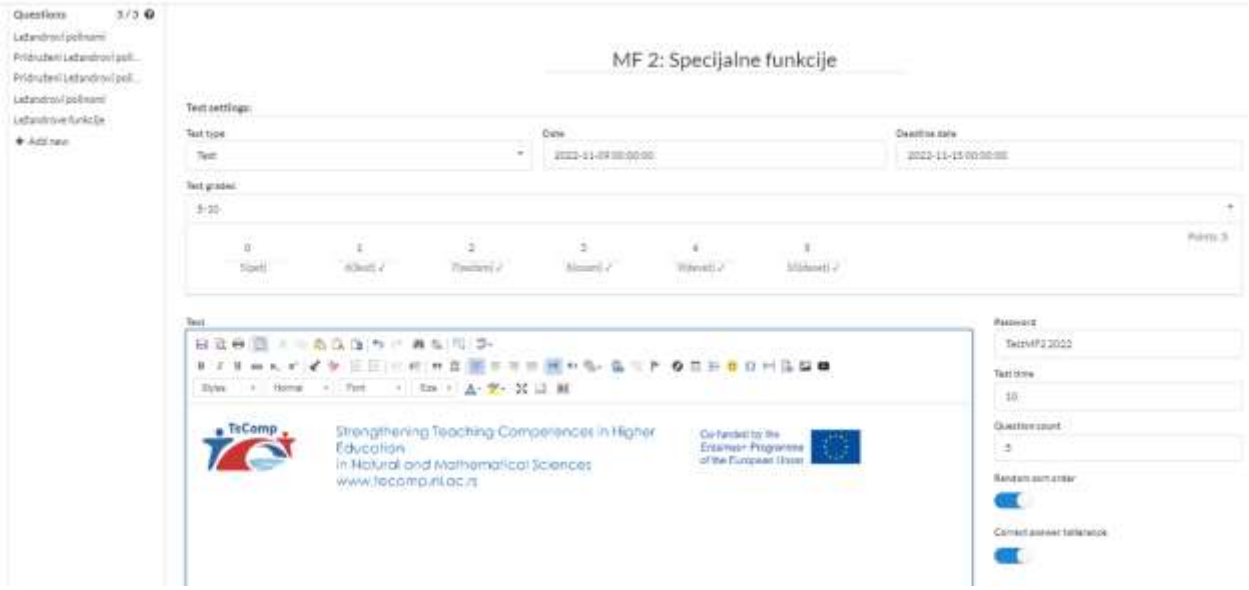
Content ▸ Physics ▸ Matematička fizika 2 ▸ Specijalne funkcije: Pridruženi Ležandrovi polinomi
U okviru ove lekcije je detaljno prikazano računanje norme pridruženih Ležandrovih polinoma koristeći upravo njihovu diferencijalnu jednačinu.
Za slučaj polinoma jednakih indeksa rešen je postupno odgovarajući pomoćni integral.
Dokazana je potpunost skupa pridruženih Ležandrovih funkcija; dodatna prezentacija u prilogu
Na kraju lekcije postavljen je kratak test.
Specijalne funkcije
Pridruženi Ležandrovi polinomi (funkcije)
Teme:
Page 1 / 24


MF 2: Specijalne funkcije
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Date
Deadline date
Test grades
Points: 5
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Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
www.tecomp.ni.ac.rs
Password
Test time
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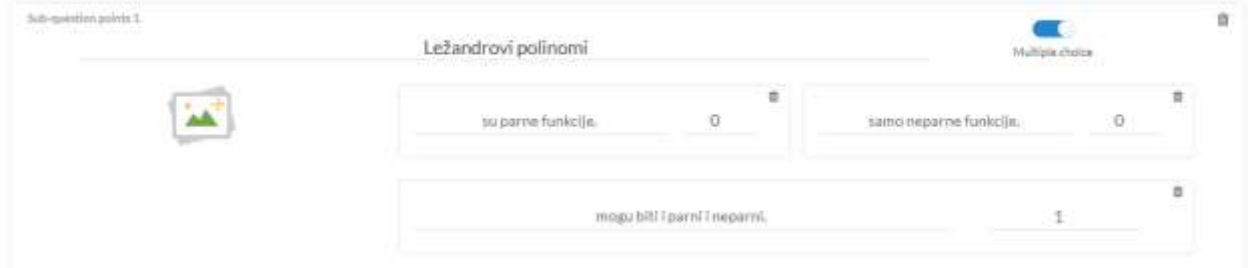
Question count
5


Ležandrovi polinomi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1

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P04-14. Microbial ecology 2021/22

REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Ecology**
Name of the course	**Microbial ecology**
Level of the study	**4th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Ivana Radojević**
E-mail of the professor in charge	**ivana.radojevic@pmf.kg.ac.rs**
Methods * which are used in the course	**students' discussions, online assessment**
Tools* which are used in the course	**PPT presentation, homework**
Name of modernised teaching units	**Microbial community – Biofilm**
Number of students	**7**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Microbial ecology, I modernized two of the teaching units. I created PPT presentations for students and posted them online for the students to use them in accordance with the pace that suits students. I created online question in order to give students opportunity to make self-evaluation of their knowledge and their achievements when it comes to predicted contents. During those lectures, I used the students' discussions and online assessment. For that purpose, I created assignments for students and gave them homework using LearningKey platform in order for students to get informed about the given contents before the class.

EKOLOGIJA MIKROORGANIZAMA

Content ▸ Biology Ecology ▸ EKOLOGIJA MIKROORGANIZAMA

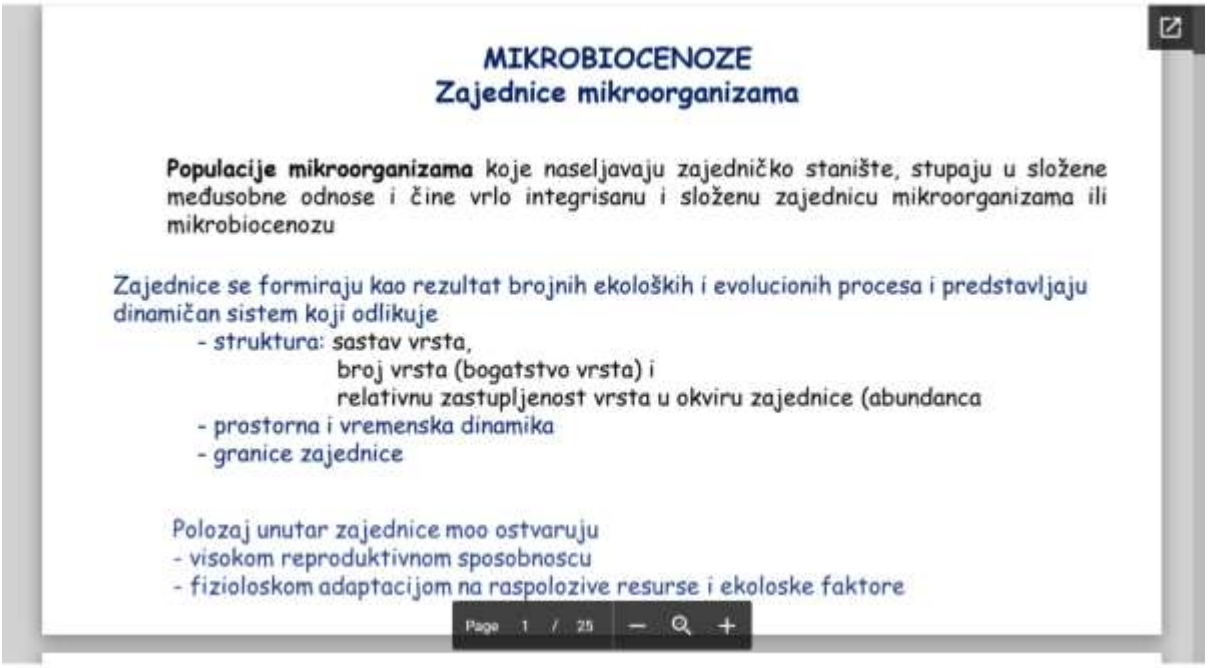
Name of the subject: Ekologija mikroorganizama (Microbial ecology)
Name of the study programme: Ekologija (Ecology)
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obligatory
ECTS: 7
Number of students: 7
Professor in charge: Ivana Radojević
E-mail of professor in charge: ivana.radojevic@pmf.kg.ac.rs
Name of the lecture that is/will be modernized: Zajednice mikroorganizama – Biofilm (Microbial community – Biofilm

Biofilm

Content ▸ Biology Ecology ▸ EKOLOGIJA MIKROORGANIZAMA ▸ Biofilm

Биофилм

Биофилм представља сесилну заједницу микроорганизама који су иреверзибилно везани за чврсту површину и међусобом, помоћу екстрацелуларне полисахаридне супстанце коју су сами створили. Биофилм се може састојати од различитих микроорганизама, као што су бактерије, диатомеје, гљиве, алге, протозое, као и нецелуларне материје (нпр. соли и муљ). Способност формирања биофилма је универзална особина и могуће је да се развила услед тога што пружа еколошку предност у преживљавању. Иако је некада важило да микроорганизми живе као усамљени ентитети, данас се биофилмови сматрају заступљенијим обликом живота микроорганизама и могу настати у природном, медицинском и индустријском окружењу



MIKROBIOCENOZE
Zajednice mikroorganizama

Populacije mikroorganizama koje naseljavaju zajedničko stanište, stupaju u složene međusobne odnose i čine vrlo integrisanu i složenu zajednicu mikroorganizama ili mikrobiocenozu

Zajednice se formiraju kao rezultat brojnih ekoloških i evolucionih procesa i predstavljaju dinamičan sistem koji odlikuje

- struktura: sastav vrsta,
  broj vrsta (bogatstvo vrsta) i
  relativnu zastupljenost vrsta u okviru zajednice (abundanca
- prostorna i vremenska dinamika
- granice zajednice

Polozaj unutar zajednice moo ostvaruju
- visokom reproduktivnom sposobnoscu
- fizioloskom adaptacijom na raspolozive resurse i ekoloske faktore

Page 1 / 25

Biofilm

Mikrobiološke zajednice

Domaći zadatak

2022-08-31 13:00:00 1

Discussion:

Prvo čitate prezentaciju pod nazivom Biofilm, a zatim prezentacijum pod nazivom Mikrobijalne zajednice.

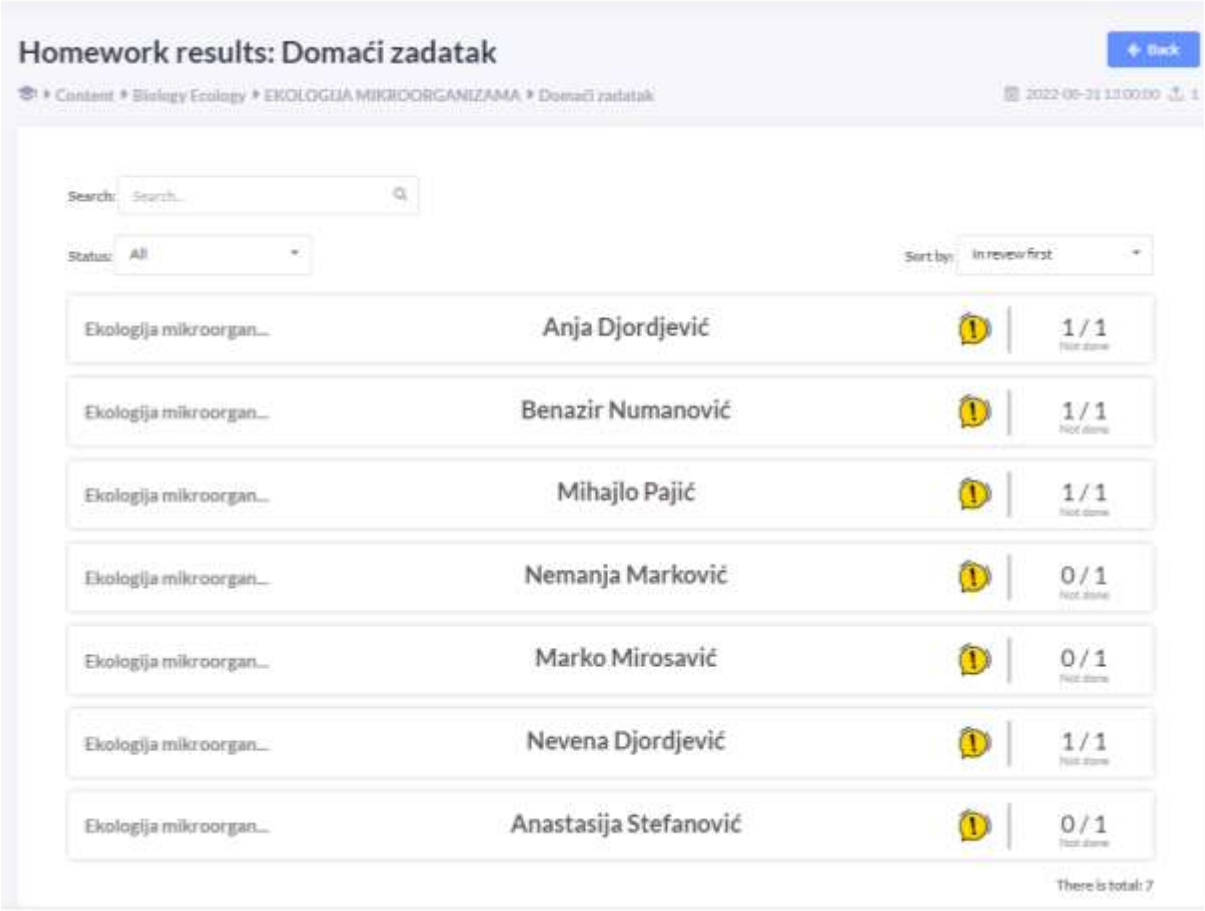
Pitanja na koja treba da date odgovor će vam se razlikovati i postaviću vam ih tabeli niže.

Odgovore mi šaljite isto preko ove platforme. Možete da ih okačite kao atačment ili da mi prosledite na četu. Pozdrav.

PITANJA

	Anastasija Stefanović
1.	Šta je biofilm?
2.	Navedi učesnike u formiranj biofilma u ustima i na zubima kod čoveka.
3.	Koje su prednosti mikroorganizama kad formiraju biofilm?
4.	Objasni - Mikrobiološki mat vrelog izvora
	Anja Djordjević
1.	Zašto se razvija biofilm?
2.	Navedi učesnike u formiranj biofilma u crevima kod čoveka.
3.	Šta je metagenomika i gde je najčešće koristimo?
4.	Objasni – Kolonizacija digestivnog trakta novorođenčeta.
	Benazir Numanović
1.	Šta određuje arhitekturu i oblik biofilma?
2.	Objasni metaboličku saradnju u biofilmu na nekom primeru.
3.	Navedi negativne primere formiranja biofilma.
4.	Nabroj hipoteze mikrobijalne biogeografije.
	Marko Mirosavić
1.	Šta je ekstracelularni polimerni matriks?
2.	Da li je bitan redosled naseljavanja mikroorganizama kod formiranja višespecijskog biofilma. Navedi primer.
3.	Objasni - Mikrobijalni mat kiselih staništa.
4.	Šta je kolonizacija i rekolonizacija mikroorganizama?
	Mihajlo Pajić
1.	Nabroj faze u formiranju biofilma.
2.	Objasni bioreaktor sa pokretnim i turbulentnim ispunama.
3.	Šta je mikrobijalni mat? Navedi primere.
4.	Šta je biogeografija u mikrobiologiji?
	Nemanja Marković
1.	Šta je uloga biofilmova?
2.	Navedi ko sve može da se javi u biološkoj zajednici bioreaktora.
3.	Objasni – Hemolitotrofni mat.
4.	Objasni - Ekološke sukcesije: promene u strukturi zajednica tokom vremena.
	Nevena Djordjević
1.	Koje faze u formiranju biofilma su reverzibilne, a koje su ireverzibilne?
2.	Koja je najčešća primena biofilmova u zaštiti životne sredine. Objasni.
3.	Šta su mikrobiocenoze?
4.	Objasni - Cijanobakterijski mat/tepih.

Biofilm


Homework results: Domaći zadatak
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1
Search:
Status: All
Sort by: In review first
Ekologija mikroorgan... Anja Djordjević 1 / 1
Ekologija mikroorgan... Benazir Numanović 1 / 1
Ekologija mikroorgan... Mihajlo Pajić 1 / 1
Ekologija mikroorgan... Nemanja Marković 0 / 1
Ekologija mikroorgan... Marko Mirosavić 0 / 1
Ekologija mikroorgan... Nevena Djordjević 1 / 1
Ekologija mikroorgan... Anastasija Stefanović 0 / 1
There is total: 7

P04-15. Biochemical and microbiological principles 2021/22

REPORT

In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**University of Kragujevac**
Name of the study programme	**Occupational Safety**
Name of the course	**Biochemical and microbiological principles**
Level of the study	**4th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Ivana Radojević**
E-mail of the professor in charge	**radojevic.i@fmgkv.rs**
Methods * which are used in the course	**students' discussions, online assessment**
Tools* which are used in the course	**PPT presentation, homework posted in LearningKey platform**
Name of modernised teaching units	**Inoculation of microorganisms on petri dishes - general, selective and differential media (hygiene)**
Number of students	**16**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Biochemical and microbiological principles, I modernized one of the teaching unit. I created PPT presentation and three pdf files for students and posted them online for the students to use them in accordance with the pace that suits students. I created questions using different tools in order to give students opportunity to make self-evaluation of their knowledge and their achievements when it comes to predicted contents. During this lecture, I used the students' discussions and online assessments. For that purpose, I created assignments for students and gave them homework using LearningKey platform in order for students to get informed about the given contents before the class.


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VEŽBE II – BLOK NASTAVA
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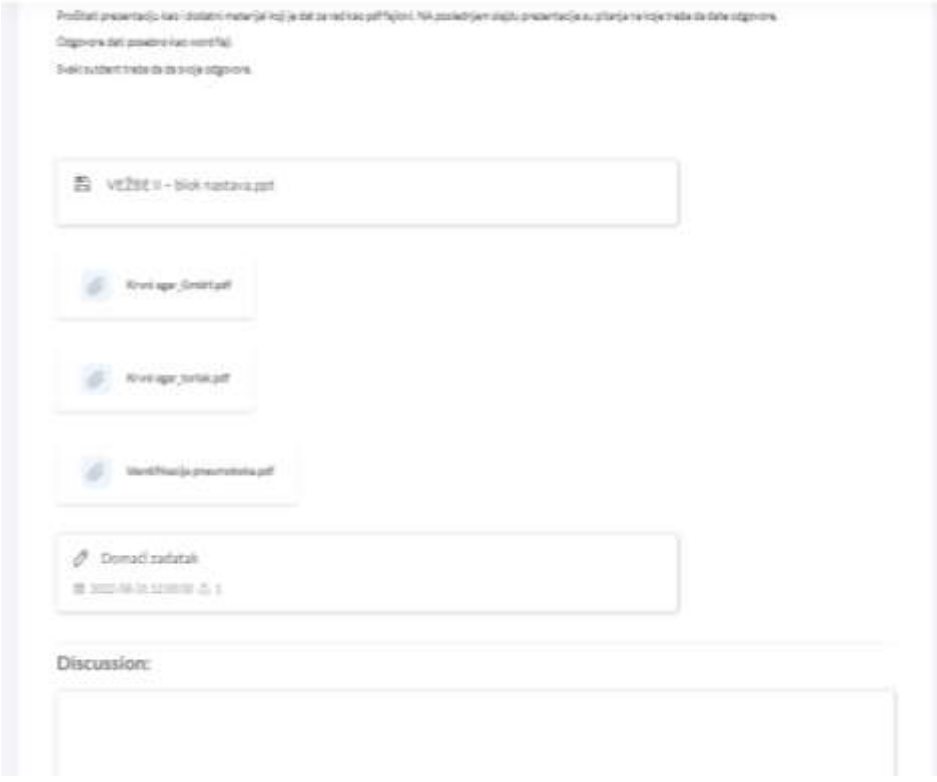
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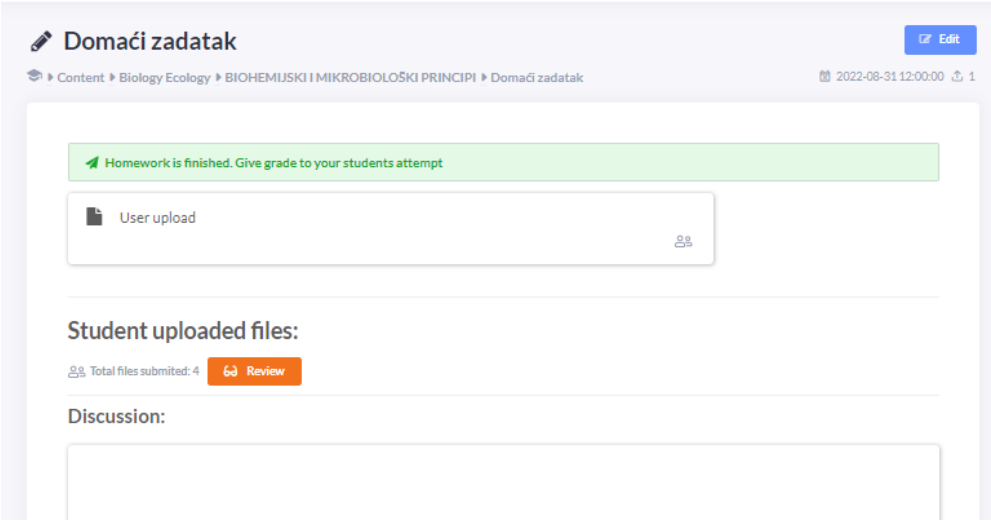
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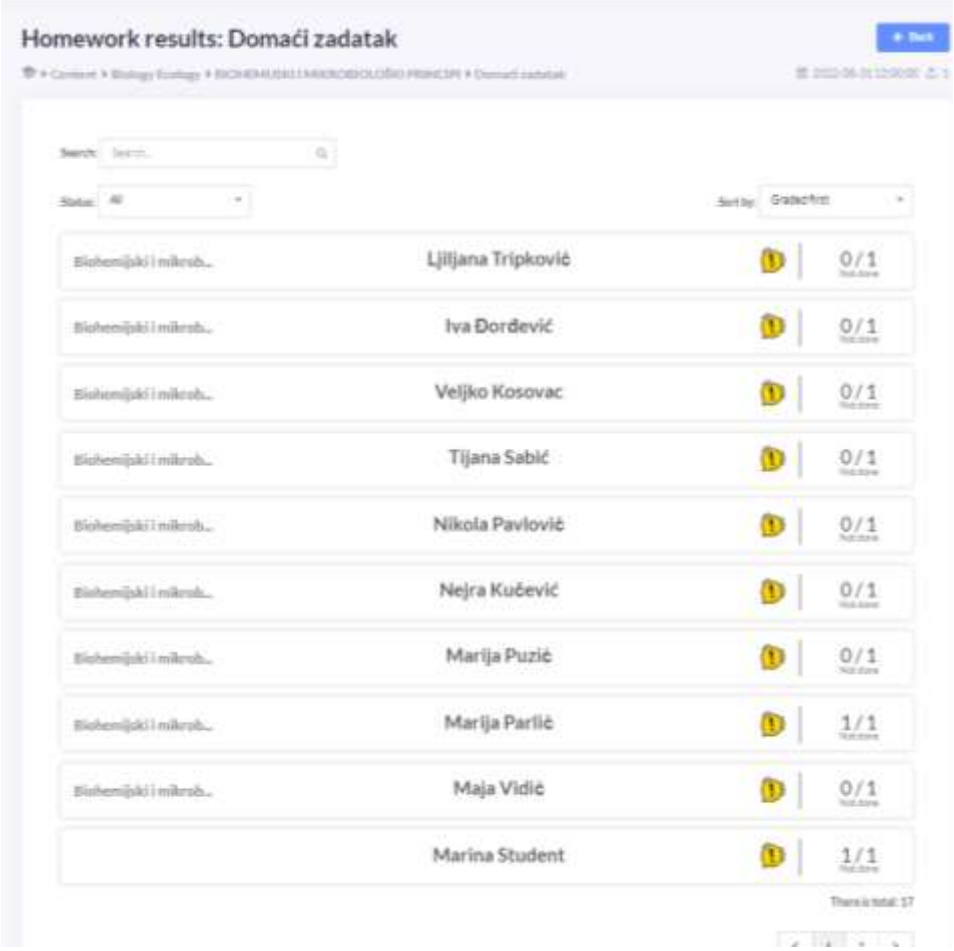
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Ljiljana Tripković 0/1
Iva Đorđević 0/1
Veljko Kosovac 0/1
Tijana Sabić 0/1
Nikola Pavlović 0/1
Nejra Kučević 0/1
Marija Puzić 0/1
Marija Parlić 1/1
Maja Vidić 0/1
Marina Student 1/1

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P04-16. Organic chemistry didactics 2021/22

REPORT

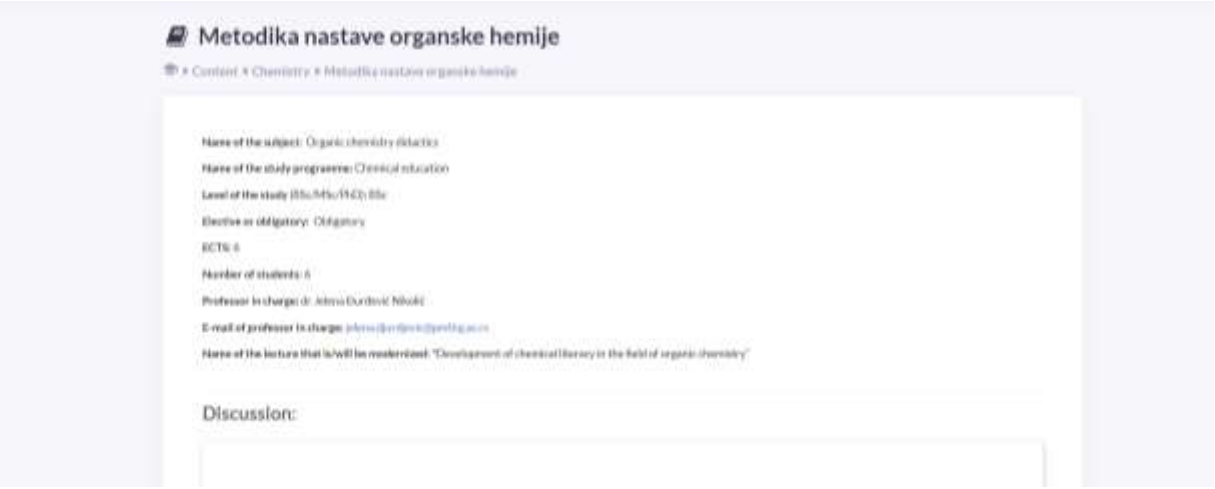
In the framework of project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

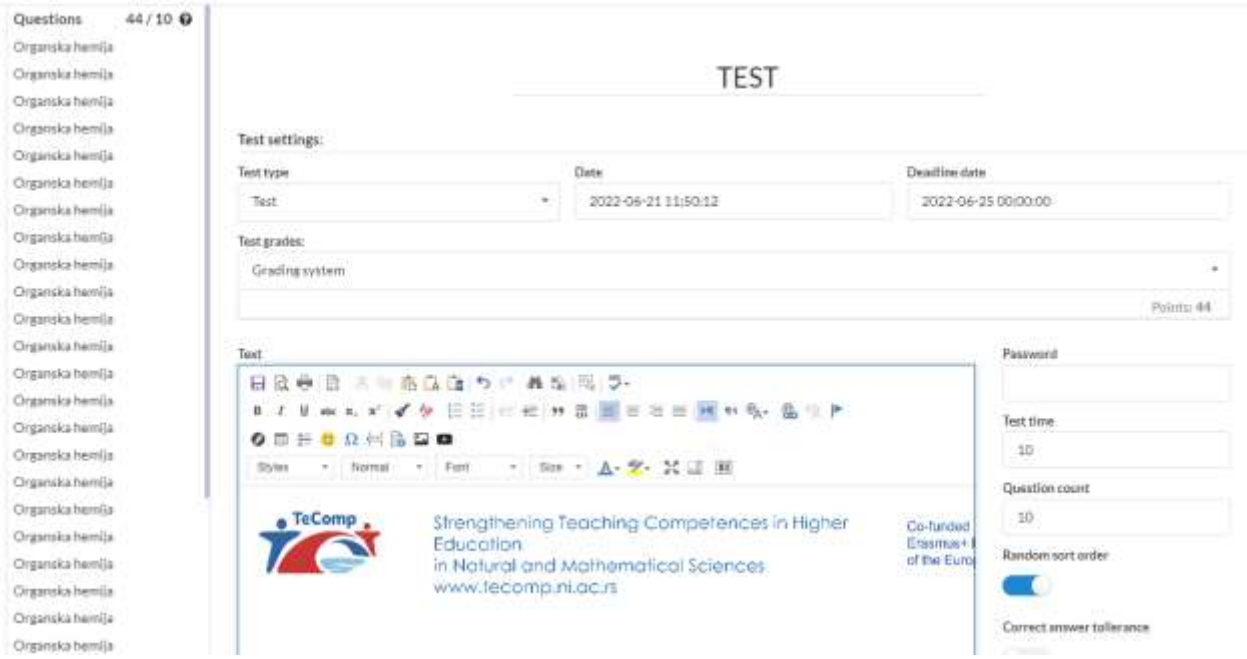
Name of the University	**University of Kragujevac**
Name of the study programme	**Chemistry**
Name of the course	**Organic chemistry didactics**
Level of the study	**6th semester, BSc**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Jelena Đurđević Nikolić**
E-mail of the professor in charge	**Jelena.djurdjevic@pmf.kg.ac.rs**
Methods * which are used in the course	**students' discussions, online assessment**
Tools* which are used in the course	**PPT presentation**
Name of modernised teaching units	**Development of chemical literacy in the field of organic chemistry**
Number of students	**6**

*Teaching planning, new teaching methods, teaching and learning in online environments presented, assessment of student learning at university level (ex: rubrics), new teaching tools presented on the trainings- OBS Studio, eXeLearning etc. (Other applications introduced during the training courses and webinars)

The methods/tools used in the course modernisation

In the course Organic chemistry didactics, I modernized one of the teaching unit. I created a PPT presentation and choose two (open-source) pdf files for students and posted them online for the students to use according to the pace that suits them. I created questions using different tools to give students the opportunity to self-evaluate their knowledge and achievements when it comes to predicted content. During this lecture, I used the students' discussions to solve different problems regarding some teaching issues in organic chemistry.


Metodika nastave organske hemije
Discussion: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Correct answer tolerance
Strengthening Teaching Competences in Higher Education
in Natural and Mathematical Sciences
www.tecomp.ni.ac.rs

Report on the modernized courses at the University of Gjirokastra

New teaching materials related to selected lectures are published at LearningKey platform for the following modernized Bachelor and Master courses at the University of Gjirokastra.

P05-1 Research Seminar
P05-2 Biophysics
P05-3 Inclusion in education
P05-4 Probability and statistics

P05-1. Research Seminar 2020/2021

REPORT

In the framework of the project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **Master course is modified by using new methods and tools.**

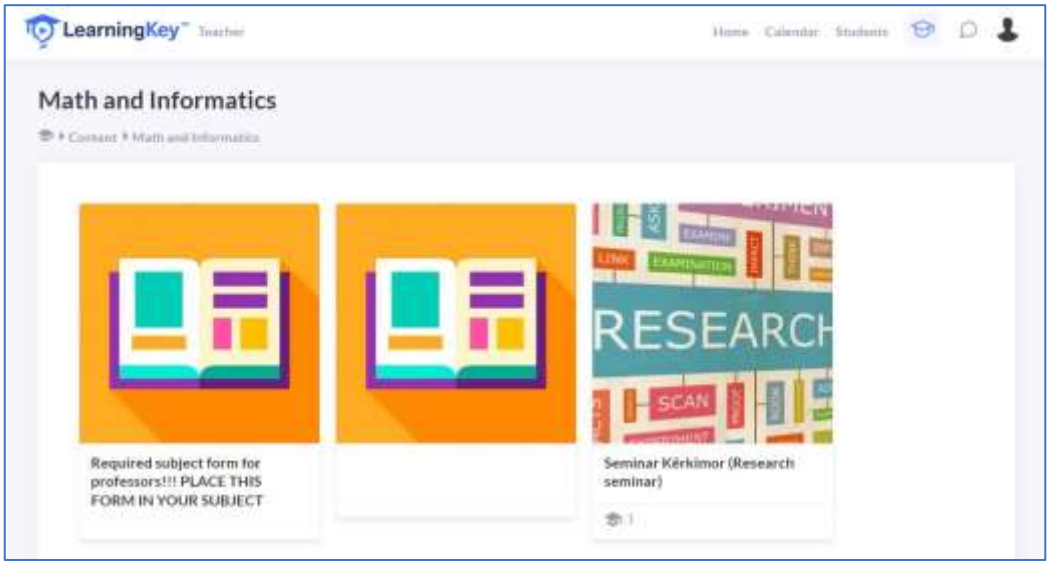
Name of the University	**"Eqrem Çabej" University , Gjirokastër**
Name of the study programme	**Master in education for mathematics and informatics**
Name of the course	**Research seminar**
Level of the study	**3rd semester, Professional Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Doc. Dr. Romeo Mano**
E-mail of the professor in charge	**rmano@uogj.edu.al**
Methods * which are used in the course	**PowerPoint, Knowledge clips, interactive video, group work**
Tools* which are used in the course	**Slovin's Formula Sampling Techniques, Raosoft calculator, Some statistical software: SPSS, Statgraphics, Minitab, MedCalc, EViews, etc**
Name of modernised teaching units	**Getting to know the basic concepts and understanding the issues of scientific research, scientific projects, etc.; Basic research techniques and tools; Ethics of scientific research.**
Number of students	**10**

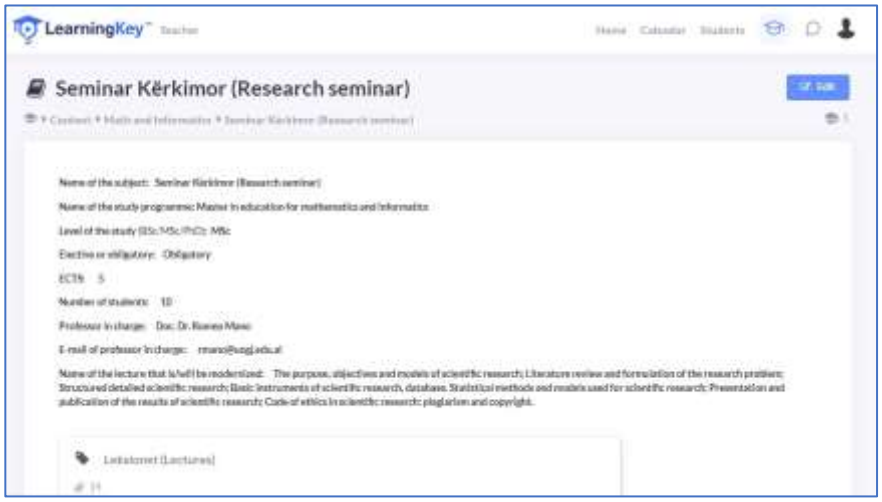
The methods/tools used in the course modernisation

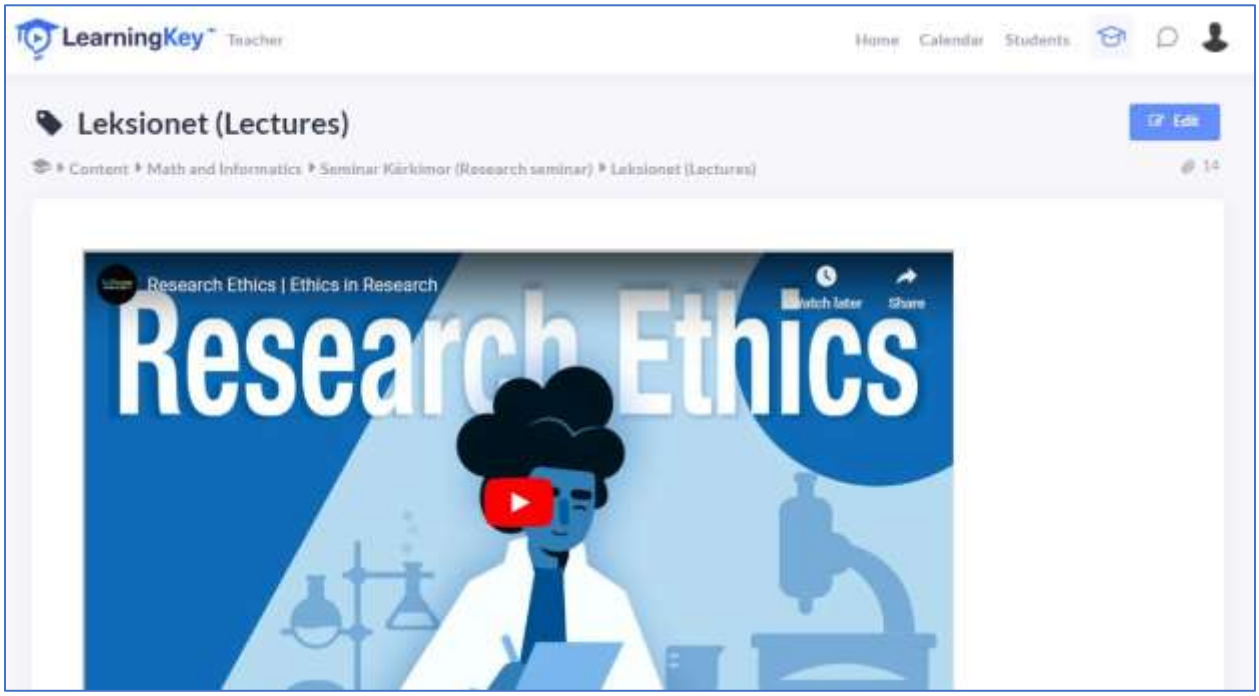
The development of this course of lectures is closely related to the use of information technology for the collection of data, their statistical processing and the extraction and publication of their results. Consequently, the development of this course runs parallel and necessarily with the daily modernization of

the techniques and software that are used. Every innovation in the field of technology and software finds immediate application in scientific research. In the framework of the TeComp project, the experiences exchanged through workshops, trainings and written materials enabled the improvement of the teaching of this course.

The use of online learning platforms, such as the Learning Key platform, this product widely used by our colleagues in Serbian universities and successfully tested by the colleagues of the Gjirokastra University team, are and will serve as a good opportunity in online learning sessions of this course



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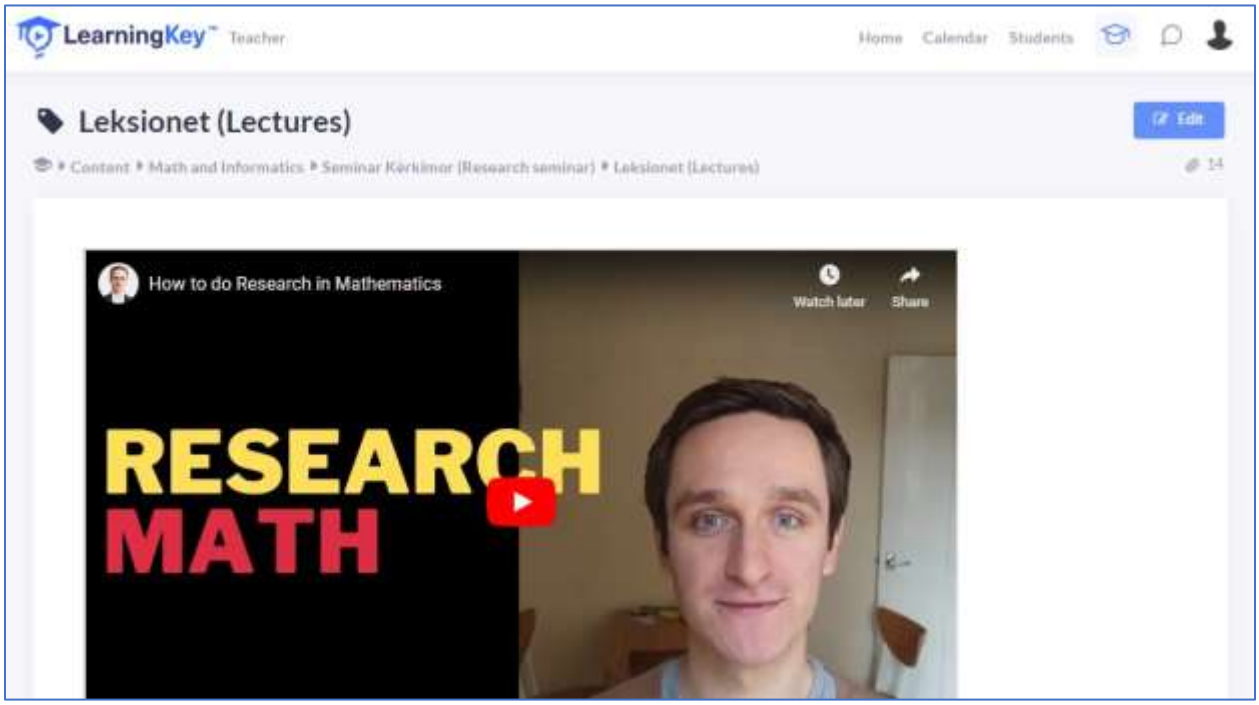
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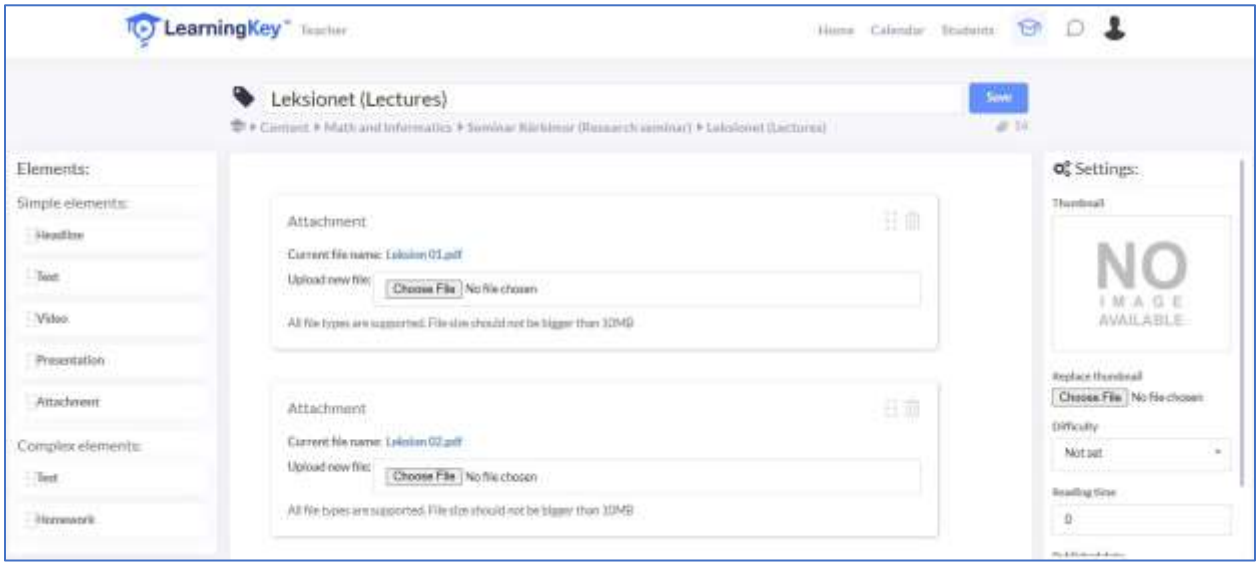
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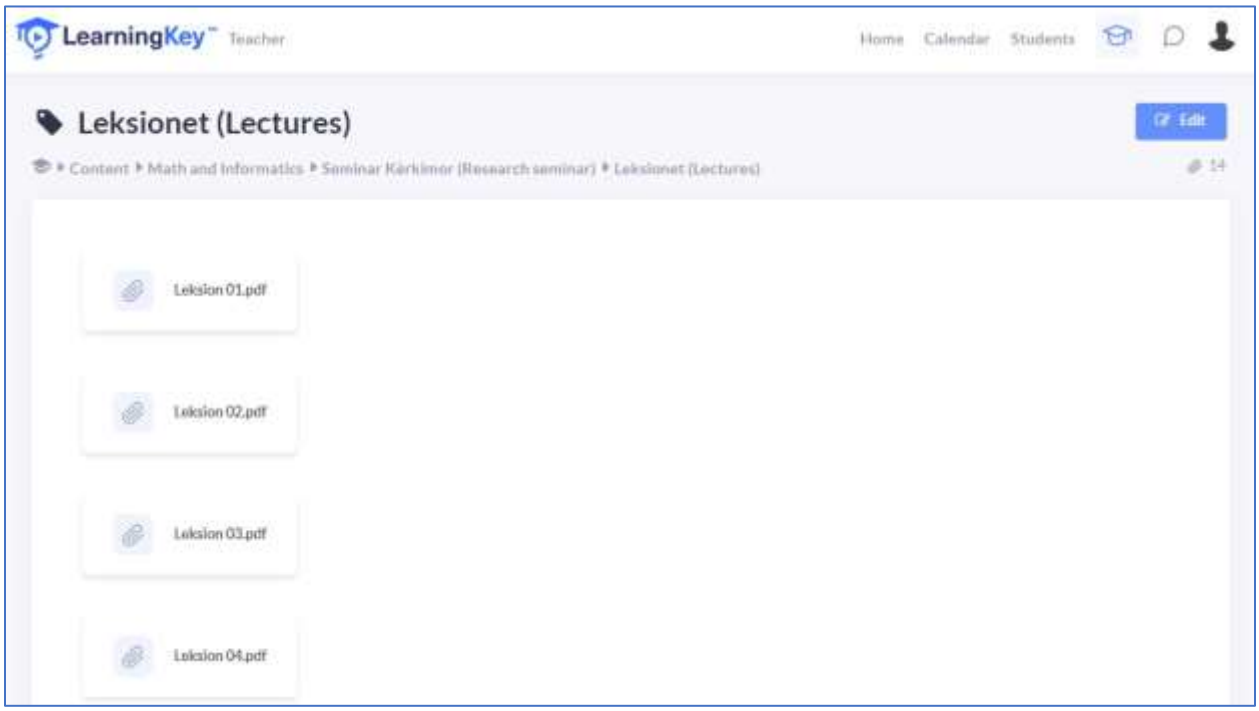
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Leksion 02.pdf
Leksion 03.pdf
Leksion 04.pdf

P05-2. Biophysics, 2021/22

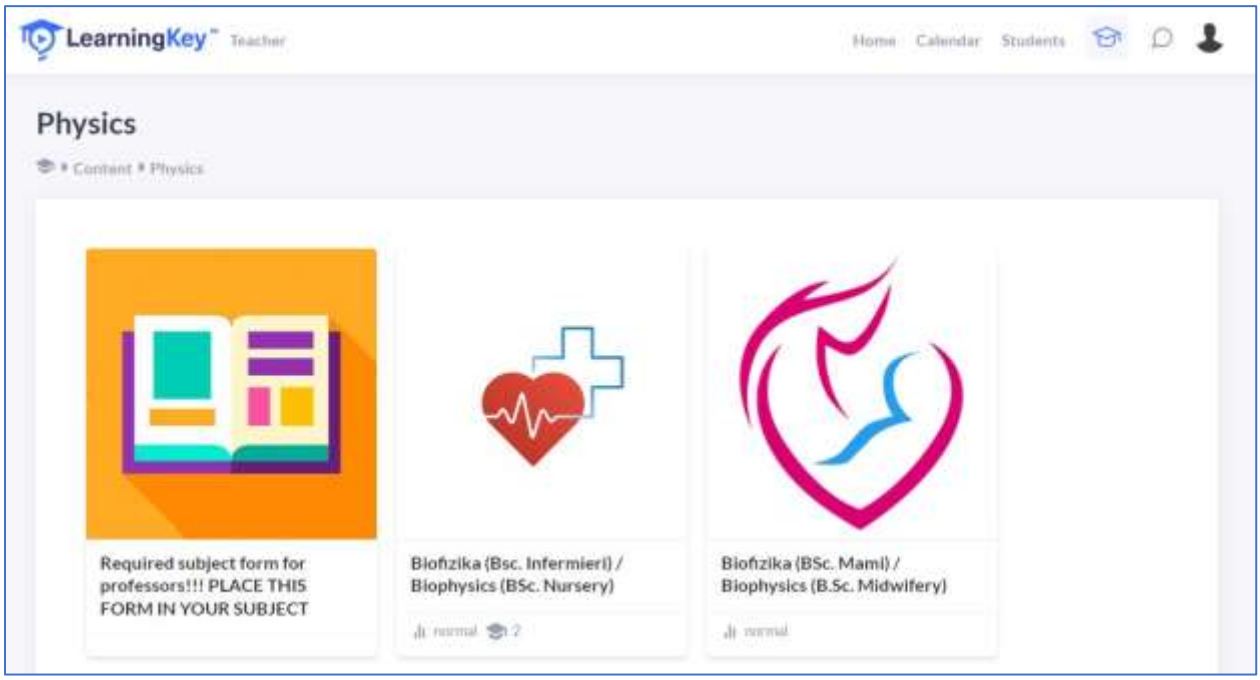
REPORT

In the framework of the project: " Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Eqrem Çabej" University , Gjirokastër**
Name of the study programme	**General Nursery / Midwife nursery**
Name of the course	**Biophysics**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Doc. Dr. Isidor Kokalari**
E-mail of the professor in charge	**ikokalari@uogj.edu.al**
Methods * which are used in the course	**PowerPoint, interactive videos, problem solution**
Tools* which are used in the course	**Virtual laboratory**
Name of modernised teaching units	**Biomechanics of the human body. Energy, work, power of muscles. Body thermoregulation. Blood pressure, flow and velocity. The intensity of the sound. Ionizing and non-ionizing radiation.**
Number of students	**38 + 10 (Nursery + Midwifery)**

The methods/tools used in the course modernisation

Lectures with PowerPoint slides are presented to students. Problem solving in traditional way are combined with demonstrative virtual labs (experiments) and physics java applets, for a better understanding of physical principles and applications in medicine. Video clips and animations are shown to students and proved to be especially helpful when discussing notions such as blood flow, radiation-matter interaction, biomechanics. The students found these very useful. However, the students were not motivated to follow actively the online part of communication. This was mainly due to the fact that it was not obligatory to follow the online activities. The poor internet access, the technical issues with e-mail accounts affected the low usage of the electronic platform. Also the level of difficulty of biophysics (as it is not considered directly connected to their professional competences) and not very user-friendly interface of browsing the platform in mobile devices, made students not very fond of using this platform. But still, using LearningKey created a good experience for the lecturer in order to use it in other study programs and courses in the future.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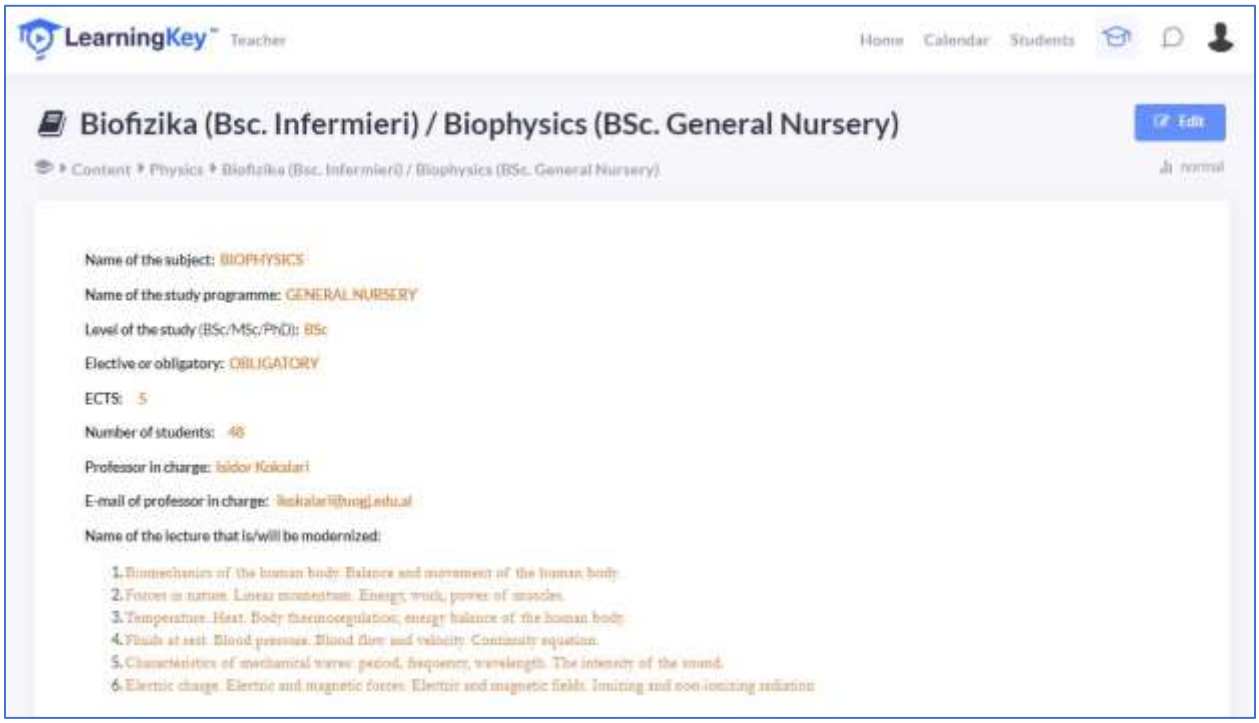
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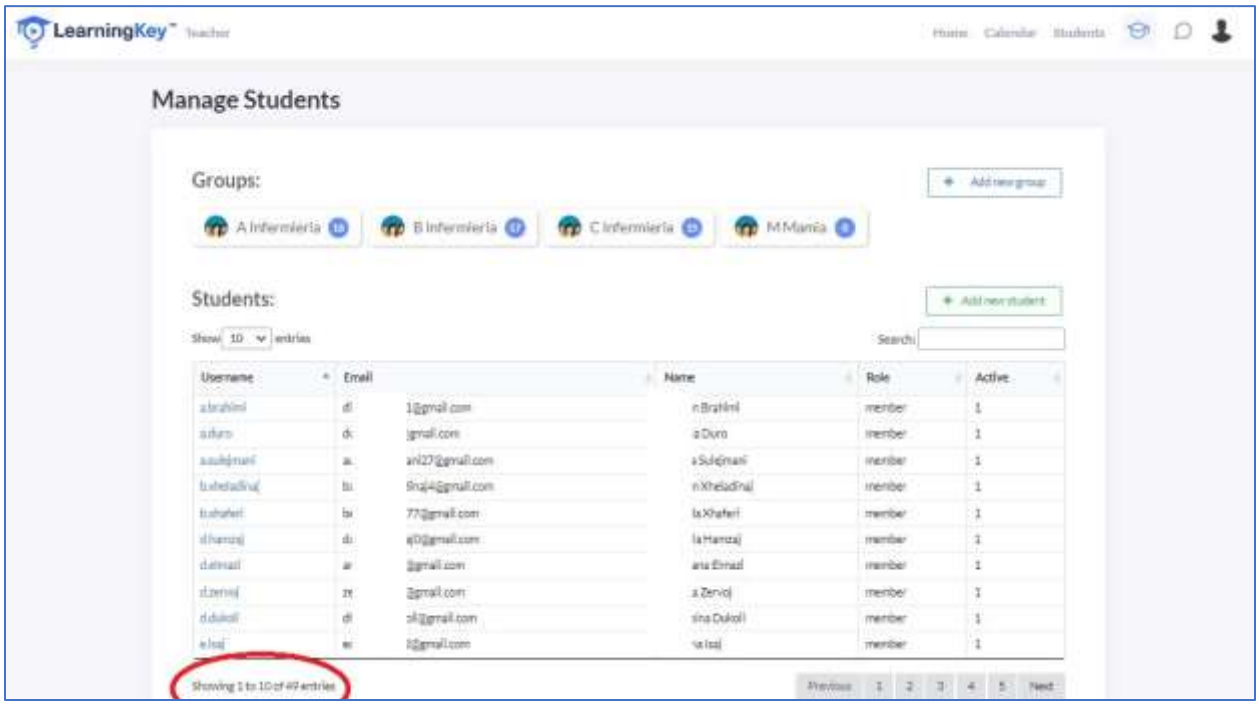
Name of the subject: BIOPHYSICS
Name of the study programme: GENERAL NURSERY
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: OBLIGATORY
ECTS: 5
Number of students: 48
Professor in charge: Isidor Kokalari
E-mail of professor in charge:
Name of the lecture that is/will be modernized:
1. Biomechanics of the human body. Balance and movement of the human body.
2. Forces in nature. Linear momentum. Energy, work, power of muscles.
3. Temperature. Heat. Body thermoregulation; energy balance of the human body.
4. Fluids at rest. Blood pressure. Blood flow and velocity. Continuity equation.
5. Characteristics of mechanical waves: period, frequency, wavelength. The intensity of the sound.
6. Electric charge. Electric and magnetic forces. Electric and magnetic fields. Ionizing and non-ionizing radiation.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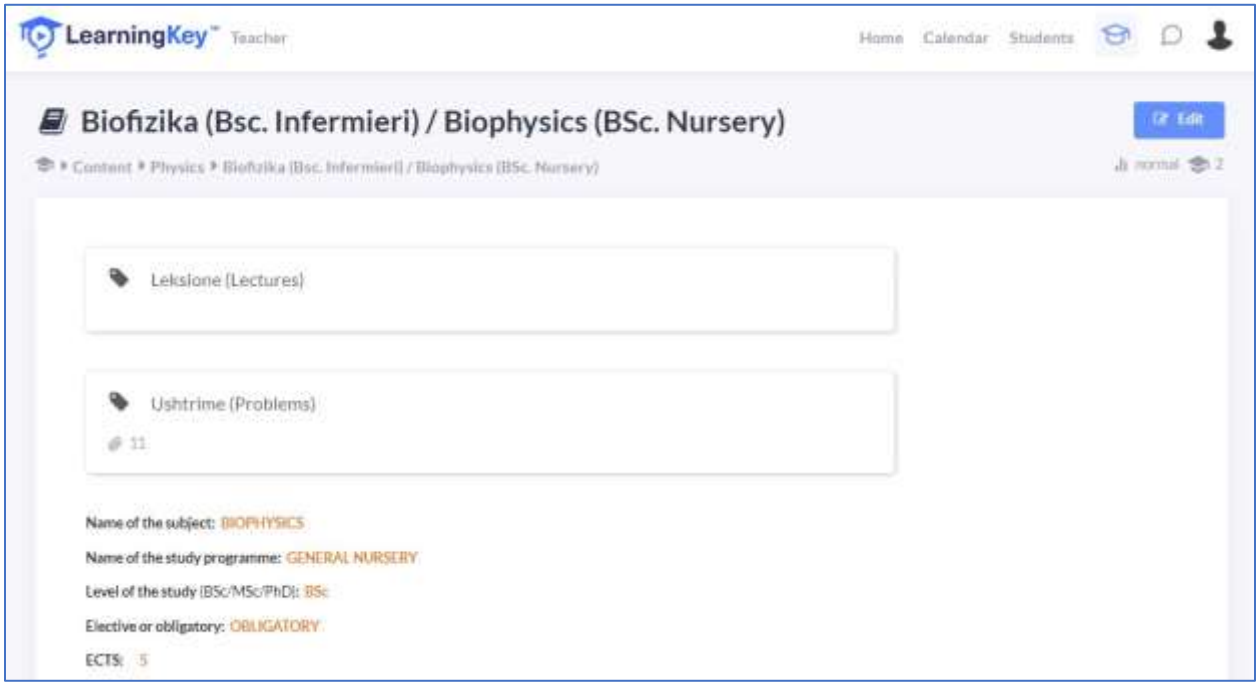
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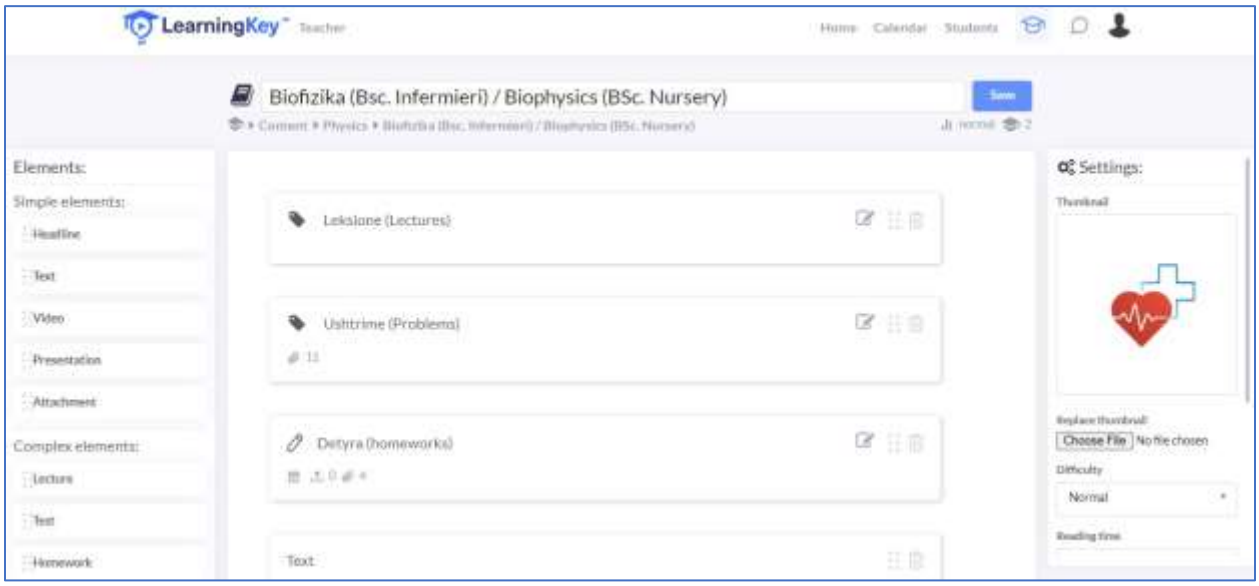
Ushtrime (Problems)
11
Name of the subject: BIOPHYSICS
Name of the study programme: GENERAL NURSERY
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: OBLIGATORY
ECTS: 5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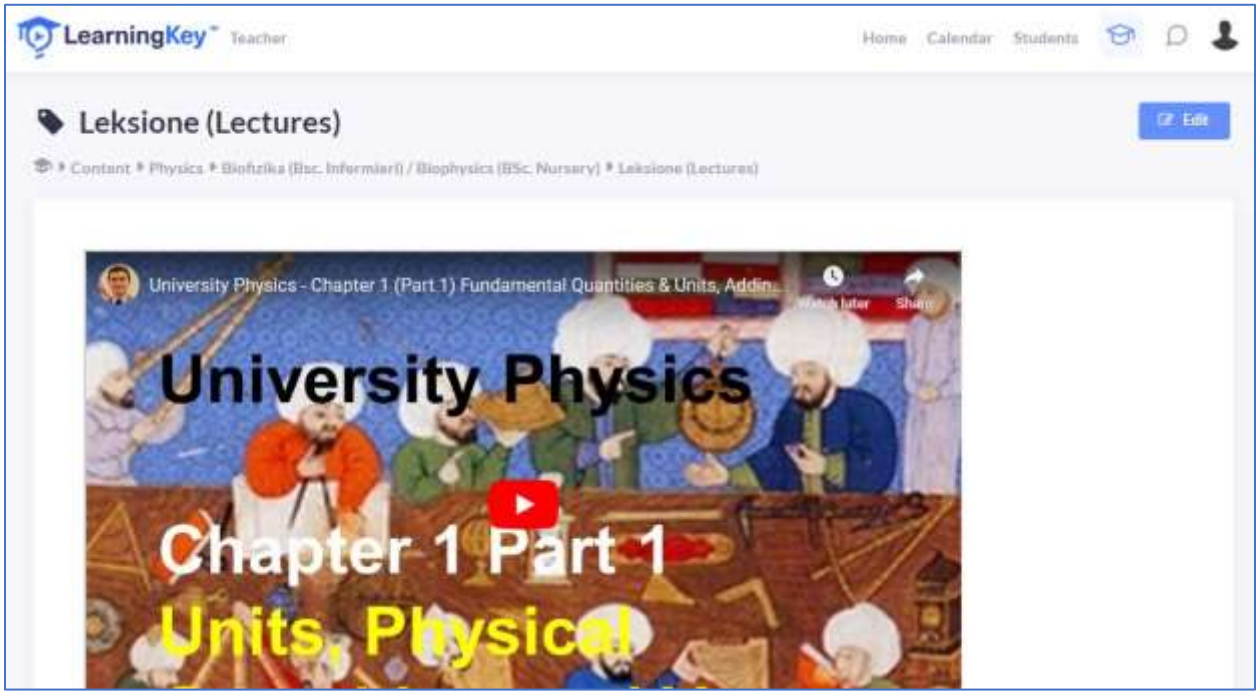
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P05-3. Inclusion in education, 2021/22

REPORT

In the framework of the project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **Masters course is modified by using new methods and tools.**

Name of the University	**"Eqrem Çabej" University , Gjirokastër**
Name of the study programme	**Professional master in teaching for special education**
Name of the course	**Inclusion in education**
Level of the study	**1st semester, Professional Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Prof. asoc. Dr. Mimoza Çarka**
E-mail of the professor in charge	**mcarka@uogj.edu.al**
Methods * which are used in the course	**Knowledge clips, interactive video, group work**
Tools* which are used in the course	**PowerPoint, Virtual Laboratory**
Name of modernised teaching units	**Limited ability. Different Ability.Inclusion in education. Involvement of children. Integration of children. Identification of needs. Intervention with educational projects. Social inclusion. Projects for life**
Number of students	**45**

The methods/tools used in the course modernisation

This course was also entirely modernized through contemporary methods, teaching and learning methods used in the Sciences of Education. The methods and tools acquired during the trainings organized in the framework of TECOMP by the European partners, have been attached to these experiences. Through the virtual laboratory, students find case studies and analyze them, relying not only on information and documents on education for inclusiveness at a national but also international level. More specifically, the chapter about "Difficulties and challenges of inclusion in higher education" in the issues of constructivism in the new concepts of limited abilities, is supported from a historical, social and educational perspective, seeing that it is a challenge not only for the inclusion of people with limited ability in pre-university education but also their inclusion in higher education. All these approaches have been considered in a creative way by student groups, giving ideas and opinions on how to act in a more practical way to ease the difficulties and challenges in this global world by including and using all the tools learned during our trainings. The course's final group project was redesigned by

detailing the students' roles and responsibilities during the collaborative work. Students evaluation (and self-check) was improved by adding to the projects instruction a detailed rubric.

P05-4. PROBABILITY AND STATISTICS 2021/22

REPORT

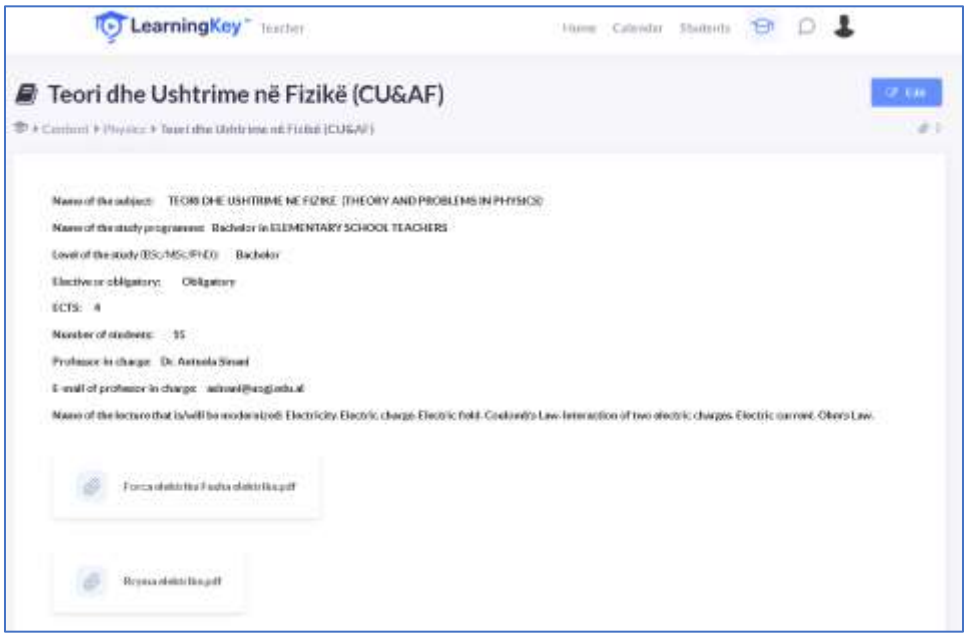
In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

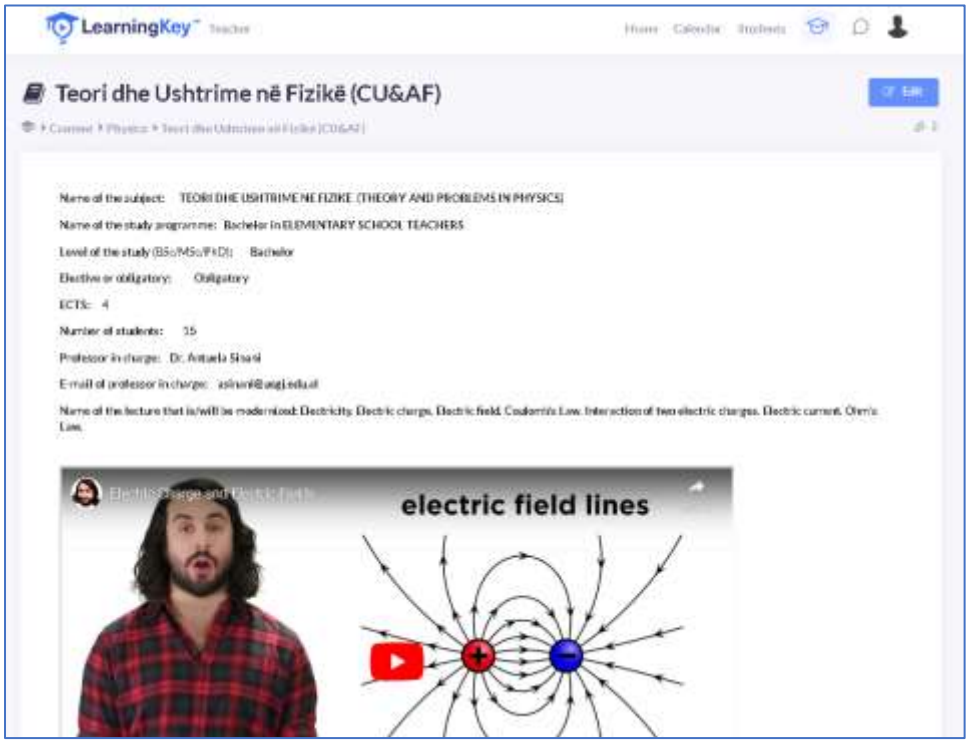
Name of the University	**University of Gjirokastra**
Name of the study programme	**Bachelor in ELEMENTARY SCHOOL TEACHERS**
Name of the course	**THEORY AND PROBLEMS IN PHYSICS**
Level of the study	**2ND SEMESTER, BACHELOR**
Type of the course (elective/obligatory)	**OBLIGATORY**
Professor in charge	**ANTUELA SINANI**
E-mail of the professor in charge	**asinani@uogj.edu.al**
Methods * which are used in the course	**POWERPOINT, ANIMATIONS, PROBLEM SOLVING, INDIVIDUAL AND GROUP WORK, QUIZES**
Tools* which are used in the course	**GOOGLE FORMS**
Name of modernised teaching units	**PROBLEM SOLVING MODELS**
Number of students	**15**

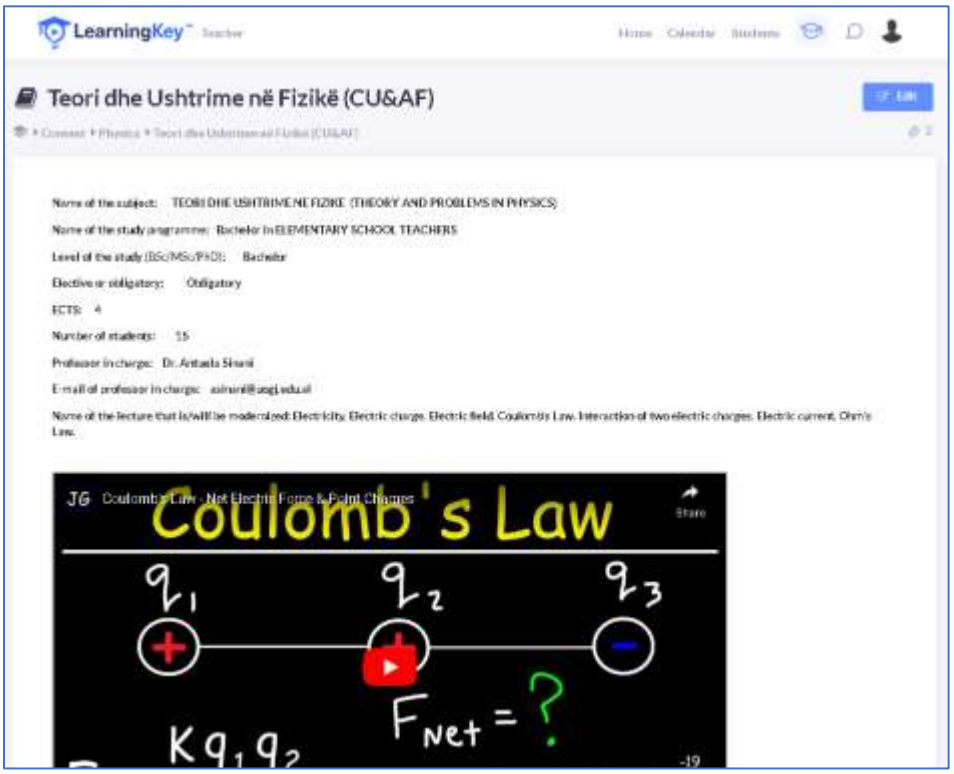
The methods/tools used in the course modernisation

The course of Probability and Statistics has proven time to have some very challenging topics. Especially abstract topics such as probability space, Normal Distribution and Law of Large numbers can puzzle students of the first year of Bachelor. Therefore, several online tools and methodological techniques were used in order to overcome students' difficulties. PowerPoint Presentation were used during teaching, and animations used as a homework, to watch and be prepared for the next lesson.

In this course, assignments required both individual and collaborative work. Rubrics were used in both cases to evaluate students. Google Forms were used to test students' knowledge with short quizzes .


LearningKey
Teacher
Home
Calendar
Students
Teori dhe Ushtrime në Fizikë (CU&AF)
Edit
Name of the subject: TEORI DHE USHTRIME NE FIZIKE (THEORY AND PROBLEMS IN PHYSICS)
Name of the study programme: Bachelor in ELEMENTARY SCHOOL TEACHERS
Level of the study (BSc/MSc/PhD): Bachelor
Elective or obligatory: Obligatory
ECTS: 4
Number of students: 15
Professor in charge: Dr. Antuela Sinani
E-mail of professor in charge: asinani@ug.edu.al
Name of the lecture that is/will be modernized: Electricity, Electric charge, Electric field, Coulomb's Law, Interaction of two electric charges, Electric current, Ohm's Law.


LearningKey
Teacher
Home
Calendar
Students
Teori dhe Ushtrime në Fizikë (CU&AF)
Edit
Name of the subject: TEORI DHE USHTRIME NE FIZIKE (THEORY AND PROBLEMS IN PHYSICS)
Name of the study programme: Bachelor in ELEMENTARY SCHOOL TEACHERS
Level of the study (BSc/MSc/PhD): Bachelor
Elective or obligatory: Obligatory
ECTS: 4
Number of students: 15
Professor in charge: Dr. Antuela Sinani
E-mail of professor in charge: asinani@ug.edu.al
Name of the lecture that is/will be modernized: Electricity, Electric charge, Electric field, Coulomb's Law, Interaction of two electric charges, Electric current, Ohm's Law.
electric field lines


LearningKey
Teori dhe Ushtrime në Fizikë (CU&AF)
Name of the subject: TEORI DHE USHTRIME NE FIZIKE (THEORY AND PROBLEMS IN PHYSICS)
Name of the study programme: Bachelor in ELEMENTARY SCHOOL TEACHERS
Level of the study (BSc/MSc/PhD): Bachelor
Elective or obligatory: Obligatory
ECTS: 4
Number of students: 15
Professor in charge: Dr. Antuela Sinani
E-mail of professor in charge:
Name of the lecture that is/will be moderated: Electricity, Electric charge, Electric field, Coulomb's Law, Interaction of two electric charges, Electric current, Ohm's Law.
Coulomb's Law
q_1
q_2
q_3
$F_{Net} = ?$
Kq_1q_2

Report on the modernized courses at "Fan S. Noli" University in Korçë

New teaching materials related to selected lectures are published at LearningKey platform for the following modernized Bachelor and Master courses at the University of Korçë.

P06-1. History of the development of mathematical thought
P06-2. Mathematical analysis 2
P06-3. Methodology of teaching mathematics
P06-4. Probability and Statistics
P06-5. Algebra 2
P06-6. Mathematics in secondary education
P06-7. MATLAB
P06-8. Discrete Mathematics
P06-9. Cryptography
P06-10.
P06-11. General Physics 2
P06-12. Physics 2

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P06-1. History of the development of mathematical thought 2020/2021

REPORT

In the framework of the project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **Master course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Teachers in mathematics, physics and informatics**
Name of the course	**History of the development of mathematical thought**
Level of the study	**4rth semester, Professional Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Prof. Dr. Lorenc Ekonomi**
E-mail of the professor in charge	**lekonomi@unkorce.edu.al**
Methods * which are used in the course	**PowerPoint, Knowledge clips, interactive video, group work**
Tools* which are used in the course	**mind maps, Animaker, Edpuzzle, study.com, rubric**
Name of modernised teaching units	**The beginning of the first mathematical concepts,**
Number of students	**35**

The methods/tools used in the course modernisation

In the case of this course, almost all teaching units were modernized. 2020- 2021 was Albanians first full academic where all the courses were taught entirely online. Since then PowerPoint presentations, video clips, animations have been adapted as teaching methods in all lectures. Edpuzzle, Animaker and other free online applications were used with this regard. The videos posted in LearningKey were used not only to explain the lesson, but also to provoke discussions with the students.

Another change made was turning this course's final task into a group project. Students were divided in groups of 5 students that worked together on a topic and at the end submitted a research paper. For evaluating said papers, rubrics were used. The next step, will be adding presentation of the results of the task in class. Also a new rubric that includes the presentation performance in the students' evaluation will be designed.

History of the Development of Mathematical Thought

Content ▸ Math and Physics ▸ History of the Development of Mathematical Thought

Name of the subject: History of the Development of Mathematical Thought

Name of the study programme: Teacher in mathematics, physics and informatics

Level of the study (BSc/MSc/PhD): Master

Elective or obligatory: Obligatory

ECTS: 2

Number of students: 35

Professor in charge: Prof. Dr. Lorenc Ekonomi

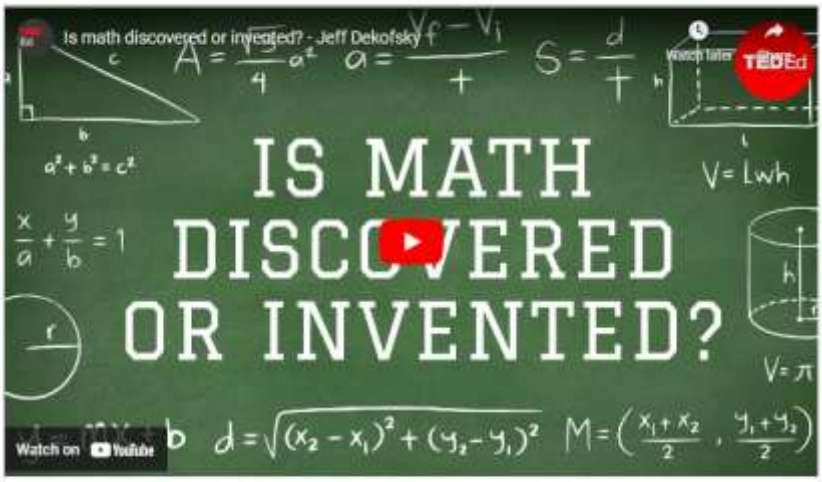
E-mail of professor in charge: lekonomi@unkorce.edu.al

Name of the lecture that is/will be modernized: The begining of the first mathematical concepts

The beginning of the first mathematical concepts

Lecture

Let's discuss



Video and Quiz

Please click below for an interactive video and a short quiz

Klikoi ketu per videon dhe nje kuiz

Mathematics: History, Background, and Development

P06-2. Mathematical Analysis 2, 2021/22

REPORT

In the framework of the project: " Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Information Technology**
Name of the course	**Mathematical Analysis 2**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Prof. Dr. Lorenc Ekonomi**
E-mail of the professor in charge	**lekonomi@unkorce.edu.al**
Methods * which are used in the course	**PowerPoint, Knowledge clips, interactive videos**
Tools* which are used in the course	**Edpuzzle, GeoGebra**
Name of modernised teaching units	**Multivariate function domain, Limit, Derivative, Indefinite and definite Integral**
Number of students	**30**

The methods/tools used in the course modernisation

Knowledge clips and interactive videos are used in almost every unit of this course. GeoGebra proved to be especially efficient when discussing notions such as the domain of multivariate functions and the limit, derivative and integrals of these functions. The students appreciated how Geogebra helped them with visualizing different exercises.

Mathematical Analysis 2

Content ▸ Math and Physics ▸ Mathematical Analysis 2

Name of the subject: Mathematical Analysis 2

Name of the study programme: Information Technology

Level of the study (BSc/MSc/PhD)**:** BSc

Elective or obligatory: Obligatory

ECTS: 5

Number of students: 30

Professor in charge: Lorenc Ekonomi

E-mail of professor in charge: lekonomi@unkorce.edu.al

Name of the lecture that is/will be modernized: Multivariate function's domain, Limit, Derivative, Nondefinite and Definite Integral for multivariate functions

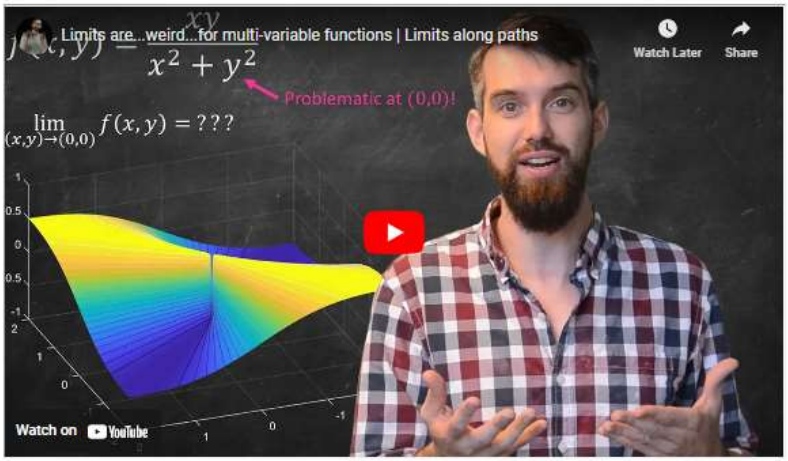
Limit of multivariate functions

Content ▸ Math and Physics ▸ Mathematical Analysis 2 ▸ Limit of multivariate functions

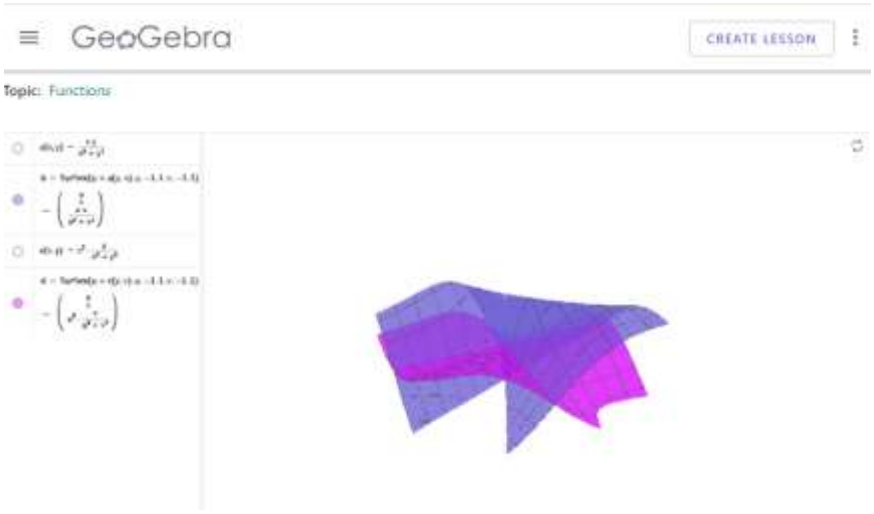
Lecture (Obligatory literature)

Limiti.pdf

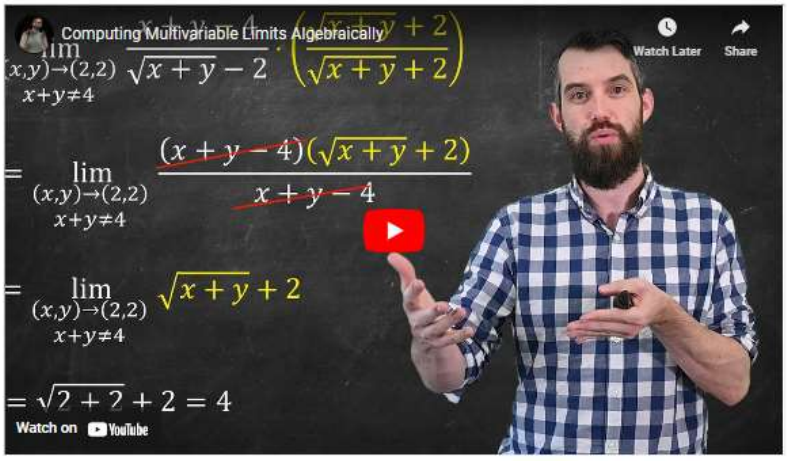
Additional materials



Click to check out the Geogebra Applet


GeoGebra
CREATE LESSON
Topic: Functions

Examples


Computing Multivariable Limits Algebraically
Watch Later
Share
$\lim_{\substack{(x,y)\to(2,2)\\x+y\neq 4}} \frac{x+y-4}{\sqrt{x+y}-2} \cdot \left(\frac{\sqrt{x+y}+2}{\sqrt{x+y}+2}\right)$
$= \lim_{\substack{(x,y)\to(2,2)\\x+y\neq 4}} \frac{(x+y-4)(\sqrt{x+y}+2)}{x+y-4}$
$= \lim_{\substack{(x,y)\to(2,2)\\x+y\neq 4}} \sqrt{x+y}+2$
$= \sqrt{2+2}+2 = 4$
Watch on YouTube

P06-3. Methodology of teaching mathematics methodology, 2021/22

REPORT

In the framework of the project: "Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **Masters course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Teachers in mathematics, physics and informatics**
Name of the course	**Methodology of teaching mathematics**
Level of the study	**3rd semester, Professional Master**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Dr. Eljona Milo**
E-mail of the professor in charge	**emilo@unkorce.edu.al**
Methods * which are used in the course	**Videoclips, Interactive clips, collaborative work**
Tools* which are used in the course	**Openshot, Edpuzzle, animaker, mind maps, Kahoot, rubrics**
Name of modernised teaching units	**Entire course,(especially use of IT in teaching mathematics)**
Number of students	**35**

The methods/tools used in the course modernisation

This course was also entirely modernized. What makes this course special is that new tools, such as Edpuzzle and Kahoot, were not only used during teaching, but also became the focus of a couple of lectures. More specifically the chapter about of "The use of IT in teaching mathematics" now includes all the tools learned during our trainings.
The course's final group project was redesigned by detailing the students' roles and responsibilities during the collaborative work. Students evaluation (and self-check) was improved by adding to the projects instruction a detailed rubric.

Methodology of Teaching Mathematics

Content ▸ Math and Physics ▸ Methodology of Teaching Mathematics

Name of the subject: Methodology of Teaching Mathematics

Name of the study programme: Teachers in mathematics physics and informatics

Level of the study (BSc/MSc/PhD)**:** Master

Elective or obligatory: Obligatory

ECTS: 3

Number of students: 35

Professor in charge: Eljona Milo

E-mail of professor in charge: emilo@unkorce.edu.al

Name of the lecture that is/will be modernized: Entire course

Perdorimi i animacioneve ne mesimdhenien e matematikes

Content ▸ Math and Physics ▸ Mathematics Methodology ▸ Perdorimi i animacioneve ne mesimdhenien e matematikes 2

Hyrje

Për shumë vite, edukatorët e mësuesve, dhe veçanërisht edukatorët e matematikës, kanë mbrojtur përdorimin e artefakteve të praktikës në edukimin dhe zhvillimin profesional të mësuesve. Për të rritur arsimimin e mësuesve të ardhshëm të matematikës, shumë programe dhe edukatorë mësues përdorin punën e studentëve ose videot në klasë me synimin për të ndihmuar mësuesit e ardhshëm të reflektojnë mbi dinamikën e klasës dhe të menduarit dhe të nxënit e nxënësve individualisht ose kolektivisht. Duke përdorur mjetet e animacionit, ne mund të bashkojmë mendimin e nxënësve dhe artefaktet e klasës së bashku për të krijuar skenarë për zhvillimin efektiv profesional të mësuesve të matematikës.

Një nga mundësitë e përdorimit të animacioneve është aftësia për të krijuar një video në klasë (bazuar në kërkime) pa pengesat e shumta që hasim kur përpiqemi të incizojmë një klasë të rregullt (siç është marrja e lejes nga IRB, distriktet shkollore dhe prindërit). Pasi përdoruesi të kapërcejë kurbën e të mësuarit të mjeteve të autorizimit, mund të jetë kursim kohe. Në vend që të kërkojmë video në internet ose të filmojmë një klasë të vërtetë, ne mund të krijojmë një skenar me synime specifike për nevojat tona të veçanta të zhvillimit profesional. Disa kufizime të animacioneve janë se ato janë realiste, por jo "reale". Zëri dixhital ose vetë filmat vizatimorë mund të jenë shpërqendrues dhe zbatimi i dialogut mund të jetë i kufizuar. Më poshtë, ne ndajmë disa nga mjetet e autorit të animacionit, burimet dhe lidhjet me disa animacione të krijuara për edukimin e mësuesve të matematikës.

Materiale

Shembull


Hapësira probabilitare
1. Ngjarjet e rastit.
2. Veprimet me ngjarjet e rastit.

P06-4. Probability and Statistics 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Information technology**
Name of the course	**Probability and Statistics**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Dr. Eljona Milo**
E-mail of the professor in charge	**emilo@unkorce.edu.al**
Methods * which are used in the course	**Knowledge clips, animations, interactive video Flipped Classroom, collaborative work.**
Tools* which are used in the course	**PowerPoint, Camtasia, Edpuzzle, Google Forms, rubrics**
Name of modernised teaching units	**Probability space. The normal Distribution probabilities. Law of large numbers.**
Number of students	**30**

The methods/tools used in the course modernisation

The course of Probability and Statistics has proven time and time again to have some very challenging topics. Especially abstract topics such as probability space, Normal Distribution and Law of Large numbers can puzzle students of the first year of Bachelor. Therefore, several online tools and methodological techniques were used in order to overcome students' difficulties. PowerPoint Presentation were used during teaching, and animations used as a homework, to watch and be prepared for the next lesson.

In this course, assignments required both individual and collaborative work. Rubrics were used in both cases to evaluate students. Google Forms were used to test students' knowledge with short quizzes .

Probability and Statistics

Content ▸ Math and Physics ▸ Probability and Statistics

Name of the subject: Probability and Statistics

Name of the study programme: Information Technology

Level of the study (BSc/MSc/PhD): BSc

Elective or obligatory: Obligatory

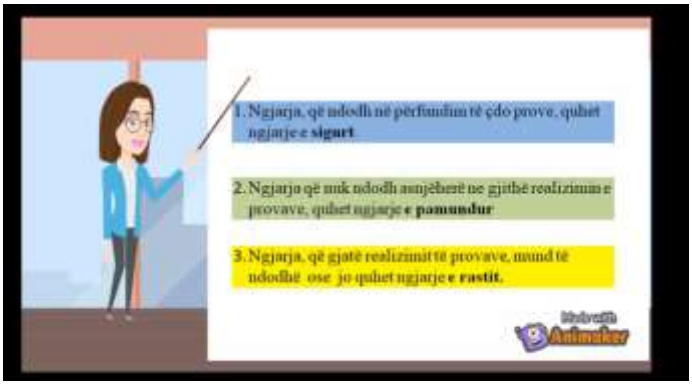
ECTS: 6

Number of students: 30

Professor in charge: Eljona Milo

E-mail of professor in charge: emilo@unkorce.edu.al

Name of the lecture that is/will be modernized: Probability space. The normal distribution. Law of Large numbers.



P06-5. Algebra 2, 2021/22

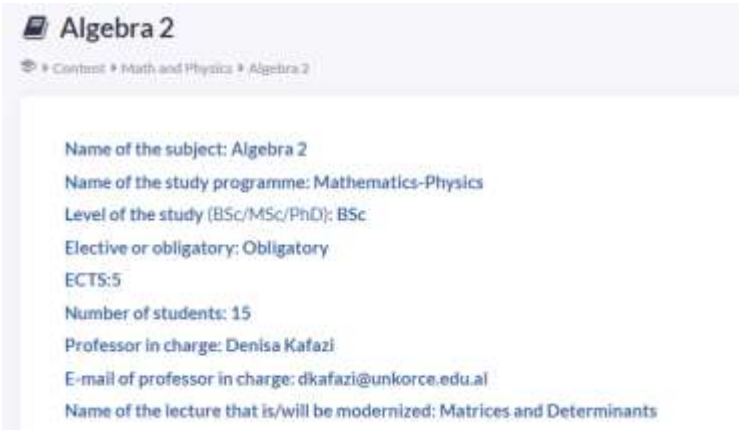
REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Mathematics- Informatics, Mathematics Physics**
Name of the course	**Algebra 2**
Level of the study	**2nd semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Denisa Kafazi**
E-mail of the professor in charge	**dkafazi@unkorce.edu.al**
Methods * which are used in the course	**Videoclips, interactive videos, rubrics**
Tools* which are used in the course	**Edpuzzle, Kahoot**
Name of modernised teaching units	**Matrices, Determinants**
Number of students	**15**

The methods/tools used in the course modernisation

Edpuzzle interactive videos proved to be the most useful throughout the entire course. These videos helped the students to get familiarized with the different algorithms that are explained in this course. Especially, when it comes to matrices and their determinant.
These videos combined with periodical Kahoot quizzes helped students to gain confidence in solving the exercises.



Matrica e anasjellte

Content ▸ Math and Physics ▸ Algebra 2 ▸ Matrica e anasjellte

Permbledhje

Perpara se te lexoni materialin e ri, kujtoni:

1. Cilat janë vetitë themelore të mbledhjes dhe shumëzimit skalar të matricës?
2. Kur ekziston matrica e anasjellte?
3. Si mund të gjejmë matricën e anasjellte?

leksioni 2 matrica.docx

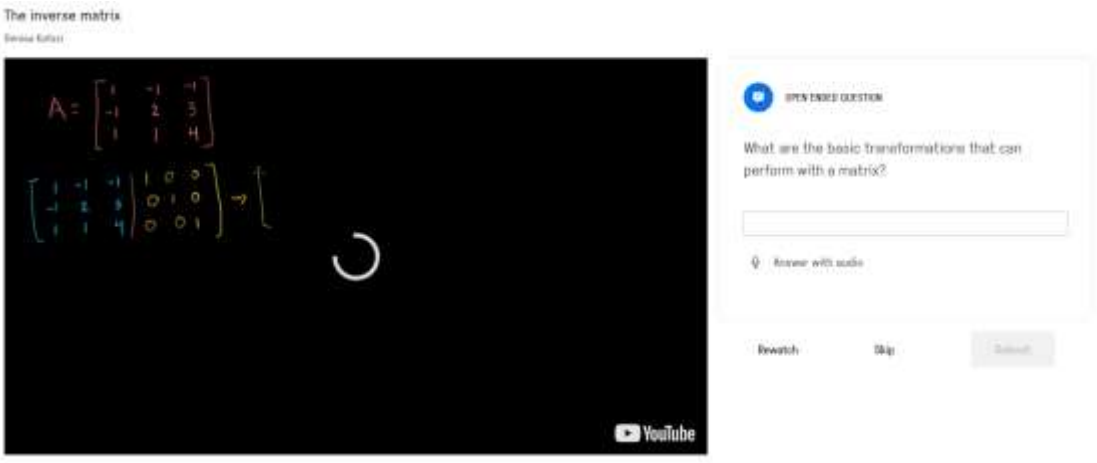
Algoritmi i gjetjes së matricës së anasjelltë.docx

Metoda e transformimeve elementare

Edpuzzle video

Metoda matricore

1matricat1.pdf



Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences

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

P06-6. Mathematics in secondary education, 2021/22

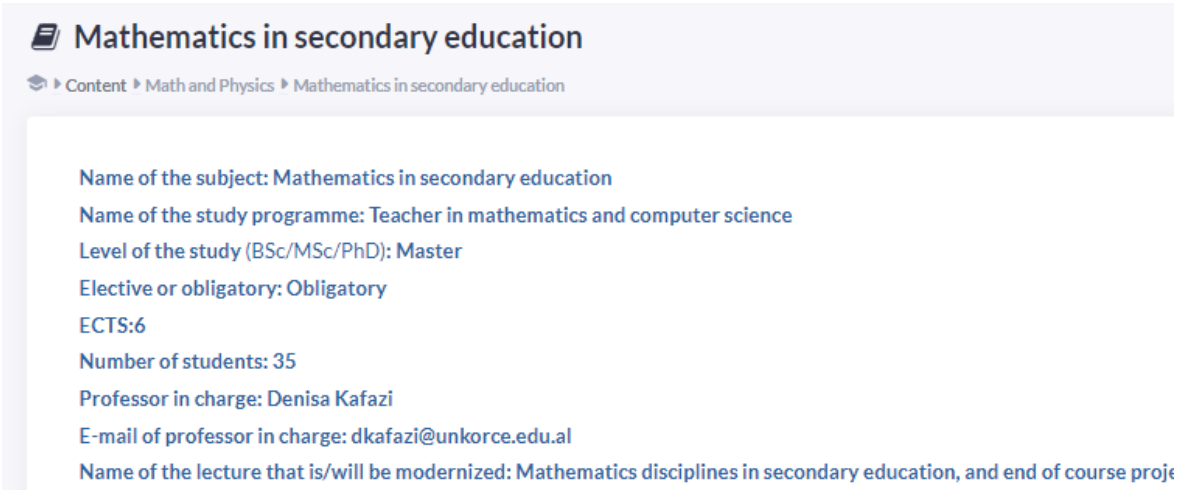
REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **Masters course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Teacher in mathematics, physics and informatics**
Name of the course	**Mathematics in secondary education**
Level of the study	**2nd semester, Professional Mater**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**Denisa Kafazi**
E-mail of the professor in charge	**dkafazi@unkorce.edu.al**
Methods * which are used in the course	**Interactive videos, animations, collaborative work, rubrics**
Tools* which are used in the course	**Edpuzzle, Animaker, mind maps, rubrics, Forms ect.**
Name of modernised teaching units	**Mathematic disciplines in secondary education, end of course project**
Number of students	**35**

The methods/tools used in the course modernisation

This course is taught with first year students of the Master's degree. Including interactive videos during most of the lectures changed them for the better. They helped with teaching the theory quicker and more efficiently and made possible to dedicate more time to discussing real and interesting examples and situations regarding the lesson. Mind maps were a common homework given to the students to summarize their acquired knowledge. Forms was used a tool to perform short quizzes.
The most important change was made to final course project (presented below), which was redesigned to include the lessons learned by the professor during her TeComp training. Rubrics were created to evaluate students both individually and as a group.



Mathematics in secondary education

Content ▸ Math and Physics ▸ Mathematics in secondary education

Name of the subject: Mathematics in secondary education
Name of the study programme: Teacher in mathematics and computer science
Level of the study (BSc/MSc/PhD): Master
Elective or obligatory: Obligatory
ECTS:6
Number of students: 35
Professor in charge: Denisa Kafazi
E-mail of professor in charge: dkafazi@unkorce.edu.al
Name of the lecture that is/will be modernized: Mathematics disciplines in secondary education, and end of course proje

DETYRE KURSI

Content ▸ Math and Physics ▸ Mathematics in secondary education ▸ DETYRE KURSI

Tema : Planifikimi vjetor, tremujor dhe ditor në lëndën e matematikës.

Qëllimi i detyrës është të përforconi materialin që keni marrë gjatë javëve të mësimit dhe t'ju ndihmojë të praktikoheni si mësus të ardhshëm. Madje duke parë më pas modele nga më të ndryshme të planeve ditore të studentëve të tjerë ju do të kini gatí një portofol të gatshëm kur të filloni punën si mësues. Nëse detyra ju duket e vështirë dhe me volum mos u shqetësoni. Në këtë periudhë do t'ju ndihmojë ndjekja e orëve të praktikës që do të zhvilloni në shkollat ku jeni caktuar.

Detyra e kursit do të realizohet në grupe prej 4 studentësh. Si tekst do të zgjidhni një nga tekstet e matematikës nga klasa 6 deri tek klasa 12 sipas dëshirës .

Udhezime

Udhezime.pdf

Course project

Detyra e kursit

P06-7. MATLAB, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Mathematics- Informatics, Mathematics- Physics**
Name of the course	**MATLAB**
Level of the study	**4rth semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**MSc. Silvja Çobani**
E-mail of the professor in charge	**scobani@unkorce.edu.al**
Methods * which are used in the course	**Knowledge clips, animations, interactive video, collaborative work, Flipped Classroom**
Tools* which are used in the course	**PowerPoint, Openshot, Edpuzzle, Google Forms, Microsoft Stream, Canvas, rubrics**
Name of modernised teaching units	**MATLAB m-files, Inline and anonymous functions, Function files, Debugging In MATLAB**
Number of students	**20**

The methods/tools used in the course modernisation

MATLAB is a course that has evolved a lot during these past few years. Animations have become common practice during lectures, besides common PowerPoint short clip tutorials. PowerPoint and OpenShot were the two tools used to create the different animated videos. Microsoft Stream and Microsoft Forms were used to create and assign interactive videos as homework to students. This method was the most popular among the students.

The aforementioned tools, helped introduce to the students to Flipped Classroom, and made the experience easier for them.

The course ends with a final project. This project was redesigned thanks to the knowledge gained during the trainings. Specifically, the project was divided in two phases, each ending with the professor giving feedback to the students on the work done thus far. To present their work, students were encouraged to use Canvas.

Students' evaluation was improved by adding rubrics as a tool that also helped with students' self-evaluation and peer evaluation.

MATLAB

Content ▸ Math and Physics ▸ MATLAB

Name of the subject: MATLAB

Name of the study programme: Mathematics- Informatics

Level of the study (BSc/MSc/PhD)**:** BSc

Elective or obligatory: Obligatory

ECTS: 2

Number of students: 20

Professor in charge: Silvja Çobani

E-mail of professor in charge: scobani@unkorce.edu.al

Name of the lecture that is/will be modernized: MATLAB *m-files, Inline* and *anonymous* functions, Functions, Debugging In MATLAB

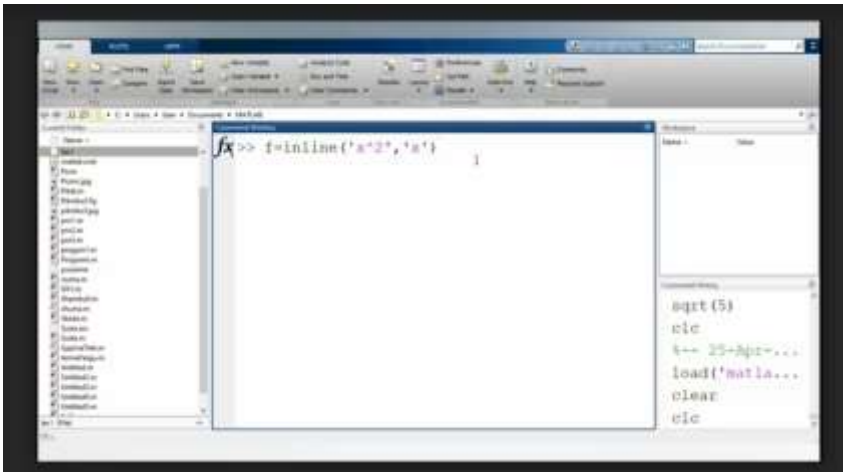
Funksionet inline dhe anonymous

Content ▸ Math and Physics ▸ MATLAB ▸ Funksionet inline dhe anonymous

Short tutorial

Please click to watch Tutorial

Detyre Shtepie




Detyre Shtepie
Shikoni videon me poshte dhe me pas pergjigjuni pyetjeve qe ju jane dhene me poshte ne Google Forms
Matlab 17. Inline Functions
Introduction to
ab Programming
for Engineers and Scientists
Watch on

KUIZ

KUIZ


Funksionet ne MATLAB
Identifikohuni me email dhe pastaj pergjigjuni pyetjeve me poshte
Sign in to Google to save your progress. Learn more
* Required
Email *
Your email
Cfare jane m- skedaret ne MATLAB? Ne sa lloje i gjejme? *
Your answer
(Pasi te keni pare videon ne YouTube) Sa menyra njihni per te percaktuar funksionet ne MATLAB dhe cilat jane ato?


Detyre Kursi
Udhezime

P06-8. Discrete Mathematics, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Information Technology**
Name of the course	**Discrete mathematics**
Level of the study	**1st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**MSc Silvja Çobani**
E-mail of the professor in charge	**scobani@unkorce.edu.al**
Methods * which are used in the course	**Knowledge clips, animations, interactive video**
Tools* which are used in the course	**PowerPoint, Camtasia, Edpuzzle, Google Forms, mind maps**
Name of modernised teaching units	**Complex Numbers**
Number of students	**30**

The methods/tools used in the course modernisation

This course is taught to first year students of the Information Technology Study Program. Thus, the professor has always been interested in making this course as much "IT friendly" as possible. Edpuzzle and animated videos using pre- prepared PowerPoint presentations and Camtasia proved to be the right way to go. These methods were introduced in the chapter of complex numbers, and were well received by the students.

Google Forms was used to test students' knowledge with short quizzes, and mind maps was used at the end of the chapter to summarize the concepts and to discuss with the students, providing examples.

Discrete Mathematics

Content ▸ Math and Physics ▸ Discrete Mathematics

Name of the subject: Discrete Mathematics
Name of the study programme: Information Technology
Level of the study (BSc/MSc/PhD)**:** BSc
Elective or obligatory: Obligatory
ECTS: 5
Number of students: 30
Professor in charge: Silvja Çobani
E-mail of professor in charge: scobani@unkorce.edu.al
Name of the lecture that is/will be modernized: Complex numbers

Trajta trigonometrike e numrit kompleks

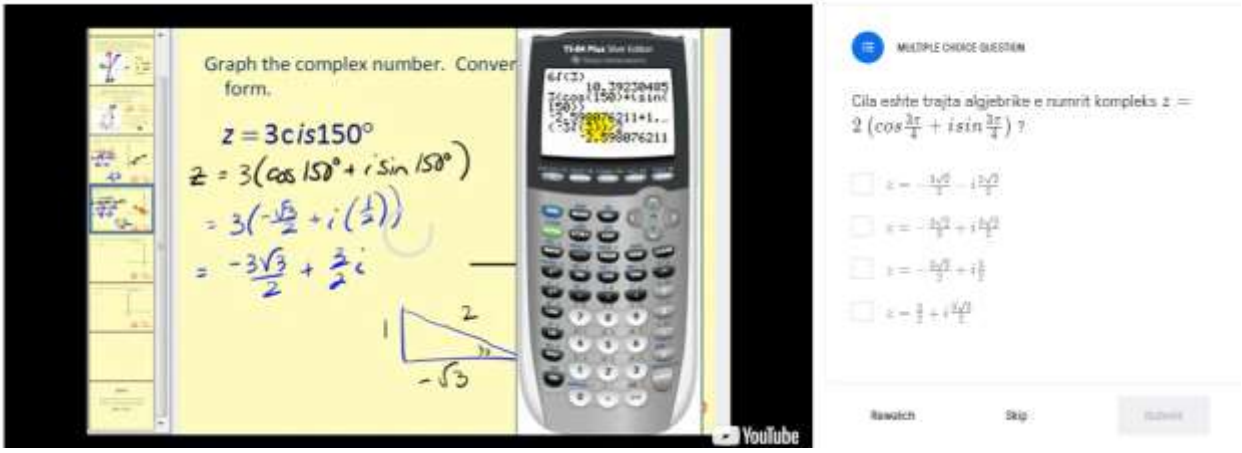
Content ▸ Math and Physics ▸ Discrete Mathematics ▸ Trajta trigonometrike e numrit kompleks

Leksioni

Material Shtese

Edpuzzle Video

Trajta trigonometrike e numrave kompleks



P06-9. Cryptography, 2021/22

REPORT

In the framework of project :" Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Mathematics -Informatics, Information Technology**
Name of the course	**Cryptography**
Level of the study	**5th semester, Bachelor**
Type of the course (elective/obligatory)	**Elective**
Professor in charge	**Dr. Blerina Çeliku**
E-mail of the professor in charge	**bceliku@unkorce.edu.al**
Methods * which are used in the course	**Knowledge clips, animations, interactive videos, collaborative work**
Tools* which are used in the course	**Camtasia Studio, PowerPoint, Edpuzzle, Microsoft Stream, Canvas, rubrics**
Name of modernised teaching units	**An Introduction to Cryptool platform; Basic transformations in SPN (Substitution Permutation Network; AES and its features;**
Number of students	**30**

The methods/tools used in the course modernisation

The course of Cryptography is focused mainly on coding theory with basic ciphers and afterward with modern algorithms that are in use nowadays; their features and transformations. Cryptool is a new platform that helps students to understand the cryptographic ciphers, algorithms and mechanisms. In this course the professor involved new methods of teaching and learning. The students to whom the course is intended for are in the 3rd year of Bachelor studies; and they are almost familiar with digital and online learning environments (Google Classroom, MS Teams). During the course the professor has chosen some topics to teach them in a different and more understandable way; using knowledge clips as tutorials, posters, animations and rubrics. Several tools to create animations and tutorials for specific lecture topics. After the theoretical explanation of the algorithm (SPN), the professor defined the properties, transformations and the structure of this cryptographic network. The students were introduced to the tools to program (coding) and the animation of this structure in PowerPoint. This presentation of SPN, the tutorial about Cryptool in Camtasia, the "AES features" clip in Edpuzzle and some quizzes that were applied during the lectures were very helpful for the students and also challenging for other topics to be modernized in the future.

Cryptography

Content ▸ Informatics ▸ Cryptography

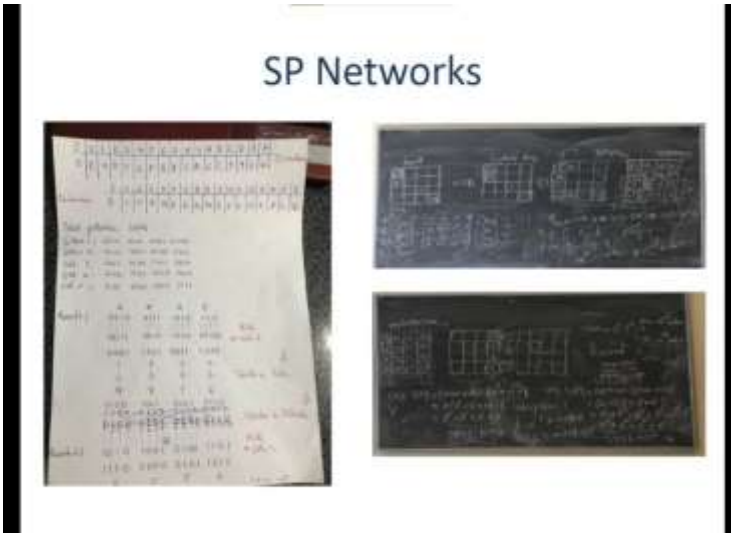
Name of the subject: Cryptography
Name of the study programme: Information Technology
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Elective
ECTS: 3
Number of students: 30
Professor in charge: Blerina Çeliku
E-mail of professor in charge: bceliku@unkorce.edu.al
Name of the lecture that is/will be modernized: An introduction to Cryptool platform. Basic trasformations ir its features.

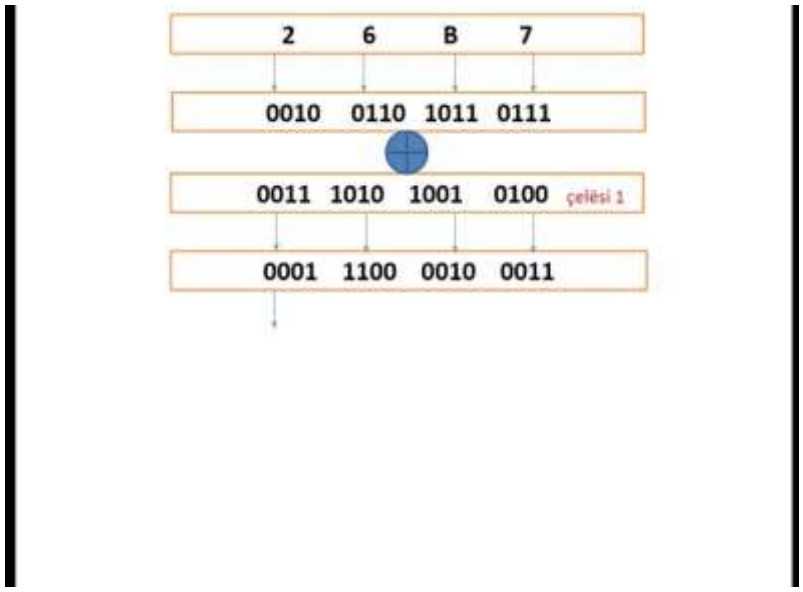
SPN network

Content ▸ Informatics ▸ Cryptography ▸ SPN network

Presentation and Animation

Click here





P06-10. General Physics 2, 2021/22

REPORT

In the framework of the project: " Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Information Technology**
Name of the course	**General Physics 2**
Level of the study	**2st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**MSc. Esmeralda Guliqani**
E-mail of the professor in charge	**eguliqani@unkorce.edu.al**
Methods * which are used in the course	**Knowledge clips, interactive videos, Flipped Classroom**
Tools* which are used in the course	**Animaker, Edpuzzle, Forms**
Name of modernised teaching units	**Graphic representation of the electric field. The electric field of charges. Electrical Potential Energy**
Number of students	**30**

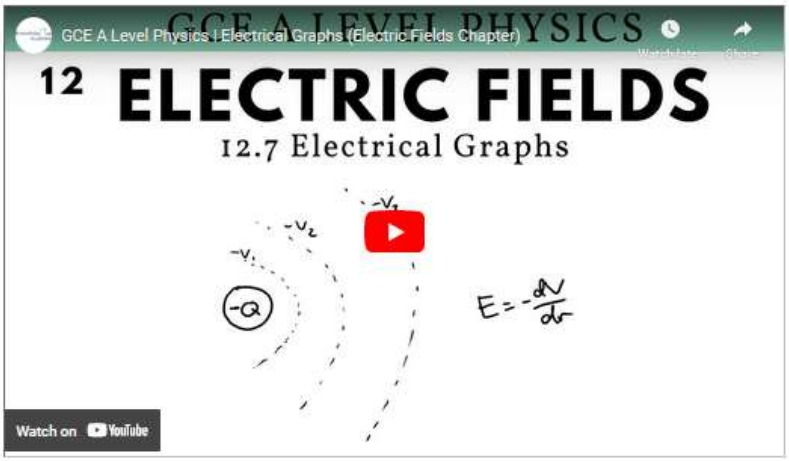
The methods/tools used in the course modernisation

This course is taught to University freshmen, with General Physics 1 as a prerequisite. The course has been improved by giving students as a homework to watch either knowledge clips, or Edpuzzle Videos.. Forms were also used to test the students. These tools also facilitated experimenting with Flipped classroom method. So the next step will be to "flip the classroom" on a few more lectures.

Detyre 1

Content ▸ Math and Physics ▸ General Physics 2 ▸ Graphic representation of the electric field. ▸ Detyre 1

Shikoni videon me poshte dhe pergjigjuni pyetjeve



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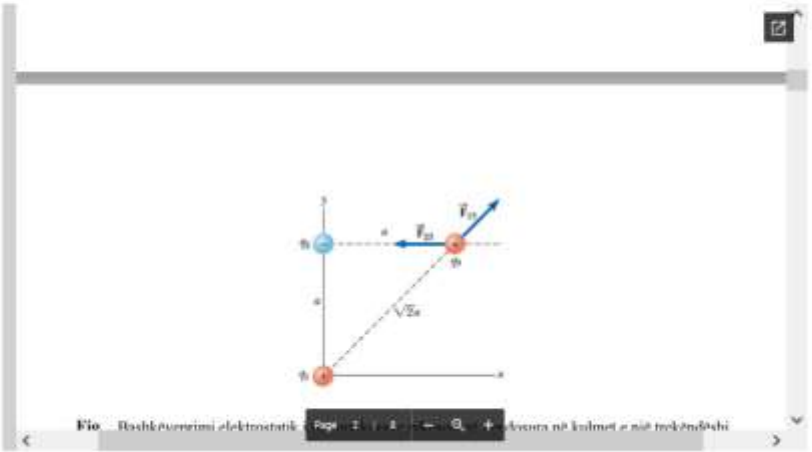
Detyre 2

Studioni shembujt dhe me pas zgjidhni ushtrimet



Ngarkoni ushtrimet tuaja ketu:

P06-11. Physics 2, 2021/22

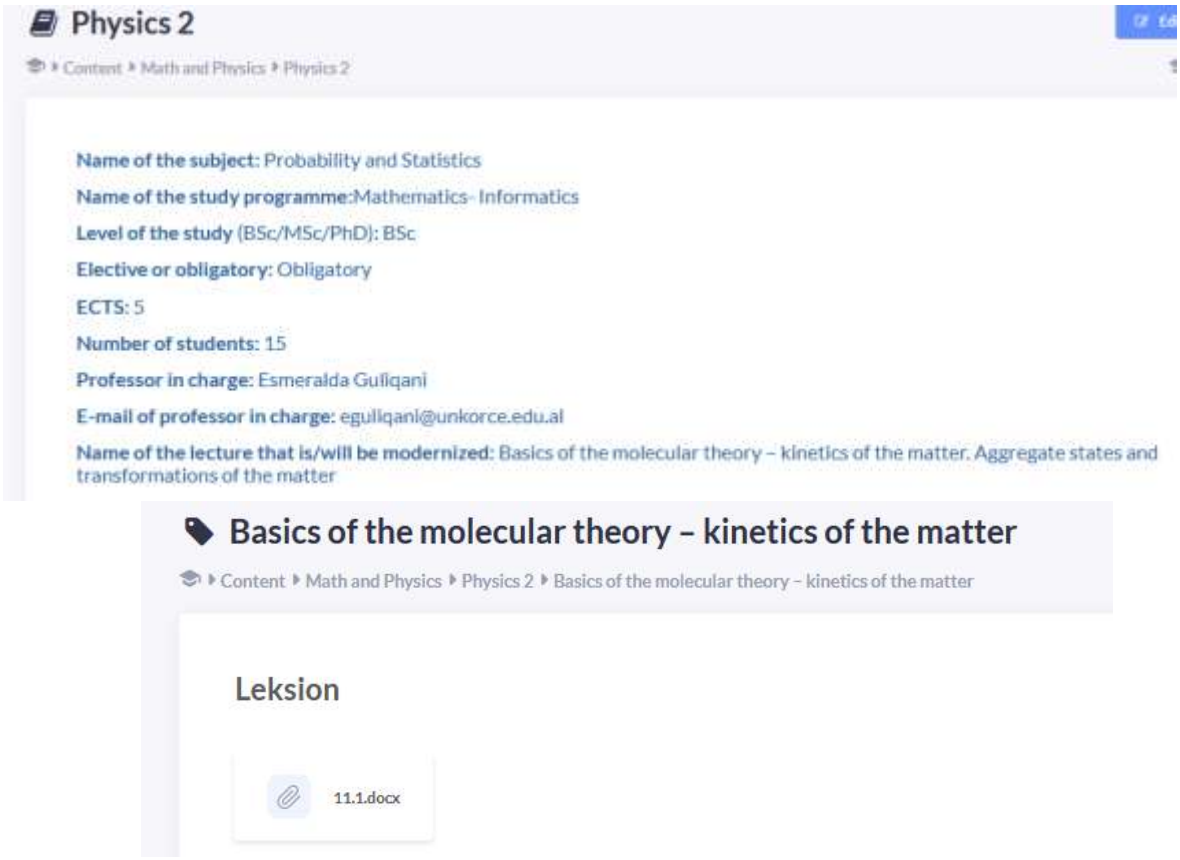
REPORT

In the framework of the project: " Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences" this **BSc course is modified by using new methods and tools.**

Name of the University	**"Fan S. Noli" University , Korçë**
Name of the study programme	**Mathematics- Informatics, Mathematics Physics**
Name of the course	**Physics 2**
Level of the study	**2st semester, Bachelor**
Type of the course (elective/obligatory)	**Obligatory**
Professor in charge	**MSc. Esmeralda Guliqani**
E-mail of the professor in charge	**eguliqani@unkorce.edu.al**
Methods * which are used in the course	**Knowledge clips, interactive videos, Flipped Classroom**
Tools* which are used in the course	**Animaker, Edpuzzle, Forms**
Name of modernised teaching units	**Basics of the molecular theory – kinetics of the matter. Aggregate states and transformations of the matter**
Number of students	**15**

The methods/tools used in the course modernisation

This course is taught to University freshmen, with Physics 1 as a prerequisite. The course has been improved by giving students as a homework to watch either knowledge clips, or Edpuzzle Videos.. Forms were also used to test the students. These tools also facilitated experimenting with Flipped classroom method. So the next step will be to "flip the classroom" on a few more lectures

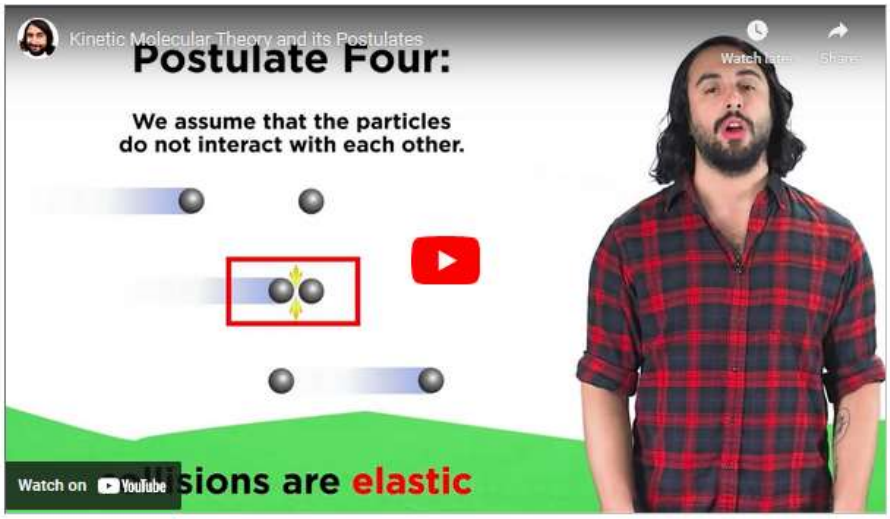

Physics 2
Content ▸ Math and Physics ▸ Physics 2
Name of the subject: Probability and Statistics
Name of the study programme:Mathematics- Informatics
Level of the study (BSc/MSc/PhD): BSc
Elective or obligatory: Obligatory
ECTS: 5
Number of students: 15
Professor in charge: Esmeralda Gufiqani
E-mail of professor in charge: eguliqani@unkorce.edu.al
Name of the lecture that is/will be modernized: Basics of the molecular theory – kinetics of the matter. Aggregate states and transformations of the matter

Basics of the molecular theory – kinetics of the matter
Content ▸ Math and Physics ▸ Physics 2 ▸ Basics of the molecular theory – kinetics of the matter
Leksion
11.1.docx

Detyra 1

Content ▸ Math and Physics ▸ Physics 2 ▸ Basics of the molecular theory – kinetics of the matter ▸ Detyra 1

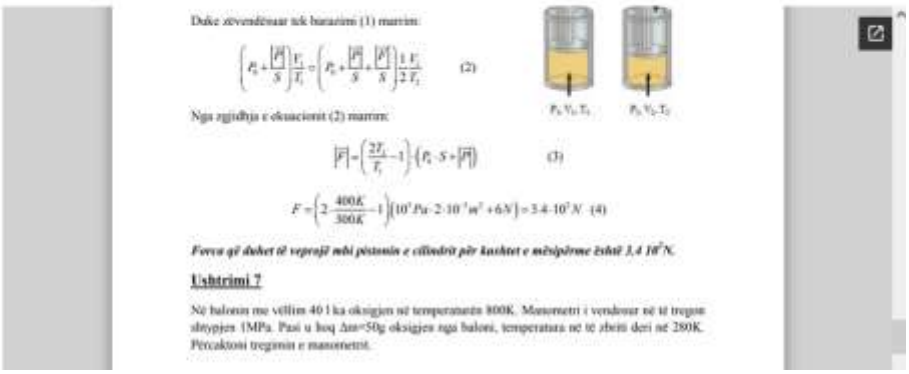
Shikoni videon me poshte dhe pergjigjuni pyetjeve



Detyra 2

Content ▸ Math and Physics ▸ Physics 2 ▸ Basics of the molecular theory – kinetics of the matter ▸ Detyra 2

Studioni shembujt dhe me pas zgjidhni ushtrimet



Duke zëvendësuar në barazimin (1) marrim:

$$\left(P_1+\frac{|\vec{F}|}{S}\right)\frac{V_1}{T_1}=\left(P_2+\frac{|\vec{F}|}{S}+\frac{|\vec{F}|}{S}\right)\frac{1}{2}\frac{V_1}{T_1} \qquad (2)$$

Nga zgjidhja e ekuacionit (2) marrim:

$$|\vec{F}|=\left(\frac{2T_1}{T_1}-1\right)\left(P_1\cdot S+|\vec{F}|\right) \qquad (3)$$

$$F=\left(2\frac{400K}{300K}-1\right)\left(10^5 Pa\cdot 2\cdot 10^{-3}m^2+6N\right)=3.4\cdot 10^2 N \quad (4)$$

Forca që duhet të veprojë mbi pistonin e cilindrit për kushtet e mësipërme është 3,4 10^2N.

Ushtrimi 7

Në balonin me vëllim 40 l ka oksigjen në temperaturën 800K. Manometri i vendosur në të tregon shtypjen 1MPa. Pasi u hoq Δm=50g oksigjen nga balloni, temperatura në të zbriti deri në 280K. Përcaktoni treguesin e manometrit.

University of Niš

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

This project has been co-funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein