Applied Project
(PUNTE Project course at SuboticaTech – College of Applied Sciences)

At Subotica Tech – College of Applied Sciences (VTŠ), the course with title Applied Project is reserved for contents connected to projects. (Within this course, several professors can give lectures and organize courses to different groups of students, depending on students' interest.) In the following years, one of the possible choices will be the PUNTE project course created by VTŠ professors participating in PUNTE project. Applied Project is sixth semester obligatory course for the students of Technical Communication Management. It is a 6 ECTS point course. This year PUNTE project course is the only one possible choice for the students. Therefore, 12 students will participate in the course. Lectures and exercises will be held live at VTŠ. If the pandemic situation worsens, lectures and exercises will be held on the BigBlueButton platform with link: https://bbb.vts.su.ac.rs/b/zol-6vx-rxv.

Description of the Course:
Applied Project (Application of Poly-Universe)

The aims of the course are:
1. to construct and organize learning environments in a way that enables students to recognize Poly-Universe as a useful teaching tool and to develop their creativity which will help them to create new applications of Poly-Universe in teaching and learning.
2. to prepare the students to be able to apply Poly-Universe in teaching using different approaches,
3. to help students' learning and overcoming their learning difficulties connected to notions of the modules of the course,
4. to develop students' logical thinking,
5. to develop students' to be more tolerant and emphatic and to use inclusion,
6. to develop students' sense of art,
7. to help students to handle the electronic version of Poly-Universe.

The structure of the course:
This is one semester course (duration: fifteen weeks) with 5 classes a week (2 lectures and 3 exercises of 45 minutes each).
The course is structured in following modules:
1. Introductory classes- exploration of the shapes of the elements of Poly-Universe sets and discussions about their potential usefulness in teaching and learning based on appropriate theoretical background (duration: 1 week),

2. Geometry and the methodology of its teaching (with appropriate theoretical background) when the Poly-Universe is used (duration: 1 weeks),
3. Combinatorics and the methodology of its teaching (with appropriate theoretical background) when the Poly-Universe is used (duration: 1 weeks),
4. Informatics and the methodology of its teaching (with appropriate theoretical background) when the Poly-Universe is used (duration: 1 weeks),
5. Developing logical thinking by using Poly-Universe with appropriate theoretical background (duration: 1 week),
6. Complex, interdisciplinary problems where Poly-Universe sets are used (duration: 2 week),
7. Using Poly-Universe as concrete representations in solving problems (duration: 1 week),
8. Electronic version of Poly-Universe and how to use it in teaching with appropriate theoretical background (duration: 1 week),
9. Games in teaching and learning when we use Poly-Universe sets with appropriate theoretical background (duration: 1 week),
10. How can using Poly-Universe sets help disabled students' learning and their communication to one another and how can it help students and their teachers to be more tolerant and to use inclusion (duration: 1 week),
11. Poly-Universe and art (duration: 1 week),
12. Presentations of students' work and ideas about using Poly-Universe sets in teaching and learning and discussions about them (duration: 3 weeks).

Learning outcomes:
After completing the course the student should be able to use Poly-Universe sets in their future teaching.

Evaluation:
The final grade is the grade of the student's presentation. In the presentation students present their ideas and possible application(s) of Poly-Universe.

Contents of modules:
1. During the introductory classes, through exploration of the elements of sets and through playing and dealing with them (spontaneously or guided by teachers) students can recognize some possibilities of using Poly-Universe sets in teaching and learning and can discuss them. Through these activities students will get some ideas of Poly-Universe applications or new variations for existing applications and can easily understand theoretical background.

2. Firstly, students deal with geometric figures which can be constructed using Poly-Universe sets and with their properties. With help of their teachers the students formulate and solve

simple and more demanding problems connected to these figures. The students and the teacher discuss the methodology of teaching these contents.

Secondly, students deal with geometric transformations in the plane using Poly-Universe sets and with their properties. With help of their teachers the students formulate and solve simple and complex problems connected to these transformations. They also discuss the methodology of teaching these contents.

Thirdly, students calculate perimeter and area of geometric figures which can be constructed using Poly-Universe sets and the area and volume of geometric solids which nets can be constructed using Poly-Universe. They also formulate similar problems and discuss the methodology of teaching them.

3. Basic concepts of combinatorics like permutations with and without repetitions, variations within without repetitions and combinations without repetitions are explained by using Poly-Universe sets. Permutations and variations without repetitions are introduced. After that variations with repetitions and combinations without repetitions are explained. The poly-Universe set is used to improve recognition of permutations, variations and combinations.

4. The aim of the Informatics module is to use Poly-Universe in teaching programming in Python and coordinate geometry. Basic concepts of Python programming language and some libraries in Python are introduced. The Turtle Python's library is used to draw given patterns. While writing the program for drawing a given pattern built by Poly-Universe set, students will intensively use their coordinate geometry knowledge, and broaden their knowledge in Python programming.

5. The Poly-Universe set is used to exercise tasks which will improve logical thinking of students. The students will be encouraged to introduce them to exercises for developing and improving logical thinking.

6. Students deal with complex, interdisciplinary problems where Poly-Universe sets are used. The students learn to analyze the problem and the connections among different parts of that problem. They try to create that type of problem and discuss the possible methodologies of teaching them.

7. Students learn about using concrete and visual representations in teaching and then solve different types of problems where the elements of Using Poly-Universe sets are used as concrete representations. The students formulate such types of problems and discuss the possible methodologies of teaching them.

8. Through using an electronic version of Poly-Universe the students explore its characteristics. They analyze and compare them with the characteristics of classical Poly-

Universe sets. They try to formulate the advantages and disadvantages of using the electronic version of Poly-Universe and to collect problems for which this version of Poly-Universe is useful.

9. Students learn about using games in teaching and learning. They play different games using Poly-Universe sets for learning notions of different fields and for students' development. Then the students analyze the games and try to create new ones or to modify the rules of the games they played. Through discussion students try to improve the characteristics of the games and try to find more applications for using Poly-Universe sets through games.

10. Students learn about inclusion and its importance in education. In concrete examples they learn how to use Poly-Universe sets to create an inclusive learning environment which can help disabled students' learning, communication and collaboration. In order to be more inclusive and tolerant the students play games using Poly-Universe sets, where their eyes are closed to feel what the world looks like in the sense of the visually impaired students. Then the students discuss their experiences and feelings.

11. The students can see some photos of pieces of art which are inspired by Poly-Universe or where the elements of Poly-Universe sets are used as pieces of which the piece of art is constructed. Inspired by these, the students try to make something new and discuss their work.