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2020-1-HU01-KA203-078810 - Poly-UNiverse in Teacher Training Education - PUNTE

**Name of the course: Poly-UNiverse in Education**      **Code:** NBT\_MT173G2      **Nr. of credits: 2**

Type of lessons (lect./semin./pract./consult.) and number: **practice, 1 hour per week**

Method of evaluation (colloquium/practical mark/other): **practical mark**

Place of the course in the curriculum (which semester): **7 to10, any semester**

Frequency of offering the course: **yearly, in even semesters**

Language of the course (if not Hungarian): **Hungarian and English**

Prerequisites (if there are any): -

### Course description

#### Educational aims:

The aim of the course is to reveal how the Poly-UNiverse game can be used in an experience-based, enabling differentiated development teaching methods, for students of different levels of teacher training education (from special education to subject teachers). The course aims to construct a teaching-learning environment through which the students can realize that the Poly-UNiverse game is an appropriate tool for raising motivation, developing creativity and involving pupils with learning difficulties in teaching different subjects.

#### Competences to be developed:

##### a) knowledge

The students should get acquainted with the Poly-UNiverse toolkit and its artistic background. The students should learn about the pedagogical-psychological theories which give the base for using the game in teaching situations. The students should acquire those methodological tools and approaches with which they will be able to plan a teaching-learning unit using the Poly-UNiverse game.

##### b) skills/abilities

The students evolve in abstract, logical thinking, analytical skills, spatial seeing, problem solving, problem posing and model-making abilities through practicing with the Poly-UNiverse game on the course. The students' creativity can also evolve by inventing new exercises.

##### c) attitude

Fulfilling the expectations of the course should raise the empathy and tolerance of the students when teaching pupils with learning difficulties or special needs, regarding differentiated development strategies. The student should be engaged in teaching his/her own subject using experiential teaching methods. The student should be sensible for involving visual arts in teaching/learning procedure.

##### d) autonomy and responsibility

After the course the students should be able to work out a special topic (regarding his/her specification of planning a lesson) using the Poly-universe game independently.

#### Content of the course and its timing:

- 1 Introduction – Getting acquainted with the elements of the Poly-UNiverse game family, discussing the characteristics and the artistic background of it. Theoretical background of usage in teaching-learning procedures (self-study by e-learning materials). (2 lessons)
- 2 Poly-UNiverse and arts. Teaching-learning through arts. (2 lessons)
- 3 Using Poly-UNiverse in teaching geometry – methods, exercises, ideas. About spatial skills and their development. Using Poly-UNiverse in the development of combinativity – problems from the field of Combinatory. (2 lessons)
- 4 Development of abstract, logical thinking and analytical skills with the Poly-UNiverse game. Complex and interdisciplinary problems, where Poly-UNiverse can help modelling the solution. The theory of Problem Based





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Learning methods. Using Poly-UNiverse as a concrete/material representation form in problem solving – the role of different representation forms in learning procedure. (2 lessons)

- 5 Poly-UNiverse in a digital environment – using GeoGebra for solving problems connected to the game. The methodology of using ICT tools and material tools during the teaching/learning procedure. (2 lessons)
- 6 The role of games in teaching-learning in general. Presenting game-based teaching methods through Poly-UNiverse game. How can the Usage of the Poly-UNiverse game help in the development of pupils with special needs, special attention or learning difficulties? (2 lessons)
- 7 Presenting the students' projects – worked out individually, in pairs or small groups, where the using of Poly-UNiverse appears in a certain learning activity – and evaluation. (2 lessons)

### Teaching management:

- in 2 lessons per 2 weeks modules!
- The course will be held with attendance of the students aided by e-learning material.
- Tools used in the lessons: Poly-UNiverse game family, paper, pen, notebook, camera or smartphone.

### Requirements of the course:

- Active participation in the lessons and in the project work.
- Presentation of 1 chosen theoretical issue on the lessons.
- Working out a project and presenting it individually, in pairs or in small groups at the last lessons.

### Evaluation of the acquired knowledge:

- At the end of the semester an online test from the theoretical issues.
- Evaluation of the presented project according to given viewpoints (applicability, feasibility, meets the expectations of the curricula and methodological studies).

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### Compulsory bibliography:

- PUSE Methodology – Mathematics education based on visual experiments (<http://www.punte.eu/puse-methodology/>)
- Poly-UNiverse in teacher training – Methodological Study and Handbook for student teachers and in-practice-teachers <https://www.punte.eu/punte-study/>

### Selected bibliography:

- Symmetry: Culture and Science. (2020) Poly-UNiverse in School Education, Editor: György Darvas, Vol. 31., Nr. 1, 1-112
- Művészet/tudomány határterületek az alkotásban. Magyar Tudomány 2021/8. (Tematikus összeállítás). Vendégszerkesztők: Saxon-Szász János, Dárdai Zsuzsa

### Selected and compulsory digital material:

- <http://poly-universe.com/>
- <http://www.punte.eu/>
- <https://www.geogebra.org/m/ms8nznfym>
- [www.puse.education](http://www.puse.education)

