Mathematics 1.
Course Code: EPE075AN
Semester: Autumn 2019/2020 1.

Course Syllabus
Time: L Wednesday 11:15-12:45
P Wednesday 13:15-14:45
Location: PTE MIK,L A-216, P A-216

General Information:

Name of Course:	# MATHEMATICS 1.
Course Code:	EPE075ANEM
Semester:	1st
Number of Credits:	4
Allotment of Hours per Week:	2 hours lecture, 2 hours practice
Evaluation:	Exam (with grade)
Prerequisites:	-
Instructors:	**Dinnyés Enikő, assistant professor**
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Introduction, Learning Outcomes

The lectures give some elements of important mathematical techniques that are used in an architect's practice.
Upon completion of this course, the student should be able to: **interpret,** and **put into practice**

  a. Constructing the golden ratio
  b. Vectorial products, matrix multiplication
  c. Using an Affine coordinate system
  d. Plot objects with infinitely far points in a Projective coordinate system
  e. Transformations in the projective plane and their matrix form

General Course Description and Main Content:

Brief Syllabus: This lecture- and practical-based course aims to give architect students a solid mathematics basis through covering the following topics:

- Golden ratio. Operations with vectors. Matrices.
- Inhomogenous and homogenous coordinates of the plane. Group of similarity transformations in the plane.
- Projective transformations in the plane.
- Congruent, affine and projective mappings of the three-dimensional space.
- Matrix of linear operators, their application.

Students learn the basics of mathematics enabling them to interpret and understand architectural sciences and through solving elementary tasks they deepen their basic theoretical knowledge in the field of architecture.

Methodology:

The presentations give an introduction to important mathematical techniques of exercise solving and the basic theory of geometric transformations. Equal emphasis is given to learning new mathematics and to learning how to construct and write down correct mathematical arguments. During the course, students learn to apply matrix computations parallel to the visualization of transformations.

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Schedule:

Study period in 15 weeks: 7 September - 19 December 2020

1. Constructing the golden ratio, golden spiral.
2. Vector spaces, linar combination, scalar product of vectors. Inhomogenous (affine) coordinates in the plane.
3. Vectorial product. Matrices; matrix multiplication.
4. Rotations and their matrices in the plane.
5. Projective coordinates of the plane. Infinitely far points.
6. Translations and their matrices in the plane.
7. Revision before test; Midterm Test in the practice class.
8. Autumn break.
9. Composition: consecutive use of the known transformations.
10. Homogenous (projective) coordinates in the space.
11. Rotations in the 3D space.
12. Translations in the 3D space.
13. Final Test.
14. Retake of the Final Test.
15. Oral exam for those who failed the tests.

Further exams are possible in the exam period that starts on 21 December 2020.

Attendance:

Attending all classes is required. In case of absence from more than 30% of the total number of lessons will be grounds for failing the class. To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence.

Evaluation + Grading

Grading will follow the course structure with the following weight:
1. Tests 100%
2. Proposed exam grade: over 65 % during the study and correction period.
3. Oral exam in the exam period. A minimum of 55% is required to pass the exam.

Grading scale

Numeric Grade:	5	4	3	2	1
Evaluation in points:	89%-100%	77%-88%	66%-76%	55%-65%	0-54%

Students with special needs:

Students with special physical needs and requiring special assistance must first register with the Dean of the Students Office. All reasonable requests to provide an equal learning environment for all students is to be assured.

Available sources about the topics of the course:

Golden ratio – on Wikipedia;
Scalar product, vectorial product – on Wikipedia;
Matrix multiplication – on Wikipedia;
Homogenous coordinates (projective plane) – on Wikipedia;
Transformation matrix (linear algebra) – on Wikipedia.

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