

## M A T H E M A T I C S B / 2

Copies of the approved course syllabus are available at:  
[www.pmmik.pte.hu](http://www.pmmik.pte.hu)

### Catalogue information:

ECTS credits: 5

course number:

prerequisites: Mathematics b/2  
allotment of hours per week: 2 L,  
2 P

### Instructor:

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### General Course Description:<sup>1</sup>

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

Limit and continuity of functions: types of discontinuity,

Differential calculus of functions in one variable: differential coefficient, derivatives, relations between differentiability and continuity, rules of derivation, derivatives of elementary functions, l'Hospital rule, Taylor-polynomials, testing functions.

Integral calculus: antiderivatives, basic integration formulas, techniques of integration: integration by parts, substitution, integral of trigonometric function. Definite integral, Riemann-sum, numerical integration. The fundamental theorem of calculus: Newton-Leibniz theorem. Applications of integral: area between curves, volumes by slicing and rotation about an axis, length of a plane curve, areas of surfaces of revolution. Improper integration.

Functions of two variables: partial derivatives, directional derivatives, gradient vector. Double integrals.

Students learn the basics of mathematics so that they can interpret and understand engineering sciences and through solving elementary tasks they deepen their basic theoretical knowledge in the field of engineering. The practical sessions are designed to complement the requirements of specific engineering degree programs..

### Methods:

The presentations give an introduction to important mathematical techniques of exercise solving and the basic theory of calculus. Equal emphasis is given to learning new mathematics and to learning how to construct and write proper mathematical arguments.

### Learning Objectives:

Upon completion of this course the student should be able to:

1. **interpret**, and **put into practice**

- a. limit and continuity of functions; types of discontinuity
- b. differential calculus of functions
- c. applications of derivatives
- d. antiderivatives

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<sup>1</sup> az akkreditációs anyag rövidleírása

- e. definite integral and applications
- f. functions of two variables: derivatives and double integral

**Required Reading and other Materials will be equivalent to:**

*Required Reading:*

GEORGE B. THOMAS, JR.: THOMAS' CALCULUS, PEARSON ADDISION WESLEY, 2005.

**Programme:**

1. Limit and continuity of functions; types of discontinuity
2. Differential coefficient, derivatives, relations between differentiability and continuity
3. Rules of derivation, derivatives of elementary functions
4. l'Hospital rule, Taylor-polynomials, testing functions
5. Test 1
6. Antiderivatives, basic integration formulas
7. Integration by parts, substitution, integral of trigonometric function
8. Definite integral, Riemann-sum, numerical integration
9. Newton-Leibniz theorem. Applications of integral: area between curves
10. Test 2
11. Volume, length, areas of surfaces. Improper integration
12. Spring holiday
13. Partial derivatives, directional derivatives, gradient vector
14. Test 3
15. Double integral

**Completing of the course is dependent on the following:**

1. Class participation, class activity. Any unexcused absences will negatively affect your grade; 3 unexcused absences will result in failing the class. If you need to miss a class for any reason, please notify your professor by email prior to the start of that class.
2. Achieving a minimum score of 40% in each of the three written tests during the semester.
3. Written exam in the exam period. A minimum score of 40% is required to pass the exam.

Grading scale

Grade	5	4	3	2	1
Numeric Grade	100-86	85-71	70-56	55-41	40-0

**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.