

**Mathematics A/2**

Course Code: PMKMANB002CA  
Semester: Spring 2015/2016 2.

**Course Syllabus**

Time: L Monday 9:30-11:00  
P Monday 11:15-12:45  
Location: PTE MIK, L A-215, P A109

**General Information:**

<b>Name of Course:</b>	<b>MATHEMATICS A/2</b>
<b>Course Code:</b>	PM-KMANB002CA
<b>Semester:</b>	2 <sup>nd</sup>
<b>Number of Credits:</b>	5
<b>Allotment of Hours per Week:</b>	2 lectures, 2 practices
<b>Evaluation:</b>	Exam (with grade)
<b>Prerequisites:</b>	-
<b>Instructors:</b>	<b>Dr Ildikó PERJÉSINÉ HÁMORI, associate professor</b> Office: 7624 Hungary, Pécs, Boszorkány u. 2. Office N° B234 E-mail: <a href="mailto:perjesi@mik.pte.hu">perjesi@mik.pte.hu</a> Office Phone: +36 72 503650/23878

**Introduction, Learning Outcomes**

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 down correct mathematical arguments.

Upon completion of this course the student should be able to: **interpret, and put into practice**

- application of derivation,
- integralcalculus in one variable,
- differential equations
- differential and integralcalculus in two variable

**General Course Description and Main Content:**

Brief Syllabus: This lecture and practical based course aims to give civil engineer and engineering information technologist students a solid mathematics basis through covering the following topics:

Application of derivation: testing functions.

- Integral calculus: antiderivatives, basic integration formulas, techniques of integration: integration by parts, by substitution, integral of rational functions by partial fraction, 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 axes, length of a plane curve, areas of surfaces of revolution. Improper integration.
- Functions of two variables: partial derivatives, directional derivatives, gradient vector. Double integrals.
- Differential Equations: First-order separable and linear differential equations, Second-order linear differential equations with constant coefficients

Students learn the basics of mathematics enabling them to 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 different specialisations.

**Methodology:**

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 down correct mathematical arguments.

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**Schedule:**

Study period in 15 weeks: February 1 - May 15 (2016)

1. Applications of differential calculus to the study of properties of functions
2. Solving applied optimization problems. Antiderivatives, basic integration formulas
3. Integration by parts, integral by substitution
4. Integral of rational functions by partial fraction, integral of trigonometric functions
5. **1<sup>st</sup> test**
6. Definite integral, Riemann-sum, numerical integration, Newton-Leibniz theorem, applications of integral: area
7. *National holiday*
8. Applications of integral: area between curves, volume, length, areas of surfaces. Improper integration
9. *Spring holiday*
10. Partial derivatives, directional derivatives, gradient vector
11. Double integral
12. **2<sup>nd</sup> test**
13. First-order separable and linear differential equations
14. Second-order linear differential equations with constant coefficients
15. **3<sup>rd</sup> test**

Correction period: May 17-19 (2016)

Exam: May 26 (2016)

**Attendance:**

Attending is required all classes, and will impact the grade (max. 10%). Unexcused absences will adversely affect the grade, and in case of absence from more than 30% of the total number of lesson 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. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

**Evaluation + Grading**

Grading will follow the course structure with the following weight:

1. Class participation, class activity 10 %
2. Homeworks 10 %.
3. Tests 80 %
4. Offered exam grade: over 65 % during the study and correction period.
5. Written 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.

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

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

<https://www.khanacademy.org/math/integral-calculus>

<https://www.khanacademy.org/math/differential-equations>

<https://www.khanacademy.org/math/multivariable-calculus>

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