Subject name	*Mathematics for Information Technology 2*
Subject code	**IVB292ANMI**
Classes per week (L/P/Lab)	**2/0/2**
Number of Credits	**6**
Program	**full-time**
Division	**computer science engineering**
Requirement type	**exam**
Semester	**2020/2021 Semester 2**
Preliminary requirements	**Mathematics for Information Technology 1**
Organization name	**Department of Engineering Mathematics**
Responsible lecturer name	*Ildikó Perjési-Hámori PhD*

GOAL OF INSTRUCTION

The presentations introduce 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

- **a.** solving basic mathematical problems using computer algebra,
- **b.** application of derivation,
- **c.** integralcalculus in one variable,
- **d.** differential equations
- **e.** differential and integralcalculus in two variable

SUBJECT CONTENT

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

- Application of derivation: testing functions, solving applied optimization problems.
- 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 specializations.

Schedule

1. Application a differential calculus: Linear approximation, Taylor polynomial.
2. Applications of differential calculus to the study of properties of functions
3. Solving applied optimization problems. Antiderivatives, basic integration formulas
4. Integration by parts, integral by substitution
5. Integral of rational functions by partial fraction, integral of trigonometric functions
   Homework1
6. **Midterm 1**
7. Definite integral, Riemann-sum, numerical integration, Newton-Leibniz theorem, applications of integral: area
8. Applications of integral: area between curves, volume, length, areas of surfaces.
9. Improper integration. Function of two variables. Partial derivatives, directional derivatives.
10. *Spring break*
11. Gradient vector, tangent plane
12. Double integral
13. First-order separable and linear differential equations
14. Second-order linear differential equations with constant coefficients.
    Homework2
15. **Midterm 2**

EXAMINATION AND EVALUATION SYSTEM

Signature

- Writing 2 midterm tests with minimum 40%,
- submitting 2 homeworks,

are required to get the signature at the end of 15. study week.

Exam

Written exam, minimum of 55% is required to pass.

Grading

- Homeworks 20 %.
- Tests 80 %
- Offered exam grade: over 65 % during the study and correction period
- 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%

LITERATURE

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

[2] SUBJECT MATERIALS ON NEPTUN MEET STREET

[3] https://www.khanacademy.org/math/integral-calculus

[4] https://www.khanacademy.org/math/differential-equations

[5] https://www.khanacademy.org/math/multivariable-calculus

SCHEDULE

2019/2020. 2. SEMESTER		STUDY PERIOD, STUDY WEEKS															EXAM PERIOD				
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	1.	2.	3.	4.	5.
Lecture number		1	2	3	4	5		7	8	9		11	12	13	14						
Practice number		1	2	3	4	5		7	8	9		11	12	13	14						
Midterm test						X										X					
Homework	publishing					X									X						
	submitting						X									X					
Signiture																X					
Retake																	X				
Exam																					

01/02/2021.

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Ildikó Perjési-Hámori responsible lecture