CALCULUS I. (BMETE90AX21)   Autumn, 2019

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Branch of SOFTWARE Engineering , Faculty of Electrical Engineering and Informatics
Undergraduate Course, First Year, Semester 1

Duration: One Semester, 14 weeks, 6 lectures/week
                   Examination, 6 credits

Prerequisites: At least satisfactory in Placement Test

Suggested Books:
      Thomas: Calculus, Addison-Wesley, ISBN 0-321-24335-8
      Robert A. Adams: Calculus a complete course, Addison-Wesley, ISBN 0-201-50944-X

Students get the *faculty signature* if they achieve at least 40% of the available scores on each of the two midterm tests (the tests will be on 6th and on 11th week) and attend lectures continuously. (Absences from lectures should not exceed 30%.) 10 minutes late in any classes means that students are considered as to be absent.

Students can repeat all of the midterm tests (on 9th week and on the repeat week). Date will be announced in time.

Students with scholarship stipendium have some extra requirements with the "0"-th test.

Exam mark can be given for students who have the faculty signature. Final exam contains a written test (solving theoretical problems and exercises). Students fail if the result of the final exam is less than 40%. There is no possibility to correct the result of the written test by an oral account.

Evaluation is based on:

Midterm tests	50%
Final exam	50%

Final mark calculation:

00 – 39 %	fail	(1)
40 – 54 %	pass	(2)
55 – 64 %	satisfactory	(3)
65 – 79 %	good	(4)
80 – 100 %	excellent	(5)

Curriculum

Complex numbers. Algebraic, trigonometric form. Operations on complex numbers. Powers and radicals.

Sequences. Monotonity, convergence, divergence. Operations on limits.

Pinching theorem. Bounded and monotonic sequences. Recursively given sequences.

Real function of a single variable. Limits. Operations on limits. Extensions of the limit concept. Continuity.

Classifications of discontinuities. Bolzano theorem. Inverse trigonometric functions. Exponential and logarithmic function.

Differentiation. Derivatives of elementary functions. Operations on derivatives. Chain rule. Interpretation of derivative. Tangent line. Differential, linearization.

Higher order derivatives. Implicit and logarithmic differentiation. Parametric and polar curves. L'Hopital rule.

Applications of derivatives. Mean value theorem. Monotonity and extrema. Convexity and inflection point. Linear asymptotes. Sketching graphs.

Integration. The fundamental theorem of integration. Antiderivatives. *Indefinite integrals.*

Method of partial fractions. Integration by parts. Integration by substitutions.

Definite integral. The fundamental theorem of calculus (Newton-Leibniz formula, derivative of an integral with respect to its upper limit).

Applications. Improper integrals.

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