YMM0012 Mathematical analysis II
Spring semester of the academic year 2016/17.

5 credits 4 2-0-2 E K

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1. Functions of several variables. Graph of function of two variables.
2. Increment of function and special cases.
3. Limit of function of two variables.
4. Continuity of function of two variables.
5. Partial derivatives of functions of several variables.
6. Total increment and total differential.
7. Partial derivatives of functions given implicitly.
8. Partial derivatives of composite functions.
9. Partial derivatives of higher order.
10. Equation of the tangent line of spatial curve.
11. Tangent plane and normal of surface.
12. Directional derivative.
13. Gradient.
14. Divergence and curl.
15. Taylor's formula of function of two variables.
16. Local extrema of function of two variables.
17. The least and the greatest value of function in the given domain.
18. Conditional extrema of functions of several variables.

19. Definition and properties of double integral.
20. Iterated integrals. Computation of double integral.
21. Change of variable in double integral.
22. Double integral in polar coordinates.
23. Evaluation of volumes and areas by double integrals.
24. Definition and properties of triple integral.
25. Computation of triple integral.
26. Change of variable in triple integral.
27. Triple integral in cylindrical coordinates.
28. Triple integral in spherical coordinates.
29. Line integral of the first kind.
30. Evaluation of line integral of the first kind.
31. Line integral of the second kind.
32. Evaluation of line integral of the second kind.
33. Green's formula.
34. Path independence of line integral.
35. Surface integral of the first kind.
36. Surface integral of the second kind.
37. Evaluation of surface integral of the second kind.
38. Arithmetic series, partial sums and convergence.
39. Comparison test of positive arithmetic series.
40. D'Alembert's and Cauchy tests.
41. Integral test of convergence.
42. Alternating series. Leibnitz's test.
43. Series with whatever signs. Absolute and conditional convergence.

44. Functional series.

45. Uniform convergence, majorant series.

46. Continuity of sum of functional series.

47. Integration and differentiation of functional series.

48. Power series. Abel's theorem.

49. Taylor's series.

50. Trigonometric system of functions.

51. Fourier' series.

52. Fourier' sine and cosine series.

Spring semester lasts 16 weeks. Every week there take place lectures 2 academic hours and exercises 2 academic hours. In lectures will be given theoretical material an in exercises the theory will be applied to solve problems. The semester ends with an oral examination during the examination session.

The lectures and the exercises are on the web-side www.staff.ttu/∼lpallas

To get the credits one has to pass the examination.

Prerequisites for the examination: the student has to write three tests on exercises. The first test contains ten exercises about indefinite integrals, definite integrals and applications of definite integral. Every student gets an individual variant and has to solve the exercises without supervising. The deadline to submit this test is 27th of February 2017. To pass this test, at least 80% of solutions and answers has to be correct. If a student passes the first test, he/she has 10 points for semester work. The second test takes place during the practical lesson in the 8th week (21st of March) and the third test in the 15th week (9th of May).

Standard exercises to prepare for tests as well as for the examination are on the web-side in fail Math an2 exercises.pdf

The second and the third test will be assessed in 100-points system. To pass the test one has to get at least 51 points.

If the student gets for test at least 80 points, he/she has not to solve the corresponding exercise on the examination.

The theory can be written during the semester in three parts (colloquiums). During the semester there will take place three colloquiums. The first - on 15th of March 2016, the second - on 19th of April 2016 and the third - o17th of May. The colloquiums are not compulsory and will take place during the consultation hours.

The maximal amount of points for the first and second colloquium is 17 and for the third colloquium 16 points. Thus, for theory one can get in total 50 points.

The colloquiums will be in writing and do not contain the exercises, only theory and examples. To pass the colloquium one has to get at least 7 points. If the student is content oneself with the amount of points obtained and does not want to improve the result, he/she can skip on the examination the items of theory involved.

A student will be graded as follows. All the points for colloquiums and exercises will be added (or the points obtained on the examination for the corresponding question). Maximum amount of points for one exercise on the examination is 20. If a student has written the second exercises test on the 8th week and/or the third exercises test on the 15th week at least on 80 points, the amount of points for the exercise is the result of the corresponding test divided by 5 and rounded to the nearest integer.

Example. A student has got for the first colloquium 6 points, he/she has not written the second colloquium and for the third colloquium this student has got 11 points. The first test of integrals has been passed (10 points). For the second exercises test this student has got on the 8th week 74 and for the third on the 15th week 82 points. This student comes to the examination and tells before taking the variant that he/she wishes to write the first and the second colloquium, does not want to improve the result of the 3rd colloquium and has to write the first exercise.

Suppose that on the examination this student obtains 15 points for the first colloquium, 10 points for the second colloquium and solves the exercise correctly, which gives 20 points. Total amount of point for the semester is in our case 15+10+11+10+20+16=82.

The students will be graded according to the following scale.

91 ... 100 points "5" excellent

81 ... 90 points "4" very good

71 ... 80 points "3" good

61 ... 70 points "2" satisfactory

51 ... 60 points "1" poor

... 50 points "0" failed

Thus, the student in our example will be graded by "4" very good.