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Obuda Universit	ty E E a au	ltr, of Im	formation		Institute of A	pplied	Mathematics
John von Neuman	ш гаси	ny of m	normatics				
Name and code:		Credits:					
Asymptotic analysis of special functions II							
		2019/20 year II. semester					
Subject lecturers:	Prof. d	r. habil.	Arpad Baricz				
Prerequisites (wit	vith at the second s						
code).	Calculus I, II						
20de):	.		a :		T 1 1		
Weekly hours:	Lectur	e:	Seminar.:		Lab. hours:		Consultation:
Way of							
assessment:							
			Course de	escrip	tion:		
Goal: to provide a	a deepe	r unders	tanding of the	meth	ods of the asym	ptotic a	analysis for the most
well-known speci	al func	tions of	classical analy	sis.	•	•	•
Course description	on: this	course	gives a basic	intro	duction into the	e basic	s of the asymptotic
analysis of the sp	ecial fu	nctions,	which arise in	ı appl	ied mathematic	al sciei	nces. It is our aim to
present the most	mnorto	nt meth	ode of asympto	stic or	alveis through	ovomn	les of known special

present the most important methods of asymptotic analysis through examples of known special functions, like Bessel functions, Euler's gamma function, Riemann's zeta function and others.

		Lecture schedule					
Education wee	2k	Торіс					
1.	Real Laplace	Real Laplace type integrals					
2.	Asymptotic e	Asymptotic expansions					
3.	Laplace meth	Laplace method					
4.	The Watson 1	The Watson lemma					
5.	. Asymptotic expansion of Laplace type integrals						
6. Generalization of Perron's formula							
7.	7. The CFWW formula						
8.	8. Complex Laplace type integrals						
9.	9. The steepest descent method						
10.	10. Perron method						
11.	Ordinary pote	ential polynomials					
12.	The r-associa	ted Stirling numbers					
13.	The WKB me	ethod					
14.	Singularities	and other asymptotic methods					
		Midterm requirements					
	Education week	Topic					
		•					

Finalgrade o	calculation methods
Achieved result	Grade
89%-100%	excellent (5)
76%-88<%	good (4)
63%-75<%	average (3)
51%-62<%	satisfactory (2)
0%-50<%	failed (1)

Type of exam

Project presentation & Written exam

Type of replacement

Project presentation

References

Mandatory:

- 1. F.W.J. Olver, Asymptotics and Special Functions, Academic Press, 1974.
- 2. N.M. Temme, Special Functions, John Wiley & Sons, 1996.
- 3. R. Wong, Asymptotic Approximations of Integrals, SIAM, 2001.
- 4. G.E. Andrews, R. Askey, R. Roy, *Special Functions*, Cambridge Univ. Press, 1999. Recommended:
 - 1. J.D. Murray, Asymptotic Analysis, Springer-Verlag, 1984.
 - 2. P.D. Miller, Applied Asymptotic Analysis, American Mathematical Society, 2006.