IV.14.6 Function theory 1

module designation	***Function** Theory 1*
abbreviation	***B-FT1***
course	*function theory 1*
Module manager	*Prof. Dr. Wolfgang Lauf, Prof. Dr. Martin Pohl*
lecturer	*Prof. Dr. Wolfgang Lauf, Prof. Dr. Martin Pohl*
Assignment to the Curriculum	*B.Sc .: Conscription, 6. o. 7. Sem.*
Lehrform / SWS	*Seminar-based instruction, exercises / 4 SWS*
workload in hours	*Attendance study: 60 h,* *Self-study: 90 h*
credit points	*5 ECTS*
recommended requirements	*B-AN1,2,3: Analysis 1,2,3;* *B-MS: Mathematical Software*
Learning goals: Professional competence	*After successfully completing the module, students are able to* • *calculate confidently and skilfully with complex numbers in all forms of representation (2),* • *Thoroughly distinguish holomorphism from real differentiation zen (2),* • *safely use Cauchy's integral theorems to calculate complex and real integrals (3),* • *the geometric and value behavior of holomorphs describe and assess illustrations (3),* • *use the interplay of geometric and analytical approaches to solve problems in complex analysis (3).*
Learning goals: personal competence	*See preliminary remarks of this module handbook*
contents	• *Arithmetic and geometric properties of complex numbers* • *Stereographic projection* • *Complex differentiability, holomorphy, Cauchy-Riemann differential equations* • *Harmonic functions* • *Conformity of holomorphic functions* • *Value behavior of elementary holomorphic functions* • *Complex curve integrals* • *Cauchyscher Integralsatz, Integralformel* • *Fundamental properties of holomorphic functions (including Liouville's theorem, fundamental algebra theorem, maximum principle, mean value property)*
Study/examination *achievements*	*Written examination (90-120 min.) or* *oral exam (15-45 min.)* *Note weight: 4*
media forms	*Blackboard, projector, mathematical software*

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literature	• *Burg, K., et.al.: Function theory* • *Busam, R., Freitag, E.: Function Theory 1* • *Conway, J.: Functions of One Complex Variable I* • *Fischer, W., Lieb, I.: Introduction to complex analysis* • *Forst, W., Hoffmann, D.: Exploring function theory with Maple* • *Fritzsche, K.: Basic course on function theory* • *Marsden, J., Hoffman, M.: Basic Complex Analysis* • *Mathews, J., Howell, R.: Complex Analysis for Mathematics and Engineering* • *Remmert, R., Schuhmacher, G.: Function theory 1* • *Saff, E.B., Snider, A.D.: Complex Analysis* • *Weyl, H.: Introduction to the theory of functions* • *Desire, AD: Complex Variables* • *Zill, D., Shanahan, P.: A First Course in Complex Analysis with Applications*