

CATEGORICAL AND HOMOLOGICAL ALGEBRA

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This course is an introduction to category theory with emphasis on its use in algebra. In the first part we introduce adjoint functors and monads. We study algebraic structures which are monadic over sets such as groups, monoids or compact Hausdorff spaces. The second part is devoted to abelian categories and homological algebra centered around the method of “diagram chasing”. In the third part we give some applications of group and monoid homology, especially in the context of Artin monoids and Artin groups.

References for the first part:

Pareigis, Bodo: *Categories and functors*. Translated from the German. Pure and Applied Mathematics, Vol. 39, Academic Press 1970.

Borceux, Francis: *Handbook of categorical algebra 1*. Encyclopedia of Mathematics and its Applications, 50. Cambridge University Press 1994.

Reference for the second part:

Weibel, Charles A.: *An introduction to homological algebra*. Cambridge Studies in Advanced Mathematics, 38. Cambridge University Press 1994.

References for the third part:

Squier, Craig C.: *The homological algebra of Artin groups*. Math. Scand. 75 (1994), 5–43.

Squier, Craig C.: *Word problems and a homological finiteness condition for monoids*. J. Pure Appl. Algebra 49 (1987), 201–217