Title: An introduction to algebraic geometry codes

Abstract: Error-correcting codes play an important role in many areas of science and engineering, as they safeguard the integrity of data against the adverse effects of noise in communication and storage. On the most basic level, good error-correcting codes are able to both transmit data efficiently and correct a large number of errors relative to their length. As observed by V. D. Goppa in 1975, one can use algebraic function fields over $\mathbb{F}_q$ to construct a large class of interesting codes. Properties of these codes are closely related to properties of the corresponding function field, and the Riemman-Roch Theorem provides estimates, sharps in many cases, for their main parameters. In this short course we will study Goppa's construction of codes by means of an algebraic function field after a brief introduction of the theory of error-correcting codes, some classical bounds for the parameters of these codes and their detection and error-correction capabilities.

Bibliography: H. Stichtenoth "Algebraic Function Fields and codes". Graduate Text in Mathematics. Springer. 2009