This paper proposes an equalization approach to mean-square (MS) feedback stabilization for multi-input/multi-output (MIMO) discrete-time systems over fading channels. An orthogonal encode/decode matrix pair is placed at the two ends of the fading channel, thereby equalizing the complementary sensitivity in the MS sense. By adopting the notion of the MS stability in an input-output setting, and using the signal-to-noise ratio (SNR) and encode/decode matrix as additional design parameters, we are able to convert the networked stabilization over fading channels into an equivalent constrained H_2 optimal control, and derive the MS stabilizability conditions over linear time-invariant controllers. Our results recover the existing MS stabilizability condition under the state feedback. For output feedback control, we provide a characterization of the minimum network resource for the SNR required to stabilize the networked control system over the fading channel, and develop the synthesis algorithms for design of the orthogonal coding matrix and output feedback controller in different scenarios. Our results show that the MS stabilization problem as formulated in this paper admits the closed-form solution for MIMO plants with unstable block zeros, and is mathematically tractable for more general MIMO plants. Two numerical examples are worked out to illustrate our results.