Abstract  Quadratic forms on complex random matrices and their joint eigenvalue densities are derived for applications in information theory. These densities are represented by complex hypergeometric functions of matrix arguments, which can be expressed in terms of complex zonal polynomials. The derived densities are used to evaluate the most important information-theoretic measures, the so-called ergodic channel capacity and capacity versus outage of multiple-input multiple-output (MIMO) Rayleigh-distributed wireless communication channels. Both correlated and uncorrelated channels are considered and the corresponding information-theoretic measure formulas are derived. It is shown how channel correlation degrades the communication system capacity.