This paper expands our previous work on planar tunable capacitive coupling structures in substrate-integrated cavities using lumped components. We demonstrate both frequency and bandwidth tunable filters with adjustable transmission zeros (TZs). By the appropriate choice of the absolute and relative strength of magnetic and electric coupling coefficients, we demonstrate: 1) tunable bandwidth and the ability to maintain either a constant absolute bandwidth or a constant fractional bandwidth; 2) adjustable TZ location at a prescribed bandwidth; and 3) the ability to switch OFF the filter with high isolation. Filter design methodologies based on a dispersive coupling structure are presented using lumped circuit models, coupling matrix, and full-wave simulations. With this planar capacitive coupling, it is also convenient to realize cross-coupling in higher order filters to produce additional TZs for rejecting spurious resonances or interferes. Fabricated two-pole filters with one or two TZs and four-pole filters with three or four TZs validate the filter design. A two-pole filter with tunable center frequency and tunable bandwidth along with a four-pole filter with tunable center frequency and tunable TZs are also demonstrated.