Assume G is disconnected. We want to show that G^c is connected. So suppose u and v are vertices. We need to show there is path from u to v in G^c.

Case 1: (u, v) is not an edge in G. Then it is an edge in G^c and so we have a path uv from u to v in G^c.

Case 2: (u, v) is an edge in G. This means u and v are in the same component of G. Since G is disconnected, we can find a vertex w in a different component. Note that (u, w) and (v, w) are not in G. Hence (u, w) and (v, w) are in G^c. Thus uwv is a path from u to v in G^c.