Born in 1931 in Badayun, Uttar Pradesh, into a family of musicians of the Rampur-Sahaswan and Gwalior gharanas, Shri Ghulam Mustafa Waris Khan was initiated into Hindustani vocal music by his father Shri Waris Husain Khan. Later, he studied under Shri Fida Hussain Khan and Shri Nisar Husain Khan. Under the guidance of Shri. K.C.D. Brahaspati, Shri Ghulam Mustafa Khan studied the ancient jatigayan.

To his ancestral heritage Shri Ghulam Mustafa Khan has added the mark of his individual talent. Gifted with a melodious voice, he is adept in several forms of Hindustani classical music, and has performed widely at home and abroad. Besides recordings made for the archives of music institutions, he has many commercial albums of Hindustani music on the market. In the field of popular music, he has sung playback songs in a number of films including Umroo Jan, Badnam Basti, and Bhuvan Shome. More than seventy documentary films have also carried his music.

He was the legendary musician Baiju Bawra in the German film Rain Maker.

Shri Ghulam Mustafa Khan has received several honours including the Padma Shri in 1991.

Shri Ghulam Mustafa Khan receives the Sangeet Natak Akademi Award for his contribution to Hindustani vocal music.