

**SEMI-ANALYTICAL APPROACH TO  
FRACTIONAL DIFFERENTIAL EQUATIONS  
AND ITS APPLICATIONS**

A thesis submitted to



**THE MAHARAJA SAYAJIRAO UNIVERSITY OF  
BARODA**

for the partial fulfillment of the degree of

**Doctor of Philosophy**

in

**APPLIED MATHEMATICS**

by

**KHIRSARIYA SAGAR RAMESHBHAI**

(Reg. No.: FOTE/1083)

under the supervision of

**DR. SNEHAL BABUBHAI RAO**

Assistant Professor

Department of Applied Mathematics,

Faculty of Technology and Engineering,

The Maharaja Sayajirao University of Baroda,

Vadodara – 360001, Gujarat, India

March, 2024