

**DESIGN AND DEVELOPMENT OF DATA
PROVENANCE FRAMEWORKS FOR SQL AND
NOSQL DATABASES USING ZERO-INFORMATION
LOSS DATABASE CONCEPT**

THESIS

Submitted in partial fulfillment
of the requirements for the degree of
DOCTOR OF PHILOSOPHY

by

Asma Rani

Under the Supervision of

Prof. Navneet Goyal

Birla Institute of Technology and Science, Pilani, India

&

Prof. Shashi K. Gadia

Iowa State University, Iowa, United States



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

August 2021