

**FABRICATION OF NOVEL NANO-STRUCTURED  
TRANSITION METAL ION DOPED ZnO BASED THIN FILMS  
FOR METHANE SENSING APPLICATIONS**



**Thesis Submitted in partial fulfillment for the  
Award of Degree  
Doctor of Philosophy**

**By**  
*Brij Bansh Nath Anchal*

**DEPARTMENT OF CERAMIC ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY  
(BANARAS HINDU UNIVERSITY)  
VARANASI - 221005**

**Roll No : 12601EN003**

**2020**