

**NANOFLUIDS FOR EFFICIENT HEAT  
TRANSFER APPLICATIONS USING SOLAR  
ENERGY FOR CHEMICAL PROCESS**

A THESIS SUBMITTED TO

**SAVITRIBAI PHULE PUNE UNIVERSITY**

FOR AWARD OF DEGREE OF

**DOCTOR OF PHILOSOPHY (Ph.D.)**

IN

**CHEMICAL ENGINEERING**

UNDER THE

**Faculty of Engineering**

SUBMITTED BY

**CHETAN VASANTRAO KAPADNIS**

UNDER THE GUIDANCE OF

**Dr. DAULAT RAM SAINI**

RESEARCH CENTRE

**Department of Chemical Engineering  
Vishwakarma Institute of Technology  
Bibwewadi, Pune- 411037, India**

**March 2017**