



**Tezpur University**  
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## CERTIFICATE OF THE PRINCIPAL SUPERVISOR

This is to certify that the thesis entitled “*Design consideration of low-cost surface enhanced Raman scattering (SERS) substrate for various sensing applications*” submitted to the School of Sciences, Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy in Physics, is a record of research work carried out by **Mr. Nabadweep Chamuah** under my supervision and guidance.

All help received by him from various sources have been duly acknowledged. No part of the thesis has been submitted elsewhere for award of any other degree.

**Date:**  
**Place:** Tezpur University, Assam, India

**(Pabitra Nath)**  
**Principal Supervisor**



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## **CERTIFICATE OF EXTERNAL EXAMINER AND ODEC**

This is to certify that the thesis entitled “*Design consideration of low-cost surface enhanced Raman scattering (SERS) substrate for various sensing applications*” submitted by Mr. Nabadweep Chamuah to Tezpur University in the Department of Physics under the School of Sciences in partial fulfillment of the requirement for the award of the degree of Doctor of Philosophy in Physics has been examined by us on ..... and found to be satisfactory.

The committee recommends for the award of the degree of Doctor of Philosophy.

**Signature**

**Principal Supervisor**

**Date:**

**External Examiner**

**Date:**