

पश्चिम बंगाल पश्चिम बंगाल WEST BENGAL

T 982880

MEMORANDUM OF UNDERSTANDING (MOU)

BETWEEN

**INDIAN INSTITUTE OF ENGINEERING SCIENCE AND
TECHNOLOGY, SHIBPUR (IEST)**

AND

HERITAGE INSTITUTE OF TECHNOLOGY, KOLKATA (HITK)

1. Preamble:

IEST, Shibpur and HITK have agreed for a long term institutional collaboration in education and research. The primary objective is to promote contact and collaboration between members of faculty, staff and the students, carry out joint research programmes, cooperation in academic programmes, organize seminars, workshops on mutually agreed activities. This document presents a general framework for such a relationship.

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2. Participation and Coordination:

The partnership shall initially be between the following:

- For IEST : Centre of Excellence for Green Energy and Sensor System (CEGESS)
- For HITK: Heritage Institute of Technology, Kolkata (HITK) and other associated group of institutions decided by HITK.

Other Departments, Centres and Schools from IEST and other Departments, Centres and Schools from HITK will be covered under the MOU as and when required.

Professor H. Saha of CEGESS shall be the Coordinator from IEST and Prof. Alok Kr. Sen of HITK shall be the Coordinator from HITK. There shall be a Management Committee comprising members nominated by the Director, IEST, Shibpur and the Principal, HITK to coordinate the collaborative activities. The participants and the coordinators may change the nature of activities from time to time as decided by the appropriate authority of the respective institutions.

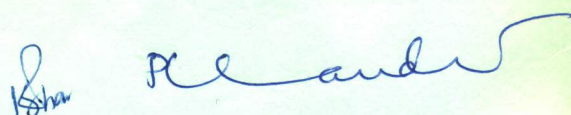
Scope and Activities:

This agreement deals with specific activities, utilisation of facilities, outputs of collaborative research work and exchange of manpower, scientists, holding of workshops, seminars etc.

Present activities at the CEGESS (IEST) are the following:

CEGESS has established a state-of-the-art facility for fabrication and characterisation of crystalline and thin film silicon solar cells. Following activities are being pursued at present at CEGESS:

- i. Development of single crystal solar cells with innovative approaches to enhance the conversion efficiency



- ii. Development of material and fabrication technology for single junction amorphous, microcrystalline and tandem solar cells
- iii. Development of high efficiency Hetero-junction with intrinsic thin layer (HIT) solar cells
- iv. Development of Nanomaterials based 3rd generation (3G) solar cells
- v. Application of plasmonics to thin film and crystalline solar cells for the enhancement of efficiency
- vi. Development of solar photovoltaic systems of different types including Off-Grid, Grid-Tied PCUs, MPPT chargers, Data-Logging and Remote Monitoring units etc.
- vii. Development of Storage Technology for Solar Photo Voltaic (SPV) electricity
- viii. Smart Micro-Grid Systems including SPV power plant, Wind Generator, Biomass Generator etc.
- ix. Monitoring and modelling of local climatic conditions under SRRA programme of MNRE
- x. Development of High Sensitivity High Selectivity Sensors using Metal-Oxide Semiconductors and their alloys, Graphene, CNT etc., as well as MEMS micro-heaters
- xi. Development of manpower through M.Tech course in Renewable Energy Science and Technology and other training programmes in collaboration with Govt. Organisations like MNRE, National Institute of Solar Energy (NISE).

Present Activities at HITK are the following:

- i. Roof-top SPV panels of 100 kW peak are being studied by the relevant members of faculty and students
- ii. Research activities in the form of institute-funded students' projects for both green energy applications and energy saving systems
- iii. Few Nationally important projects funded by DST and AICTE are in progress

K. Shrivastava

R. K. Singh

- iv. Organising workshops, special lectures and seminars in the area of Green Energy
- v. M.Tech Projects on Renewable Energy and other fields
- vi. Promoter of the institute is the manufacturer of SPV panels.

The following areas have been identified as possible starting points of the partnership. The area of cooperation can further be enhanced by mutual consent.

- i) **Research students, Staff training and exchange programme:** HITK may depute research/post graduate students, members of faculty and staff for specific purposes to IEST. This includes students/ staff of the funded projects by DST or AICTE/ DBT, MNRE etc., or any other agencies. Funds for utilising the advanced facilities of CEGESS in the implementation of the projects or otherwise will be earmarked from the sanctioned projects, if such projects are done in collaboration between HITK and CEGESS, IEST. CEGESS, IEST will extend all its facilities and guidance to HITK for training and individual research activities of the members of faculty, students, research staff of the projects and/or M. Tech students deputed to CEGESS using the CEGESS laboratory facilities during the suitable period as agreed mutually and the cost of actual consumables for such research and training will be borne by HITK on case to case basis.

Besides the above, members of faculty and experts of CEGESS, IEST, Shibpur would visit HITK periodically to train various groups of members of faculty and research workers of HITK on the renewable energy harvesting techniques and procedures.

CEGESS, IEST, Shibpur will also extend help in setting up a dedicated energy laboratory for the R & D work on renewable energy in HITK.

CEGESS, IEST, Shibpur will also provide necessary help, assistance and support in development of curriculum and syllabi for an M.Tech Course on Renewable Energy & Energy Audit in HITK.

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ii) **Cooperative Research Projects:** The two institutions will define joint collaborative research projects between members of faculty and/ or research groups. Collaborating members of faculty will approach various funding agencies to submit joint project proposals. Focus will be on Industry-funded projects and those funded by International agencies. Depending on the nature of collaboration, output should be published jointly in the form of IPR/publication in journals/presentation in the conference.

iii) **Utilisation of mutual facilities at IEST and HITK:**

IEST has established state-of-the-art facilities for fabrication and characterisation of crystalline and amorphous silicon solar cells and their efficiency enhancements through nanoparticles and nanostructure. These facilities will be further extended to include R & D activities on other types of solar cell such as organic/inorganic solar cells etc. These facilities will be utilised by different other joint projects of the two institutions under mutually agreed terms. HITK with its potential academic resources in the form of members of faculty and students has established a sound academic and research environment in the institute in different inter-disciplinary fields of research involving Computer Science & Engineering, Electronics and Communication Engineering, Applied Electronics and Instrumentation Engineering, Chemical Engineering, Biotechnology, Mechanical, Electrical and Civil Engineering Departments. In the field of photovoltaic system, HITK have one 100 kW peak roof top Photo Voltaic (PV) system and the activity of research in this field is in place by the research faculty of ECE and Chemical Engineering of HITK, which may be shared by the researchers of the two institutes after receiving due approval.

iv) **Workshops and Seminar / Conferences:** Exchange of information, organising Joint workshops/seminars, or interactive sessions/special talks in different areas of renewable Energy Sources will be held at regular intervals on mutually agreed schedules.

Bhar

Prasad

3. Intellectual Property:

Each institution will adhere to the intellectual property policy of their respective Institutions. Intellectual property developed during the collaboration will be governed by the rules of the host institute unless otherwise specified by an alternative agreement. The two institutions shall jointly own results of clearly defined collaborative projects and research and students exchange programmes. This joint ownership entitles each party to commercialise and create derivatives independently. Whenever one institution receives any information from the partner under a clearly defined non-disclosure agreement, necessary steps will be taken to protect the intellectual property received. Any proceeds out of the transfer of jointly developed / owned IP will be shared equally.

Validity:

This agreement is valid for an initial period of three years and becomes effective from the date it is signed by the partners. The partnership period may be extended by mutual consent. In case one partner wishes to cancel the contract, intimation will have to be sent by June of that year. In that case, the agreement will terminate at the end of the year i.e., 31st December.

Signed by:



Prof. Kalyan Kumar Bhar
Dean, Research & Consultancy ^{and Development}
IEST, Shibpur

Signed by:



Prof. Pranay Chaudhuri
Principal, HITK

Date: 6-12-2016

Date: 6.12.2016

In presence of



Prof. Hiranmoy Saha
Chair Professor & Coordinator,
CEGESS, IEST, Shibpur
Howrah, West Bengal

In presence of



Prof. Dulal Chandra Ray
Coordinator, TEQIP-II,
Heritage Institute of Technology
Kolkata