RV College of Engineering®

Centre for Hydrogen and Green Technology

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Need for the Centre

Sustainable development goals of the United Nations: An urgent call for action by all countries

- Create an avenue for affordable, reliable, sustainable and modern energy
- Combat climate changes and its impacts
- Revitalize the global partnership for sustainable development

National Hydrogen Energy Mission: A Govt. of India initiative

- Focus on generation of hydrogen from green power resources
- To link India's growing renewable capacity with the hydrogen economy

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY

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Team

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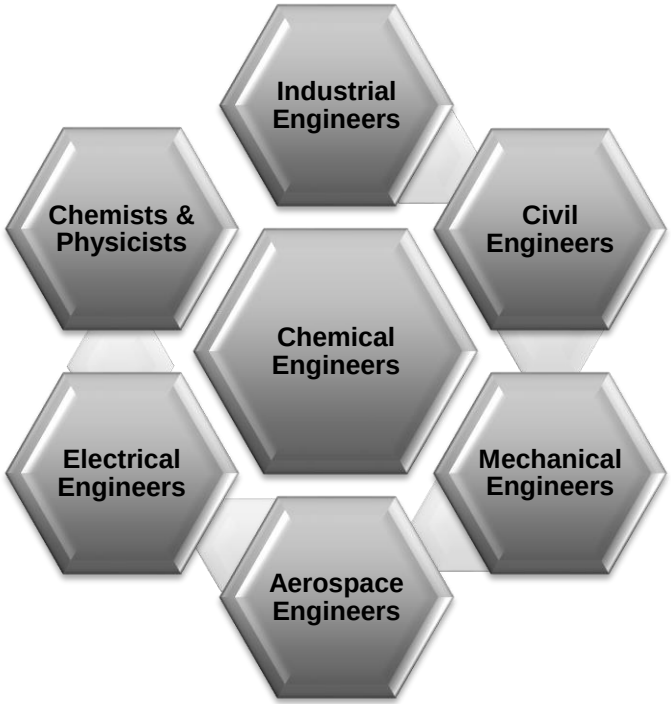
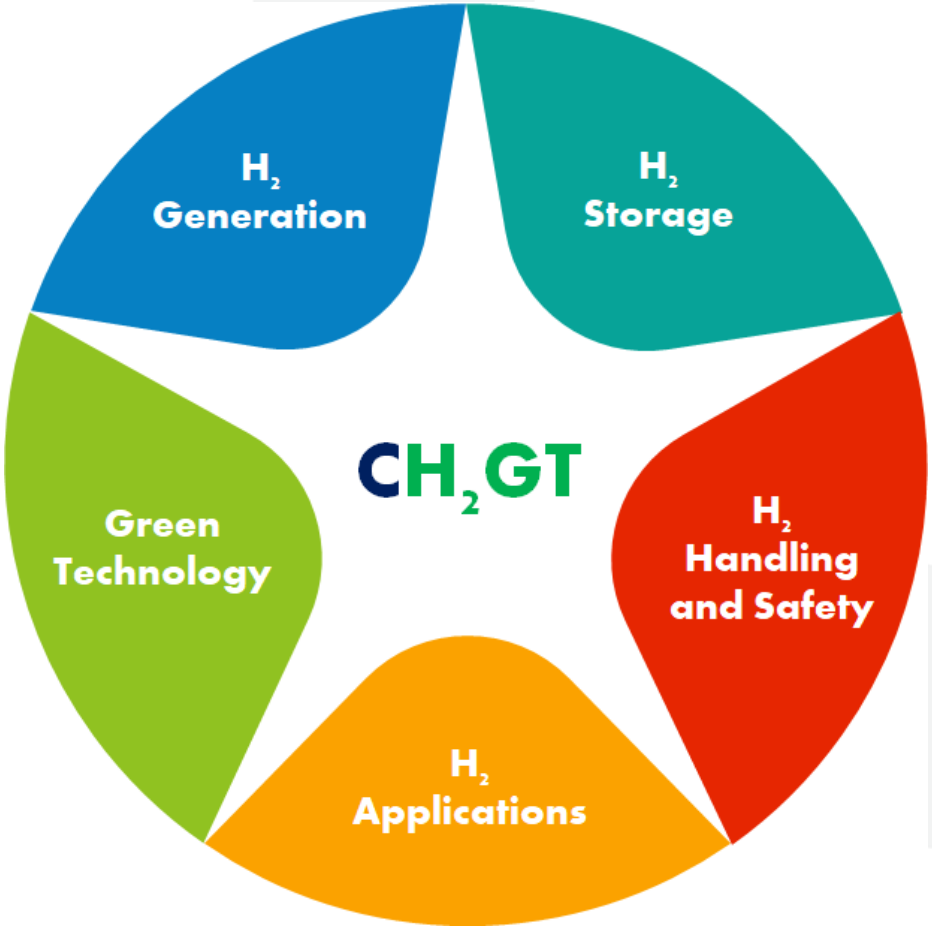


Modules


H_2 Generation
H_2 Storage
H_2 Handling and Safety
H_2 Applications
Green Technology
CH_2GT

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Overview & Accolades

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118 Interns (Five internships)	₹ 2Cr worth facilities	9 SCI Publications	8 Collaborations	
	7 Teck Talks	₹ 0.1Cr Student Scholarships	1 Funded Project	5 Patents
27 Student Projects	5 MoUs	31 Conference Proceedings	2 Courses	

Publications

Generation of green hydrogen using self-sustained regenerative fuel cells: Opportunities and challenges

Ujwal Shreenag Meda, Yashesh Vijay Rajyaguru, Aditi Pandey

International Journal of Hydrogen Energy | Q1 | Impact Factor: 8.1

Challenges associated with hydrogen storage systems due to the hydrogen embrittlement of high strength steels

Ujwal Shreenag Meda, Nidhi Bhat, Aditi Pandey, K.N. Subramanya, M.A. Lourdu Antony Raj International

Journal of Hydrogen Energy | Q1 | Impact Factor: 8.1

Titanium dioxide based heterogeneous and heterojunction photocatalysts for pollution control applications in the construction industry

Ujwal Shreenag Meda, Khushi Vora, Yash Athreya, Ujwal Arun Mandi

Process Safety and Environmental Protection | Q1 | Impact Factor: 8.1

Publications

Solid Electrolyte Interphase (SEI), a boon or a bane for lithium batteries: A review on the recent advances

Ujwal Shreenag Meda, Libin Lal, Sushantha, Paridhi Garg

Journal of Energy Storage | Q1 | Impact Factor: 9.4

Nano-engineered textiles: Development and applications

Ujwal Shreenag Meda, Gnana Soundarya, Madhu H, Nidhi Bhat

Materials Science & Engineering B | Q2 | Impact Factor: 3.9

High selectivity and sensitivity through nanoparticle sensors for cleanroom CO2 detection

Manjunatha Channegowda, Arpit Verma, Iqra Arabia, Ujwal Shreenag Meda, Ishpal Rawal, Sarvesh Rustagi, Bal Chandra Yadav, Patrick SM Dunlop, Nikhil Bhalla, and Vishal Chaudhary

Nanotechnology | Q2 | Impact Factor: 3.5

Publications

Development of novel non-stoichiometric hybrid Co3S4@Co0.85Se nanocomposites for an evaluation of synergistic effect on OER performance

Manjunatha C, Ujwal Shreenag Meda, S Lakshmikant, S Ashoka, BW Shivraj, et al

Surfaces and Interfaces | Q1 | Impact Factor: 6.2

Development of CuS nanostructures for electrochemical detection of Ascorbic Acid

Sudeep M, Manjunatha C, Ujwal Shreenag Meda, Sham Aan M P, Ashoka S, Suresh R

Journal of Nanostructures

Facile synthesis of Ni/NiO nanocomposites: The effect of Ni content in NiO upon the oxygen evolution reaction within alkaline media

Manjunatha C, Ashoka S, Craig E Banks, et al

RSC Advances | Q1 | Impact Factor: 3.1

Patents

Method and System for developing a sensor to detect hydrogen gas at ambient conditions

Ujwal Shreenag M, Akshay Kulkarni, Abhinav Bajaj, Aditya Kulal, Karthik S S

Patent Granted | Patent No: 480905

Method and system to develop a polymer - hydrogel - metal oxide composite based sensor to detect and quantify hydrogen gas

Ujwal Shreenag M, Lourdu Antony Raj, Shripathi Ramakrishnan, Maitri Uppaluri, A R Phani

Patent Granted | Patent Number: 338004

A Method and System to Enhance the Properties of Cementitious Products

Ujwal Shreenag Meda, Radhakrishna, Sachin K C

Patent Granted | Patent No: 461359

Patents

A Method to Enhance the Performance of a Microbial Fuel Cell

Ujwal Shreenag Meda, Pradeep G A

Patent Published | Application number: 202141015075

Method for synthesizing titanium dioxide and iron oxide based nano composite capable of reducing oxides of nitrogen in atmospheric air

Ujwal Shreenag Meda, Radhakrishna, Aditi Pandey, Yaseen Muneer, Vamshika I

Patent Filed | Application number: 202341042932

Funded Project

Project Title: Development of geopolymer composites for enhanced mechanical properties and to subside air pollution by the addition of nano particles with emphasis on achieving content uniformity

Sponsoring Agency: **DST – Nano Mission**

Sanction Order: **SR/NM/NT-1025/2017**

Total Cost: **Rs. 70,04,306**

Investigators: Dr. Radhakrishna, Professor and Head, Civil Engineering and Dr. Ujwal Shreenag M, Assistant Professor, Chemical Engineering

Labs created: **Nanomaterial synthesis lab** (8 nano powders including thin films for sensors)

Bulk solids blending lab (Nauta Mixer – to uniformly mix 0.1% nano powder with rest of the cementitious materials)

Activities under H_2 Generation

Sl. No.	Activity	Remarks
1	Hydrogen generation via microbial electrolysis	1 Ph.D. Completed
2	A method to enhance the performance of a microbial fuel cell	1 Patent published
3	Designing a solar PV module for powering an electrolyzer	1 Conference Proceeding | 1 student project
4	Nanocomposite based catalysts development to enhance OER performance	4 SCI Publications

Activities under H_2 Storage

Sl. No.	Activity	Remarks
1	Hydrogen Embrittlement Resistant Coatings (In collaboration with a German University)	1 Conference Proceeding | 1 student project | 1 SCI Publication
2	Metal Hydrides for Solid Hydrogen Storage – Opportunities and Challenges	1 article under review | 1 student project
3	Liquid Organic Hydrogen Carriers for hydrogen storage	1 student project
4	Storage of Hydrogen in Carbon Nano Tubes	1 Conference Proceeding

Activities under H_2 Handling & Safety

Sl. No.	Activity	Remarks
1	Method and system to develop a polymer - hydrogel - metal oxide composite based sensor to detect and quantify hydrogen gas	Indian Patent Granted
2	Method and system for developng a sensor to detect hdyrogen gas at ambient conditions	Indian Patent Granted
3	Product design of a hydrogen sensing system | Development of IoT enabled hydrogen sensing system | Development of IoT enabled hydrogen sensing system	3 Conference Proceedings
4	Remote Sensing of Molecular Hydrogen (In collaboration with a German University)	2 proposals submitted
5	Prototyping of Hydrogen Sensor (Hydrogen Innovations)	Sensor Prototyping

Activities under H_2 Applications

Sl. No.	Activity	Remarks
1	Development of a PEMFC powered two wheeler	1 project proposal submitted
2	Development of Hydrogen based 3-Wheeler for Waste Management in Indian Cities (In collaboration with a French Company)	1 project proposal submitted
3	Hydrogen based Pressure Gain Combustors (In collaboration with NDRF)	1 project proposal submitted

Activities under Green Technology

Sl. No.	Activity	Remarks
1	Geo-polymer composites and NOx reduction	1 funded project
2	A Method and System to Enhance the Properties of Cementitous Products	1 patent granted
3	Development of Flexible Bio Poly-Urethane Foams (In collaboration with a Canadian University)	1 Student Project

International Collaborators

	**Prof. Dr. Holger Walter** Head of Applied Mathematics and Physics Technical university of Applied Sciences (THWS) Wurzburg – Schweinfurt **Germany** Research Interests: Active and Passive Remote Sensing
	**Prof. Dr. Ansgar Brunn** Dean, Faculty of Plastics Engineering and Surveying Technical university of Applied Sciences (THWS) Wurzburg – Schweinfurt **Germany** Research Interests: Remote Sensing, Laser Scanning

International Collaborators

	**Prof. Dr.-Ing. Stephan Sommer** Faculty of Mechanical Engineering Technical university of Applied Sciences (THWS) Wurzburg – Schweinfurt **Germany** Research Interests: Rolling Bearing Technology
	**Glen Dsouza** Lecturer, Center for Teaching Learning Western University London, Ontario **Canada** Research Interests: Biomass Valorization

Collaborating Organizations

KREDL

INDIAN WIND POWER ASSOCIATION
IWPA
helping mankind with energy from nature

thws
Technical University of Applied Sciences Würzburg-Schweinfurt

ipgi instruments
Technical Support for all

Western
UNIVERSITY · CANADA

AUM
American University Of The Middle East

MoUs

1.Karnataka Renewable Energy Development Ltd

2.Indian Wind Power Association

3.Skill Council for Green Jobs

4.Anvita Electronics

5.IPGI Instruments

6.NTRL

Internships and Skill Development

- Internships for UG students
- Consists of 8 modules spread across four years
- To train the students in the RE sector
- Open to all engineering disciplines

Module	Title
1	Introduction to Renewable Energy, Indian Power Sector and Asset Management
2	Wind measurement, analysis & Mico-sitting
3	Evacuation planning of RE projects using load flow studies
4	Wind Turbine Technology
5	Heavy materials handling and foundations in Wind and Solar forms
6	SCADA Remote monitoring and appliction of power electronics in RE projects
7	RE Hybrid Projects and Hydrogen Technology
8	Operation and Maintanance of RE projects

Student Internships

Open Day @ CH_2GT






CH_2GT in Action

CH_2GT @ GEM Meet 2024
International Conference

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