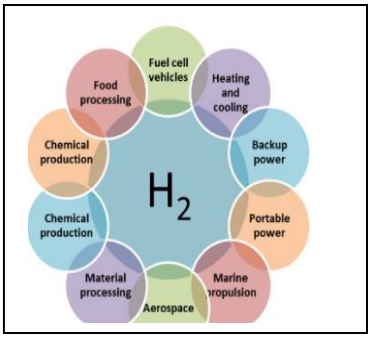
Government General Degree College, Nakashipara
Department of Chemistry

offers 30 hours certificate course
on
Sustainable Hydrogen energy
[From 26th December, 2022 to 30th December, 2022]



SCHEDULE

Date	10:00 am – 12:00 pm	12:00 pm – 02:00 pm	02:30 pm – 4:30 pm
26-12-2022	Dr. Rajib Sarkar	Dr. Sudipta Kr Kundu	Dr. Ayan Bandyopadhyay
27-12-2022	Dr. Rajib Sarkar	Dr. Sudipta Kr Kundu	Dr. Raudra Tapas Dey
28-12-2022	Dr. Rajib Sarkar	Mr. Rajib Mondal	Dr. Sudipta Kr Kundu
29-12-2022	Dr. Rajib Sarkar	Dr. Raudra Tapas Dey	Mr. Rajib Mondal
30-12-2022	Dr. Rajib Sarkar	Dr. Raudra Tapas Dey	Dr. Ayan Bandyopadhyay

ALL THE CLASSES WILL BE HELD IN SEMINAR-II

Government of West Bengal

Government General Degree College Nakashipara

Office of the Principal

MURAGACHHA, NAKASHIPARA, NADIA, PIN- 741154

Notice No.- MGIC/CHEM-03/2022 Date 16/12/2022

NOTICE

It is hereby notified for all concerned that the course conducted by Department of Chemistry on "**Sustainable Hydrogen Energy**" will commence from 26-12-2022 to 30-12-2022. Interested students may enroll their names to Dr. Rajib Sarkar, the coordinator of the course within 20th December, 2022. Syllabus of the course and routine will be announced in due time. For any query, you are advised to contact with Dr. Rajib Sarkar (contact No. 09143373934) as well as the college website.

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Government General Degree College, Nakashipara
Muragachha, Nadia-741154, W.B

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Govt. General Degree College, Nakashipara
Muragachha, Nadia

16/12/2022
Head
Department of Chemistry
Government General Degree College,
Nakashipara
Muragachha, Nadia-741154, W.B.

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Course on sustainable hydrogen energy

Course Title: Sustainable Hydrogen energy

Course duration: 30 hours

Course coordinator: Dr. Rajib Sarkar (Assiatant Professor in W.B.E.S.)
Invited Speaker: Dr. Ayan Bandyopadhyay (Assiatant Professor in W.B.E.S.)
Organizing Committee: 1. Dr. Raudra Tapas Dey (Assiatant Professor in W.B.E.S.)
2. Mr. Rajib Mondal (Assiatant Professor in W.B.E.S.)
3. Dr. Sudipta Kumar Kundu (Assiatant Professor in W.B.E.S.)

Course Overview:

The course will broadly cover all the aspects of hydrogen energy including the production, storage, transportation, utilization of hydrogen as an energy carrier. Hydrogen sensing methods and safety associated with the use of hydrogen at all the places whether at the point of production, storage, transport, refueling etc will be discussed.

Learning Objectives:

- Concept of Sustainable energy.
- How hydrogen can be utilized as a green energy source.
- Production of different types of hydrogen.
- Hydrogen storage and transportation.

Course Structure:

The course is divided into five modules, each consisting of six hours of lectures, discussions.

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Module 1: Introduction to Hydrogen energy (6 hours)

1. **Session 1: Introduction (2 hours)**

- What is hydrogen energy?
- What is sustainable energy?
- Status of hydrogen in the Earth.

2. **Session 2: Properties of hydrogen (2 hours)**

- Physical and chemical properties of hydrogen,
- Fuel properties of hydrogen.

3. **Session 3: Production of Hydrogen (2 hours)**

- Electrochemical principal of hydrogen production.
- Different ways of Hydrogen Production (Preliminary ideas)

Module 2: Hydrogen production-I (6 hours)

1. **Session 1: Production and Raw Materials (2 hours)**

- Raw materials used in hydrogen production.

2. **Session 2: Diverse reforming reactions (1 hour)**

- Steam Reforming,
- Sorption Enhanced Reforming,
- Hydrogen Membrane Reforming

Session 3: Partial oxidative ways (2 hours)

- Catalytic partial oxidation processes,
- Non-catalytic partial oxidation processes.

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Module 3: Hydrogen production-II (6 hours)

1. **Session 1: Non-oxidative methods of hydrogen production (2 hours)**

   - Thermal decomposition,
   - Catalytic methane decomposition,
   - Plasma assisted decomposition.

2. **Session 2: Hydrogen Production from coal & biomass (2 hours)**

   - Hydrogen production from coal,
   - Hydrogen production from biomass.

3. **Session 3: Hydrogen Production by electrolysis (2 hours)**

   - Electrolysis fundamentals,
   - Various types of Electrolyzers.

Module 4: Hydrogen storage (6 hours)

1. **Session 1: Hydrogen storage fundamental(2 hours)**

   - Principal,
   - Different methods (Elementary ideas)

2. **Session 2: Compressed & liquid state storage (2 hours)**

   - Thermodynamics, equipment and processes,
   - Storage tanks requirements and current state of art.

3. **Session 3: Solid state storage (2 hours)**

   - Materials for storage,
   - Requirements for storage materials, thermodynamics and kinetics of materials.

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Module 5: Hydrogen transportation & safety (6 hours)

1. **Session 1: Introduction (2 hours)**
    - Different ways of transporting,
    - Distributing hydrogen to the point of utilization.
2. **Session 2: Application (2 hours)**
    - Hydrogen Utilization for various applications including sectors like transportation, energy storage, industrial and space applications.
3. **Session 3: Safety (2 hours)**
    - Hydrogen sensing and safety,
    - Current state of safety technologies.

Course outcome:

By the end of the course, participants will have a comprehensive understanding about sustainable energy and how hydrogen can be utilize as a sustainable energy carrier.

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