# Assignment Booklet

## MSCRWEE Programme

**M.Sc (Renewable Energy and Environment)**

| Third Semester (Compulsory) | |
|---|---|
| MRW-005 | Solar Energy and Applications |
| MRW-006 | Bioenergy Conversion and Utilization |
| MRW-007 | Energy Economics and Planning |

| Third Semester (Electives) | |
|---|---|
| MRWE-001 | Nano Technology in Energy & Environment |
| MRWE-002 | Energy Storage |
| MEV-021 | Introduction to Climate Change |
| MEVE-001 | Environmental Impact Assessment for Environmental Health |
| MCS-224 | Artificial Intelligence and Machine Learning |
| MCS-226 | Data Science and Big Data |
| MCS-227 | Cloud Computing and IoT |
| MCS-231 | Mobile Computing |

***SCHOOL OF ENGINEERING & TECHNOLOGY***
***INDIRA GANDHI NATIONAL OPEN UNIVERSITY***
Maidan Garhi, New Delhi – 110 068

**JANUARY 2026**

Dear Student,

Please read the information on assignments in the Programme Guide that we have sent you after your enrolment. A weightage of 30%, as you are aware, has been earmarked for continuous evaluation, **which wouldconsist of one tutor-marked assignment** for this Programme. The assignment for MSCRWEE (Third semester) has been given in this booklet.

## Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLLMENT NO :……

NAME :……

ADDRESS :……

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PROGRAMME CODE: ……..

COURSE CODE: ……

COURSE TITLE: ……

STUDY CENTRE: ……..…… DATE: ……..……...

## PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION ANDTO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

**5) These assignments submitted should be hand written in your own hand writing.**

## We strongly suggest that you should retain a copy of your answer sheets.

**6) You cannot fill the Exam Form without** submission of the assignments. So solve it and **submit it at the earliest.** If you wish to appear in the **TEE, June 2026,** you should submit your TMAs by **April 30, 2026.** Similarly, if you wish to appear in the **TEE, December 2026,** you should submit your TMAs by **September 30, 2026.**

**7)** Assignments will be submitted at **your respective regional centre.**

We wish you good luck!

**Assignment -1**

(To be done **after** studying the course material)

**Course Code: MRWE-001**
**Course Title: Nano Technology in Energy & Environment**
**Assignment Code: MRWE-001/TMA/2026**
**Maximum Marks: 100**

**Last Date of Submission: April 30, 2026 (For June TEE), September 30, 2026 (For December TEE)**
**Note:**

1. **For any question worth 5 marks the word limit is 200 words, for a 10 mark question it is 350 words.**

2. **All questions are compulsory. All questions carry equal marks.**

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| Q.1 | a) | What is Nano Technology? Explain the basic concept of Nano Technology? | 5 |
| | b) | List out the various Technologies used in Nano Technology for the measurement. Explain the working of Scanning Electron Microscope with suitable diagram (SEM). | 5 |
| Q.2 | a) | Differentiate between SEM and TEM. Also list out the advantages and applications of SEM and TEM. | 5 |
| | b) | What is synthesis of Nano Materials? Also describe the various properties of Nano Materials. | 5 |
| Q.3 | a) | Discuss Top-down and Bottom-up approach with suitable sketch. List out the various methods of Top-down and Bottom-up approach. | 5 |
| | b) | Explain any one method of Top-down and Bottom-up approach with suitable diagram. | 5 |
| Q.4 | a) | Discuss the following<br>I. Nano sensors<br>II. Carbon Nano Materials<br>III. Nano Wire<br>IV. Nano Composite Materials | 5 |
| | b) | Explain the working of Atomic Force Microscopy (AFM) with suitable diagram. List out the advantages and Applications of AFM. | 5 |
| Q.5 | a) | What is Nano Machine and Nano bot? List out its applications. | 5 |
| | b) | Discuss the various applications of Nano Technology and Nano Materials? | 5 |
| Q.6 | a) | Explain the working of NP based optical sensors. | 5 |
| | b) | How the Nano Technology can apply in Solar Energy? Explain. | 5 |
| Q.7 | a) | What do you understand about Micro Electro Mechanical Systems (MEMS) and Nano Electro Mechanical Systems (NEMS)? Also list out its advantages and applications. | 5 |
| | b) | Explain Hydrogen Storage Systems with diagram. List out its applications. | 5 |
| Q.8 | a) | How the waste is treated using Nano Scale Biopolymers? Explain in brief. | 5 |
| | b) | Explain Nano-Micro Silicon (Si) composite structures and what are the various technologies used in Silicon (Si) deposition. | 5 |

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|---|---|---|---|
| Q.9 | a) | How do you monitor the various environmental factors by using sensors? Explain. | 5 |
| | b) | What is Nano Sensor? How do you design Nano Sensor? List out its various applications. | 5 |
| Q.10 | a) | How do you prevent the pollution by using Nano Technology? Explain with suitable examples. | 5 |
| | b) | What are Green Manufacturing and Green Processing? Describe the significance of the Green Nano Materials. | 5 |