

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 2025

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 would consist 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 :

.....

.....

PROGRAMME CODE:

COURSE CODE:

COURSE TITLE:

STUDY CENTRE:

DATE:

**PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE
EVALUATION AND TO 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 2025**, you should submit your TMAs by **April 30, 2025**. Similarly, if you wish to appear in the **TEE, December 2025**, you should submit your TMAs by **September 30, 2025**.
- 7) Assignments will be submitted at **your respective regional centre**.

We wish you good luck!

Assignment -5
(To be done **after** studying the course material)

Course Code: MCS-224
Course Title: Artificial Intelligence and Machine Learning
Assignment Code: MCS-224/TMA/2025
Maximum Marks: 100

Last Date of Submission: April 30, 2025 (For June TEE), September 30, 2025 (For December TEE)
Note:

1. For any question worth 10 marks the word limit is 350 words, for a 20 mark question it is 550 words.
 2. Attempt all questions. All questions carry equal marks.
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Q.1 Classify AI on the basis of the functionalities of AI. Also discuss some important applications of AI. 10

Q.2 Define Supervised, Unsupervised and Reinforcement learning with a suitable examples of each. 10

Q.3 Find the minimum cost path for the 8-puzzle problem, where the start and goal state are given as follows: 10

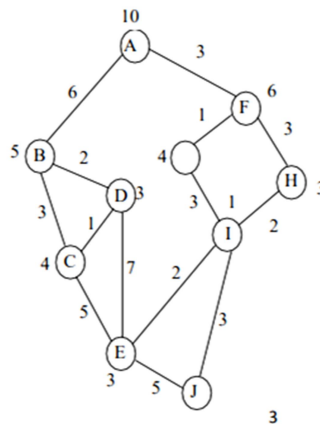
| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 8 | - |
| 7 | 6 | 5 |

Start State

| | | |
|---|---|---|
| 1 | 4 | 7 |
| 2 | 8 | 6 |
| 3 | - | 5 |

Goal State

Q.4 Consider the following graph. The numbers written on edges represents the distance between the nodes and the numbers written on nodes represents the heuristic value. Find the most cost effective path to reach from Node A to node J using A* Algorithm 10



Q.5 Compare Artificial Intelligence, Machine Learning, and Deep Learning. 10

- Q.6 Discuss the transforming an FOPL Formula into Prenex Normal Form with a suitable example. Also, discuss Skolemization with a suitable example. 10
- Q.7 Explain Forward Chaining Systems and Backward Chaining Systems with a suitable example for each. 10
- Q.8 Write short notes on following 10
- a) Reinforcement Learning
 - b) Ensemble method
- Q.9 Briefly discuss the various Ensemble methods. 10
- Q.10 For the given points of two classes red and blue: 10
- Blue: $\{ (1, 2), (2,1), (1,-2), (2,-2) \}$
- Red : $\{ (4,-1), (4,1), (5,-1), (6,1) \}$
- Plot a graph for the red and blue categories. Find the support vectors and optimal separating line.