

MASTER OF SCIENCE ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (MSCAIML)

MSCAIML/ASSIGN/SEMESTER-I

ASSIGNMENTS

(July – 2026)

**MCS-061, MCS-081, MCS-208, MCS-082, MCSL-209,
MCSL-083**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule	Page. No.
		For July-December Session	
MCS-061	MSCAIML(I)/061/Assign/2026	31 st October, 2026	3
MCS-081	MSCAIML(I)/081/Assign/2026	31 st October, 2026	5
MCS-208	MSCAIML(I)/0208/Assign/2026	31 st October, 2026	7
MCS-082	MSCAIML(I)/082/Assign/2026	31 st October, 2026	8
MCSL-209	MSCAIML(I)/L-209/Assign/2026	31 st October, 2026	10
MCSL-083	MSCAIML(I)/L-083/Assign/2026	31 st October, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MSCAIML Programme Guide.
3. To become eligible for appearing in the Term End Practical Examination for the labcourses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MSCAIML Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	:	MCS-061
Course Title	:	Mathematical Foundations-I
Assignment Number	:	MSCAIML(I)/061/Assign/2026
Maximum Marks	:	100
Weightage	:	30%
Last Date of Submission	:	31st October, 2026 (for July 2026 Session)

Note: There are four questions in this assignment, carrying a total of 80 marks. The remaining 20 marks are for viva-voce. Answer all the questions.

- Q1: a)** What is set? Explain the Finite set and the Infinite set with example. **(3 Marks)**
- b)** What is Power Set? Find $P(A)$ for $A = \{a, b, c, e, f, g\}$ **(2 Marks)**
- c)** What is a function? Explain the following types of functions with examples. **(3 Marks)**
- i) Surjective
ii) Injective
iii) Bijective
- d)** Explain how to draw a graph of a linear function. Draw graph of $y = 5x + 2$ **(3 Marks)**
- e)** Find the inverse of the following function: **(3 Marks)**
- $$f(x) = \frac{x^2 + 9}{x - 5}, x \neq 5$$
- f)** What is a relation? Explain an equivalence relation with the help of an example. **(3 Marks)**
- g)** Draw Venn diagram to represent the followings: **(3 Marks)**
- i) $A \subseteq B$
ii) $(A \subseteq B)$
iii) $(A \cap B \cap C) \cap (A \cup B \cap C)$
- h)** Explain whether the function $f(x) = x^2 + 2$ is one-one or not. **(2 Marks)**
- i)** Let f and g be the two functions such that $f(x) = x^2 + 5$ and $g(x) = 2x + 5$. Define $f \circ f$, $f \circ g$, $g \circ f$ and $g \circ g$. **(3 Marks)**
- Q2: a)** Show that: $\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 2 \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ **(2 Marks)**
- b)** If $A = \begin{bmatrix} -1 & 2 & 0 \\ -1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, show that $A^2 = A^{-1}$ **(2 Marks)**
- c)** What is a matrix? Explain Upper Triangular Matrix and Lower Triangular Matrix with examples. **(2 Marks)**

d) Find the inverse of the matrix $A = \begin{pmatrix} 1 & 6 & 4 \\ 2 & 4 & -1 \\ -1 & 2 & 5 \end{pmatrix}$ if it exists. (3 Marks)

e) Solve the following system of equations by using the Matrix Method. (3 Marks)

$$3x + 4y + 7z = 14$$

$$2x - y + 3z = 4$$

$$2x + 2y - 3z = 0$$

f) Explain how to find sum of n terms of a G.P. (2 Marks)

g) If m times the m^{th} term of an A.P. is n times its n^{th} term, show that $(m + n)^{\text{th}}$ term of the A.P. is zero. (3 Marks)

h) Explain what minors and cofactors are in a determinant? Find minor of each element of the following matrix. (3 Marks)

$$\begin{pmatrix} 1 & 6 & 4 \\ 2 & 4 & -1 \\ -1 & 2 & 5 \end{pmatrix}$$

Q3: a) What is vector? Explain how to find the inner product of vectors with an example. (3 Marks)

b) What is Eigen Vector? What is Eigen Value? Explain the characteristic equation. (3 Marks)

c) Explain the fundamental principle of multiplication. (3 Marks)

d) Prove ${}^{n+1}C_r = {}^nC_r + {}^nC_{r-1}$ (3 Marks)

e) Expand $\left(x + \frac{1}{x}\right)^4$ by binomial theorem. (3 Marks)

Q4: a) Explain the concept of limit. (2 Marks)

b) Show that if $y = ae^{mx} + be^{-mx}$, prove that $d^2y/dx^2 = m^2 y$ (2 Marks)

c) Evaluate the integrals: (3 Marks)

i) $\int e^x(e^x + 7)^5 dx$.

ii) $\int \frac{1}{x \log x} dx$

d) Evaluate $\int (x + 1)e^x(xe^x + 5)^4 dx$. (2 Marks)

e) Evaluate the followings: (3 Marks)

i) $\int (x + 1)e^x(xe^x + 5)^4 dx$. ii) $\int \frac{x^6 - x^3 + 1}{x^2} dx$

f) Evaluate the followings: (3 Marks)

i) $\lim_{n \rightarrow 0} \frac{|x|}{x}$ does not exist ii) $f(x) = |x|$ is continuous at $x = 0$.

iii) $\lim_{x \rightarrow 0} f(x)$, where $f(x) = \begin{cases} 2 - x^2, & x \neq 0 \\ 2, & x = 0 \end{cases}$

g) What is a derivative? Explain its meaning and geometrical interpretation with an example. (3 Marks)

h) What is definite integration? Give a geometrical interpretation of it with the help of an example. (2 Marks)

MASTER OF SCIENCE ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (MSCAIML)

MSCAIML/ASSIGN/SEMESTER-I

ASSIGNMENTS

(July – 2026)

**MCS-061, MCS-081, MCS-208, MCS-082, MCSL-209,
MCSL-083**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule	Page. No.
		For July-December Session	
MCS-061	MSCAIML(I)/061/Assign/2026	31 st October, 2026	3
MCS-081	MSCAIML(I)/081/Assign/2026	31 st October, 2026	5
MCS-208	MSCAIML(I)/0208/Assign/2026	31 st October, 2026	7
MCS-082	MSCAIML(I)/082/Assign/2026	31 st October, 2026	8
MCSL-209	MSCAIML(I)/L-209/Assign/2026	31 st October, 2026	10
MCSL-083	MSCAIML(I)/L-083/Assign/2026	31 st October, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MSCAIML Programme Guide.
3. To become eligible for appearing in the Term End Practical Examination for the labcourses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MSCAIML Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	:	MCS-208
Course Title	:	Data Structures and Algorithms
Assignment Number	:	MSCAIML(I)/208/Assign/2026
Maximum Marks	:	100
Weightage	:	23%
Last Date of Submission	:	31st October, 2026 (for July 2026 Session)

There are four questions in this assignment, which carry 80 marks. Each question carries 20 marks. Rest 20 marks are for viva voce. All algorithms should be written nearer to C programming language. You may use illustrations and diagrams to enhance the explanations, if necessary. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

- Q1:** Write an algorithm to list the data fields of the nodes of a binary tree by level. Within levels, nodes are to be listed left to right.
- Q2:** Show that every tree is a bipartite graph.
- Q3:** Consider a hypothetical data object X1. X1 is a linear list with the restriction that while additions to the list may be made at either end, deletions can be made from one end only. Design a linked list representation for X1. Write addition and deletion algorithms for X1. Specify initial and boundary conditions for your representation.
- Q4:** Write an algorithm to list all the identifiers in a hash table in lexicographic order. Assume the hash function f is $f(X) = \text{first character of } X$ and linear probing is used. How much time does your algorithm take?

MASTER OF SCIENCE ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (MSCAIML)

MSCAIML/ASSIGN/SEMESTER-I

ASSIGNMENTS

(July – 2026)

**MCS-061, MCS-081, MCS-208, MCS-082, MCSL-209,
MCSL-083**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule	Page. No.
		For July-December Session	
MCS-061	MSCAIML(I)/061/Assign/2026	31 st October, 2026	3
MCS-081	MSCAIML(I)/081/Assign/2026	31 st October, 2026	5
MCS-208	MSCAIML(I)/0208/Assign/2026	31 st October, 2026	7
MCS-082	MSCAIML(I)/082/Assign/2026	31 st October, 2026	8
MCSL-209	MSCAIML(I)/L-209/Assign/2026	31 st October, 2026	10
MCSL-083	MSCAIML(I)/L-083/Assign/2026	31 st October, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MSCAIML Programme Guide.
3. To become eligible for appearing in the Term End Practical Examination for the labcourses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MSCAIML Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code : MCS-081
Course Title : Artificial Intelligence
Assignment Number : MSCAIML(I)/081/Assign/2026
Maximum Marks : 100
Weightage : 30%
Last Dates for Submission : 31st October, 2026 (for July 2026 Session)

Note: There are 13 questions in this assignment, carrying a total of 80 marks. The remaining 20 marks are for viva-voce. Answer all the questions.

Q1: How does knowledge differ from intelligence? What do you understand by the term Artificial Intelligence (AI)? List the various technologies and their corresponding illustrative solutions.

(8 Marks)

Q2: What is the Turing Test? What is the criticism of the Turing Test?

(4 Marks)

Q3: Find the minimum cost path for the 8-puzzle problem, where the start and goal state are given as follows:

(5 Marks)

1	2	3
4	8	-
7	6	5

Start State

1	2	3
4	5	6
7	8	-

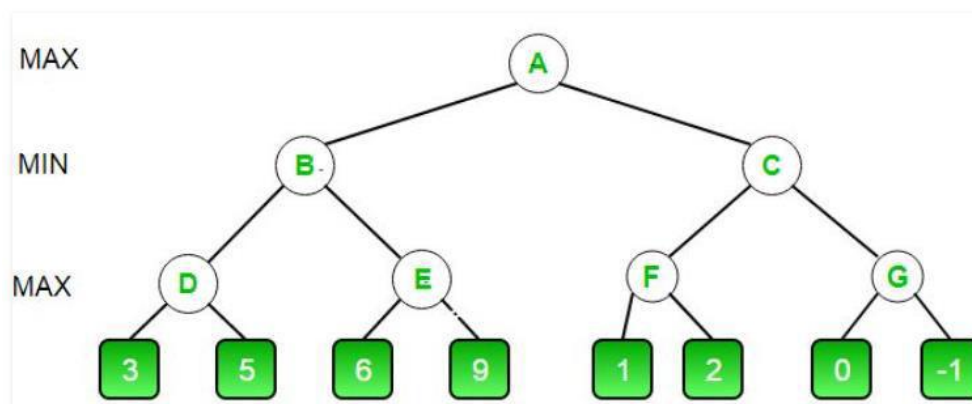
Goal State

Q4: Draw a state space tree representation to solve the Tower of Hanoi problem. (Take the number of disks $n=4$)

(5 Marks)

Q5: Apply Alpha-Beta pruning algorithm on the following graph and find which node(s) are pruned?

(5 Marks)



- Q6:** Write WFF for the following statements: **(5 Marks)**
a) Every Person has Mother
b) There is a woman and she is mother of Siya
- Q7:** Let $P(x)$ and $Q(x)$ represent “ x is a rational number” and “ x is a real number,” respectively. Symbolize the following sentences: **(6 Marks)**
(i) Every rational number is a real number.
(ii) (Some real numbers are rational numbers.
(iii) Not every real number is a rational number.
- Q8:** Explain the following rule-based systems with the help of an example: **(8 Marks)**
a) *Forward chaining systems*,
b) *Backward chaining systems*.
- Q9:** Explain the Dempster-Shafer theory with a suitable example. **(8 Marks)**
- Q10:** Using the following information, determine your choice between Action C (certain) or Action G (gamble) based on expected monetary value. **(6 Marks)**
Action C (certain): receive Rs.50 for sure.
Action G (gamble): 80% chance of Rs.100 and 20% chance of complete loss.
- Q11:** Define an expert system. Discuss the components of a generic expert system shell. **(8 Marks)**
- Q12:** Define the following forms of learning in an agent. **(6 Marks)**
(i) Rote learning or memorization
(ii) Learning through instruction
(iii) Learning by analogy
(iv) Learning by induction
- Q13:** Write Python code to do statistical analysis (average, min, max, standard deviation) of your marks in 5 subjects (user input). **(6 Marks)**

MASTER OF SCIENCE ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (MSCAIML)

MSCAIML/ASSIGN/SEMESTER-I

ASSIGNMENTS

(July – 2026)

**MCS-061, MCS-081, MCS-208, MCS-082, MCSL-209,
MCSL-083**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule	Page. No.
		For July-December Session	
MCS-061	MSCAIML(I)/061/Assign/2026	31 st October, 2026	3
MCS-081	MSCAIML(I)/081/Assign/2026	31 st October, 2026	5
MCS-208	MSCAIML(I)/0208/Assign/2026	31 st October, 2026	7
MCS-082	MSCAIML(I)/082/Assign/2026	31 st October, 2026	8
MCSL-209	MSCAIML(I)/L-209/Assign/2026	31 st October, 2026	10
MCSL-083	MSCAIML(I)/L-083/Assign/2026	31 st October, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MSCAIML Programme Guide.
3. To become eligible for appearing in the Term End Practical Examination for the labcourses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MSCAIML Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	:	MCS-082
Course Title	:	Programming Using Python
Assignment Number	:	MSCAIML(I)/082/Assign/2026
Maximum Marks	:	100
Weightage	:	30%
Last Dates for Submission	:	31st October, 2026 (for July 2026 Session)

Note: There are eight questions in this assignment, carrying a total of 80 marks. The remaining 20 marks are for the viva voce. Answer all the questions. Give the running code and its output as part of your answer wherever required.

- Q1: (a)** Compare and contrast lists, tuples, and sets in Python in detail, and provide an example Python script to illustrate your answer. **(5 Marks)**
- (b)** Explain how indexing and slicing mechanics function on multi-dimensional list elements. Write a program containing a nested list (a matrix) and use slice syntax variations to: **(5 Marks)**
1. Extract a sub-matrix grid block.
 2. Reverse the order of elements in individual inner lists using in-place reassignments.
- Q2: (a)** Discuss the procedural execution behaviour of loop variations in Python. Differentiate between while loops and for loops, and write a program that demonstrates how the break and continue keywords disrupt standard sequential control flow paths. **(5 Marks)**
- (b)** Describe the operational hierarchy of Pandas Series and DataFrame objects. **(5 Marks)**
- Q3: (a)** Analyze how Python processes variable names globally and locally, using example code to support your explanation. **(5 Marks)**
- (b)** Contrast regular named function architectures with lambda (anonymous) functions. Write a program demonstrating a higher-order function that accepts a lambda expression as an input parameter to filter and map a dictionary dataset based on custom key conditions. **(5 Marks)**
- Q4: (a)** Explain the concepts of an instance method, a class method (@classmethod), and a static method (@staticmethod) in Python's OOP model, providing examples for each. **(6 Marks)**
- (b)** Explain the structural execution mechanics of *decorators* and *generators* inside modern Python runtime engines. **(4 Marks)**
- Q5: (a)** Define polymorphism in Python and explain how operator overloading enables custom behaviours for standard operand symbols. **(5 Marks)**
- (b)** Describe the operational flow of Python's complete exception-handling block architecture (try, except, else, and finally) with the help of a program. **(5 Marks)**
- Q6: (a)** What is multithreading, and how does Python support it? Provide a foundational script utilising the threading module that synchronizes two overlapping threads competing for a single shared resource using thread-primitive lock systems. **(5 Marks)**

- (b) Write Python code utilising Tkinter that constructs a user login window consisting of entry input containers, tracking label grids, and an active submission command trigger button. **(5 Marks)**

Q7: (a) Explain the structural differences between the Flask and FastAPI web framework ecosystems for developing enterprise services. Also, explain the concepts of synchronous routing blocks versus asynchronous event-handling loops (async/await), and describe how Pydantic validation models help in automated data verification. **(5 Marks)**

- (b) Explain the operational lifecycle required to safely open, execute, commit, and terminate transactions on relational database engines using Python. Also, explain how developers protect database query interfaces against SQL injection vulnerabilities. **(5 Marks)**

Q8: (a) Explain why NumPy Array (ndarray) calculations dramatically outperform standard nested native Python lists for heavy data calculations. Furthermore, explain what vectorization and broadcasting rules imply when processing multi-dimensional array indices. **(5 Marks)**

- (b) Explain the uses of Matplotlib visualization charts, including the explicit structural hierarchy among a Figure, an Axes object class, and an individual Axis. Make necessary assumptions. **(5 Marks)**

**MASTER OF SCIENCE
ARTIFICIAL INTELLIGENCE &
MACHINE LEARNING
(MSCAIML)**

MSCAIML/ASSIGN/SEMESTER-I

ASSIGNMENTS

(July – 2026)

**MCS-061, MCS-081, MCS-208, MCS-082, MCSL-209,
MCSL-083**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule	Page. No.
		For July-December Session	
MCS-061	MSCAIML(I)/061/Assign/2026	31 st October, 2026	3
MCS-081	MSCAIML(I)/081/Assign/2026	31 st October, 2026	5
MCS-208	MSCAIML(I)/0208/Assign/2026	31 st October, 2026	7
MCS-082	MSCAIML(I)/082/Assign/2026	31 st October, 2026	8
MCSL-209	MSCAIML(I)/L-209/Assign/2026	31 st October, 2026	10
MCSL-083	MSCAIML(I)/L-083/Assign/2026	31 st October, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MSCAIML Programme Guide.
3. To become eligible for appearing in the Term End Practical Examination for the labcourses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MSCAIML Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code : **MCSL-209**
Course Title : **Data Structures and Algorithms Lab**
Assignment Number : **MSCAIML(I)/L-209/Assign/2026**
-27Maximum Marks : **100**
Weightage : **30%**
Last Date of Submission : **31st October, 2026 (for July 2026 Session)**

There are two questions in this assignment carrying a total of 40 marks. Each question carries 20 marks. Your Lab Record will carry 40 Marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

- Q1:** Write an algorithm and program in ‘C’ language that accepts a Graph as input and prints its adjacency matrix and adjacency list.
- Q2:** Write an algorithm to list the data fields of the nodes of a Binary tree T by level. Within levels, nodes are to be listed left to right.

MASTER OF SCIENCE ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (MSCAIML)

MSCAIML/ASSIGN/SEMESTER-I

ASSIGNMENTS

(July – 2026)

**MCS-061, MCS-081, MCS-208, MCS-082, MCSL-209,
MCSL-083**



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule	Page. No.
		For July-December Session	
MCS-061	MSCAIML(I)/061/Assign/2026	31 st October, 2026	3
MCS-081	MSCAIML(I)/081/Assign/2026	31 st October, 2026	5
MCS-208	MSCAIML(I)/0208/Assign/2026	31 st October, 2026	7
MCS-082	MSCAIML(I)/082/Assign/2026	31 st October, 2026	8
MCSL-209	MSCAIML(I)/L-209/Assign/2026	31 st October, 2026	10
MCSL-083	MSCAIML(I)/L-083/Assign/2026	31 st October, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MSCAIML Programme Guide.
3. To become eligible for appearing in the Term End Practical Examination for the labcourses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MSCAIML Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	:	MCSL-083
Course Title	:	Programming and AI Lab
Assignment Number	:	MSCDSA(I)/L-083/Assign/2026
Maximum Marks	:	100
Weightage	:	30%
Last Date of Submission	:	31st October, 2026 (for July 2026 Session)

Note: The assignment has two sections A and B. Section A is based on Python Programming and Section B is based on Artificial Intelligence. Answer all the questions. Each section is for 20 marks. The lab record carries 40 Marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the MSCAIML) Programme Guide for the format of presentation. If any assumptions made, please state them.

Section A: Python Programming

- Q1:** Write a Python script that generates a 4×4 nested list (matrix) containing integer values from 1 to 16. Without using any external libraries, write logic to: **(3 Marks)**
- Extract and print the inner 2×2 sub-matrix
 - Reverse the rows of the matrix in-place.
- Q2:** Design an OOP application for an inventory system of an online shopping portal. Create an Item class with attributes like name, price, and stock count etc. Make necessary assumptions. **(7 Marks)**
- Q3:** Build a fully interactive graphical user interface using Tkinter for currencies conversion. The window should feature an input box for an amount, a dropdown menu to select target currencies, a conversion trigger button, and a persistent display label mapping the calculated results. Make necessary assumptions. **(7 Marks)**
- Q4:** Write a data visualization script using Matplotlib to build a single Figure containing two side-by-side subplot Axes grids:
- Subplot 1: A line chart representing trend progression values over a timeline.
 - Subplot 2: A scatter plot diagram highlighting coordinate cluster spaces.

Note: Add clear axis titles, customised colour mappings, legends, and bounding grid markers across the visual plots. **(3 Marks)**

Section B: Artificial Intelligence

- Q1:** Write a Python Program to solve the N-Queen Problem without using Recursion. **(5 Marks)**
- Q2:** Implement the Water Jug problem in Python. **(5 Marks)**
- Q3:** Write a Python Program to implement the Min-Max Algorithm. **(5 Marks)**
- Q4:** Write a Python Program to implement the AO* Algorithm **(5 Marks)**