

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI  
DEPARTMENT OF MATHEMATICS AND STATISTICS**

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**MA522M-Data Science Programming Laboratory**

Exercise-4                      Duration: 120 Minutes                      P1 Slot                      15:00-17:00  
10 February 2025                      Practical                      3 Marks

**Answer All Questions. Usage of Internet is not Allowed**

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1. Create a Matrix class that does the following: [1]
    - (a) Define Getters and Setters for getting matrices, dimensions
    - (b) Add Two matrices using the operator `__add__`, Subtract Two matrices using the operator `__subtract__` and Multiply two matrices using `__mul__` operator
    - (c) Transpose
  2. Create a child class from the previous matrix and name it as Square matrix and perform the following operations [1]
    - (a) Trace of an  $n \times n$  matrix
    - (b) Determinant (only for  $2 \times 2$ ) and then use recursion to compute the determinant for higher dimensions
  3. Create a vector class and do all possible vector operations using operator overloading and use Matrix class and vector class to define matrix vector product [1]
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