# CSE 3045: Mathematical Modelling for Data Science

# Lab Assignment - 2

1. *General format is question followed by complete code, along with input and output screenshots for each possible scenario.*
2. *Do not copy paste other students work.*
3. *Present the work properly.*

***Lab 1: Matrices***

1. *Using Python NumPy package linalg, explore all the possible routines along with different possible scenarios with specific reference to* 
   1. *Matrix addition*
   2. *Matrix multiplication*
   3. *Determinant of a matrix*
   4. *Rank of a matrix*
   5. *Multiplicative inverse of a matrix*
2. *Without using inbuilt routines, solve a system of linear equations with two variables.* 
   1. *By substitution method*
   2. *By Elimination method*
   3. *Gaussian Elimination and Gauss- Jordan Method*

***Lab 2: Eigen Values and Eigen Vectors***

1. *Find Eigen values and eigen vectors using Python NumPy package linalg, explore all the possible routines along with different possible scenarios.*
2. *Using R, find the eigen values and vectors.*

*Reference materials*

1. [*https://numpy.org/doc/stable/reference/routines.linalg.html*](https://numpy.org/doc/stable/reference/routines.linalg.html)
2. [*https://personal.math.ubc.ca/~pwalls/math-python/linear-algebra/eigenvalues-eigenvectors/*](https://personal.math.ubc.ca/~pwalls/math-python/linear-algebra/eigenvalues-eigenvectors/)
3. [*https://cran.r-project.org/web/packages/matlib/vignettes/eigen-ex1.html*](https://cran.r-project.org/web/packages/matlib/vignettes/eigen-ex1.html)
4. [*https://www.rdocumentation.org/packages/base/versions/3.6.2/topics/eigen*](https://www.rdocumentation.org/packages/base/versions/3.6.2/topics/eigen)