Study questions

1. **Concept of Data Science**

2. **Python Basics**
   1) Keywords, reserved words
   2) Statements and Comments
   3) Variables
      i. Rules for variable names
      ii. Assigning values to variables
   4) Operators
      i. +, -, *, /, %
      ii. and, or
   3) Data types
      i. Numbers
         a) integers
         b) float, range of float numbers
      iii. Strings
         a) index slicing
      ii. Booleans
         c) Boolean operations
   6) Data Structures
      i. List
         a) Create a list
         b) index slicing of a list
         c) list operations
      iv. Set
         a) Create a set
         b) uniqueness, orderless
      iii. Tuple
      iv. Dictionary
   7) Functions
      i. Definition, scope of variables
      ii. Input, output
      iii. Default values

3. **Program Control**
   1) if-elif-else statement
      i. Syntax
      ii. # of code blocks executed (at most)
   2) while loops
      i. Syntax
      ii. Test expressions
   3) for loops
      i. Syntax
      ii. nested loops in a for-loop

4. **NumPy**
   1) import the numpy module
   2) Create 1-D arrays
      i. array( )
      ii. arange( ), linspace( )
      iii. index slicing
      iv. relational and logical operations
   3) Index slicing of 2-D arrays
      i. index slicing
      ii. Size, shape of 2-D arrays

5. **Matplotlib**
   1) customize 1-D plots
      i. xlabel( ), xlim( ), xtick( )
      ii. subplots
   2) 2-D color plots
      i. types of 2-D plots
         b) pcolor( )
         c) contour, contourf( )
      ii. types of colormaps

6. **Pandas**
   1) Data Frames
      i. delimiter, data filtering
      ii. column index, row index
      iii. column access
      iv. handy Pandas functions
         a) describe( )
         b) head( ), tail( )
         c) cut( )
         d) corr( )
         e) plot( ), hist( )

7. **Statistics Basics**
   1) accuracy versus precision
   2) Probability, Expectation
   3) Probability mass/density functions
   4) Theoretical distributions
      i. Binomial
      ii. Normal
         c) Symmetry
         d) mean, median, mode
         e) spread
      vi. Skewed distributions
         g) mean, median, mode
   5) Covariance, Correlation

8. **Time series**
   1) Definition
   2) time domain versus frequency domain
   3) periodogram, power
   4) periodicity of a signal
   5) Moving average
   6) Trend, Seasonality, Irregular