**UNIVERSITY OF THE FREE STATE**
**DEPARTMENT OF MATHEMATICAL STATISTICS AND ACTUARIAL SCIENCE**
**STSM 2634**

# Tutorial 5

**Full marks: 10**

Date: 15 May, 2025

Deadline: 16 May, 2025

**FOLLOW THESE INSTRUCTIONS METICULOUSLY, OTHERWISE MARKS WILL BE DEDUCTED:**

- **You must use R-Markdown to complete this tutorial**.

- You need to submit the word file generated by R-Markdown (.rmd).

- Name the markdown file as **'Tutorial5'** as the file name. Use your student number as the author name. Your **programming (code), and the output must be included in your answers**. Write the explanation after the code and the output as necessary.

- You have freedom to write the code in your own way.

- You are allowed to use the class notes, or any other help from the internet.

- 0 marks for submission in any other format as prescribed above (or no submission).

**Q1.**

Consider the ‘Affairs’ data from the AER package. This dataset was obtained by the magazine Psychology Today in 1969.

A sociologist wants to predict whether a person has had an extramarital affair based on demographic information. They decide to use the SVM model. **Use set.seed(100) to ensure the reproducibility of your analysis.**

1. Add a **binary target variable ‘had_affair’ to the dataset** indicating if a person has had extramarital affair or not, i.e., create a variable that will take value 1 for all positive ‘affairs’ value in the dataset. Otherwise 0.
2. Then create a new dataset that will contain all but the first variable ‘affairs’. Note that the new data must have 9 variables in total.
3. Split the new data into 70:30 ratio for the training data and the test data, respectively.
4. Train an SVM with a linear kernel using ‘**had_affair’** as the dependent (response) variable and all other variables as the independent variables (predictors).
5. Evaluate model performance using the training accuracy (see the training error for classification in the Class_slide 17).

What do conclude about the training error of the model?

$[2\times 5 = 10]$

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