**DATA 300: Statistical Machine Learning**

**Classification Metrics and the Confusion Matrix**

**Binary Case.**

* **True Positives (TP).**

It refers to the number of predictions where the classifier correctly predicts the positive class as positive.

* **True Negative (TN).**

It refers to the number of predictions where the classifier correctly predicts the negative class as negative.

* **False Positive (FP).**

It refers to the number of predictions where the classifier incorrectly predicts the negative class as positive.

* **False Negative (FN).**

It refers to the number of predictions where the classifier incorrectly predicts the positive class as negative.

**Metrics.**

**Accuracy**: Gives you the fraction of the total examples that were correctly classified by the classifier. It is given by:

**Misclassification Rate:** Tells you what fraction of the predictions from your model were incorrect. . Or 1-Accuracy.

**Precision:** It tells you what fraction of predictions as a positive class were actually positive.

**Recall:** It tells you what fraction of all positive samples were correctly predicted as positive by the classifier. It is also called **True Positive Rate, Sensitivity and Probability of Detection**:

**Specificity:**It tells you what fraction of all negative samples are correctly predicted as negative by the classifier. It is also known as **True Negative Rate (TNR)**

**F1 Score:** This is the harmonic mean of Precision and recall: