PAK-AUSTRIA FACHHOCHSCHULE:
INSTITUTE OF APPLIED SCIENCES AND TECHNOLOGY

▪ **Machine Learning**
▪ **Lab Coordinator: Ms. Sana Saleem**
▪ **Course Instructor: Dr. Abid Ali**
▪ **Lab 04 Assignment 04**
▪ **Program: BS(AI) -F23**
▪ **Semester: 5th**
DEADLINE: 23rd- SEPTEMBER-2025

Assignment 04:

Home Task need to be submitted through the Teams, add all screenshots and relevant results with explanation must be added from the system.

Home Task 1: Applying Feature Scaling and Ridge Regression

Task:

1. Select a new dataset related to a different real-world scenario (e.g., predicting house prices, car sales, or energy consumption).
2. Preprocess the dataset by handling missing values, encoding categorical variables, and splitting the data into training and testing sets.
3. Apply **Linear Regression** first, and then use **Ridge Regression** after scaling the features using StandardScaler.
4. Compare the results of both models in terms of **Mean Squared Error** (MSE) and **R-squared** values.
5. Document how feature scaling and Ridge Regression impact model performance.
6. Plot the feature importance using model coefficients for both Linear and Ridge regression.

Home Task 2: Building a Logistic Regression Classifier

Task:

1. Use a different dataset (e.g., customer churn, loan approval, or cancer detection) to build a **Logistic Regression** model.
2. Perform data preprocessing, including feature scaling using StandardScaler.
3. Split the dataset into training and testing sets.
4. Train a logistic regression model on the training data and predict on the test data.
5. Evaluate the model using a **confusion matrix**, **accuracy score**, **precision, recall, and F1-score**.

6. Plot the **ROC Curve** and calculate the **AUC** (Area Under the Curve) for your model.
7. Visualize the results using a scatter plot for the training and testing sets, similar to the visualization done in Lab Practice 3.

Good Luck!

"Hard work beats talent when talent doesn't work hard."