```python
In [5]:  import numpy as np
         import matplotlib.pyplot as plt
         from sklearn.datasets import load_iris

         class PCA:
             def fit_transform(self, X, n_components=2):
                 # Mean center the data
                 mean = np.mean(X, axis=0)
                 X_centered = X - mean

                 # Calculate covariance matrix
                 cov = np.cov(X_centered.T)

                 # Calculate eigenvalues and eigenvectors
                 eigenvalues, eigenvectors = np.linalg.eig(cov)

                 # Sort the eigenvectors in decreasing order of eigenvalues
                 idxs = np.argsort(eigenvalues)[::-1]
                 eigenvectors = eigenvectors[:, idxs]

                 # Select the top n_components eigenvectors
                 components = eigenvectors[:, :n_components]

                 # Transform the data
                 X_projected = np.dot(X_centered, components)
                 return X_projected

         # Load dataset
         X = load_iris().data
         y = load_iris().target

         # Perform PCA
         pca = PCA()
         X_projected = pca.fit_transform(X)

         print("Shape of Data:", X.shape)
         print("Shape of transformed Data:", X_projected.shape)

         # Plot the results
         plt.figure(figsize = (5,3))
         plt.scatter(X_projected[:, 0], X_projected[:, 1], c=y, cmap="jet")
         plt.xlabel("Principal Component 1")
         plt.ylabel("Principal Component 2")
         plt.colorbar(label='Class')
         plt.show()
```

```
Shape of Data: (150, 4)
Shape of transformed Data: (150, 2)
```