In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.metrics import roc_curve, auc, classification_report, confusion_ma
from sklearn.model_selection import train_test_split
from sklearn.impute import SimpleImputer
from sklearn.preprocessing import StandardScaler
from sklearn.neural_network import MLPClassifier
import pandas as pd

data = pd.read_csv('/Users/mehtap/Downloads/PCOS_data.csv')


imputer = SimpleImputer(strategy='mean')
data_imputed = imputer.fit_transform(data.iloc[:, 3:-1])
X = data_imputed
y = data['PCOS (Y/N)']


X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, rando
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)


ann_classifier = MLPClassifier(hidden_layer_sizes=(100,), max_iter=1000, rando


ann_classifier.fit(X_train_scaled, y_train)


y_pred = ann_classifier.predict(X_test_scaled)

accuracy = np.mean(y_test == y_pred)


conf_matrix = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:")
print(conf_matrix)


class_report = classification_report(y_test, y_pred)
print("Classification Report:")
print(class_report)


y_scores = ann_classifier.predict_proba(X_test_scaled)[:, 1]


roc_auc = roc_auc_score(y_test, y_scores)
print("ROC AUC:", roc_auc)


fpr, tpr, _ = roc_curve(y_test, y_scores)


plt.figure()
plt.plot(fpr, tpr, color='darkorange', lw=2, label='ROC curve (area = %0.2f)' %
plt.plot([0, 1], [0, 1], color='navy', lw=2, linestyle='--')
```

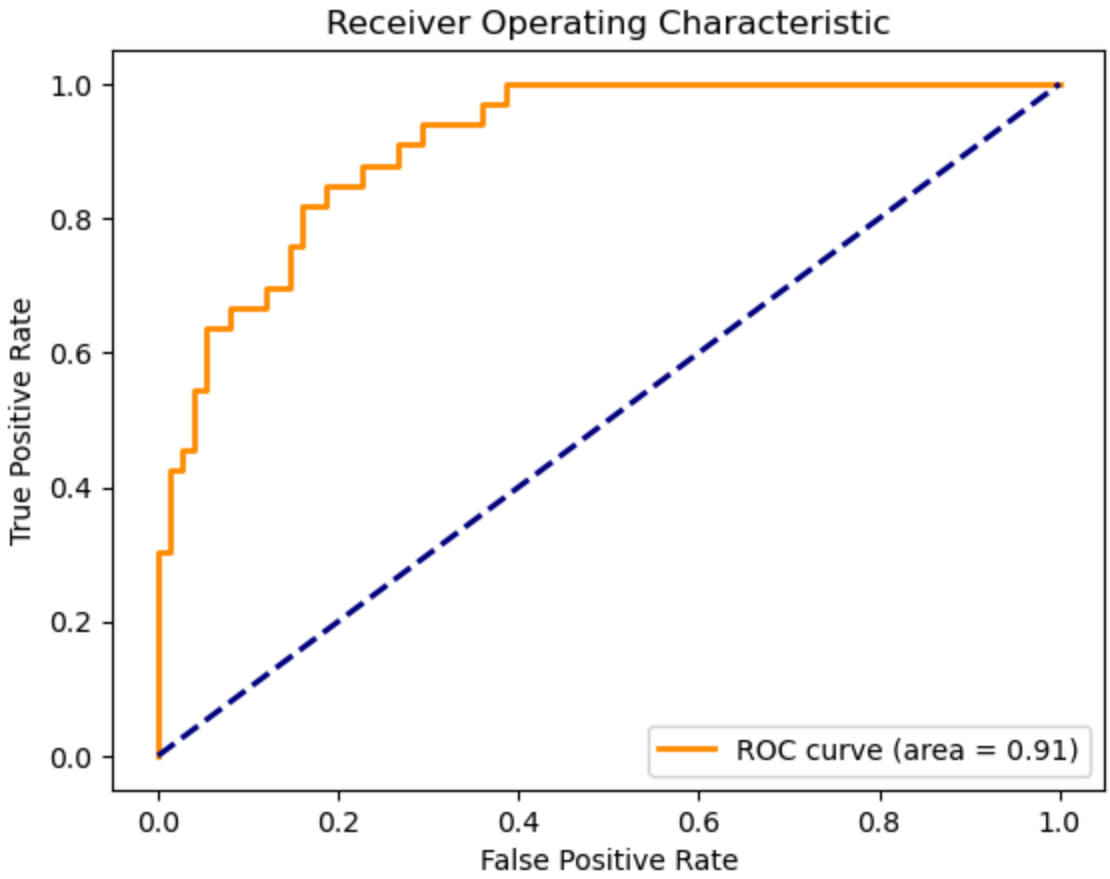
```
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('Receiver Operating Characteristic')
plt.legend(loc="lower right")
plt.show()
```

```
Confusion Matrix:
[[69  6]
 [12 21]]
Classification Report:
              precision    recall  f1-score   support

           0       0.85      0.92      0.88        75
           1       0.78      0.64      0.70        33

    accuracy                           0.83       108
   macro avg       0.81      0.78      0.79       108
weighted avg       0.83      0.83      0.83       108

ROC AUC: 0.9123232323232322
```



In [ ]: