

Course Title	Course Code	Credit Hours
Applications of ICT	CS-117	2-1

**Textbook:**

- Andreas C. Müller, Sarah Guido, “Introduction to Machine Learning with Python: A Guide for Data Scientists”, O'Reilly Media

**Reference Books/Materials:**

- Wes McKinney, “Python for Data Analysis: Data Wrangling with pandas, NumPy, and IPython”, O'Reilly Media
- Mark Lutz, “Learning Python: Powerful Object-Oriented Programming”, O'Reilly Media
- Kaggle Online Courses (<https://www.kaggle.com/learn>)
- Kaggle Online Courses at Coursera (<https://www.coursera.org/courses?query=kaggle>)
- Python Resource Material (<https://education.python.org/resources/resource/list> )
- NUST Working Paper 38, 69<sup>th</sup> ACM.

**Course Objectives:**

In this course, students will learn the integration of ICT with AI and data science, covering web/mobile app development, cloud computing, and core AI techniques. They will also gain practical skills in implementing data science and machine learning tasks across various domains.

**Course Outline:**

- Introduction to Information and Communication Technologies: ICT Application (Teaching, Learning, Research, Team Communication Tools)
- Web and Mobile Application Development Process
- Introduction to Cloud Computing (SAS, PAS, IAAS, Azure, AWS, GCP), Role of Database Systems
- Programming Concepts: Variables, Data types, Input and Output, Conditionals and Loops, and Python Libraries
- Introduction to Statistics, Artificial Intelligence, and Machine Learning using Python.

- Data Loading, Visualization, and Preprocessing, Data Summarization for Data Science Applications
- Introduction to Regression and Classification Tasks, Applications of Regression (Computer Science, Engineering, Data Analytics, Financial Sector, etc.)
- Applications of Classification (Computer Science, Engineering, Data Analytics, Financial Sector, etc.),
- Issues of Ethics in Data and AI
- Case studies of ICT in Healthcare and Business.

### **Labs Outline:**

- Microsoft (PowerPoint, Excel and Word)
- Web/Mobile Application Development
- Web/Mobile Application Development Process (Prototype Development)
- Database Systems Exploration
- Database Systems Exploration
- Programming Fundamentals (Variables, Data Types, Input and Output, Conditionals and Loops)
- Programming Fundamentals (Python Libraries)
- Data Analytics
- Data Analytics (MS PowerPoint, Excel, Word)
- Introduction to Machine Learning
- Data Visualization and Summarization