GRADE 10 ICT – Final STUDY GUIDE

(Covers Python + Unit 2 Lesson 1)

PART 1: PYTHON BASICS

1. Variables and Data Types

A variable is a container used to store information in a program.

Examples:

name = "Ahmad"
age = 15

Rules for naming variables:

- Only letters, numbers, and underscore
- Cannot start with a number
- Cannot contain spaces
- Cannot use Python keywords (if, for, print, etc.)
- Use clear names (student_name, total_price)

Common data types:

- int: whole numbers (1, 20, 300)
- float: decimal numbers (2.5, 0.1, 89.99)
- str: text inside quotes ("hello")
- list: multiple values in brackets

Check type:

type(age)

2. Strings

Strings are text written inside quotation marks.

Example:

message = "Hello"

Useful string methods:

- upper(): converts to uppercase
- lower(): converts to lowercase

- title(): capitalizes each word
- strip(): removes spaces from both sides
- lstrip(): removes left spaces
- rstrip(): removes right spaces

Example:

```
" hello ".strip()      # "hello"
"world".upper()        # "WORLD"
```

String formatting (f-strings):

```
name = "Lana"
print(f"My name is {name}")
```

Special characters:

- \n = new line
- \t = tab

3. Numbers and Operators

Number types:

- int
- float

Arithmetic operators:

  - addition
  - subtraction
  - multiplication
- / division
- % remainder
- ** exponent (power)

Examples:

```
5 + 3      # 8
7 % 2      # 1
2 ** 3     # 8
```

4. Input from the User

The input() function allows the user to enter data.

Example:

```
name = input("Enter your name: ")
```

Input is always a string. To convert:

```
age = int(input("Enter age: "))
price = float(input("Enter price: "))
```

5. Conditionals (if statements)

Comparison operators:

- == equal
- != not equal
- greater
- < less
- = greater or equal
- <= less or equal

Basic if:

```
if age >= 18:
    print("Adult")
```

If-else:

```
if grade >= 50:
    print("Pass")
else:
    print("Fail")
```

If-elif-else:

```
if score >= 90:
    print("A")
elif score >= 80:
    print("B")
else:
    print("C or below")
```

Logical operators:

- and
- or
- not

Example:

```
if color == "red" or color == "blue":
    print("Primary color")
```

Check membership:

```
if "apple" in fruits:
    print("Found")
```

6. Loops

For loop

Used when repeating a known number of times.

Example:

```
for i in range(5):
    print(i)
```

Range with start and end:

```
for i in range(1, 6):
    print(i)
```

While loop

Runs while a condition is true.

Example:

```
count = 1
while count <= 5:
    print(count)
    count += 1
```

Nested loops

A loop inside a loop.

```
for i in range(3):
    for j in range(2):
        print(i, j)
```

7. Using Google Colab

Google Colab allows:

- Running Python online
- No installation needed
- Automatic saving in Google Drive
- Suitable for school assignments

Unit 2 – Lesson 1: Cryptocurrency & Blockchain

1. Introduction to Cryptocurrency

Cryptocurrency is a **digital currency** used for buying, selling, and transferring money on the internet **without banks or financial institutions**.

It is protected by **cryptography**, which makes transactions secure.

Cryptocurrencies work using a technology called **Blockchain**.

2. What Is Blockchain?

Blockchain is a **digital, public, and permanent ledger** that records all transactions in a secure way.

Key points:

- Data is stored inside **blocks**
- Each block contains information and is linked to the previous block
- Once information is added, it **cannot be changed**
- All blocks form a **chain**, which is shared on thousands of computers
- There is **no central authority**

This makes blockchain:

- Secure
- Transparent
- Impossible to alter
- Resistant to hacking

3. Types of Financial Systems: CeFi vs DeFi

The lesson compares **Centralized Finance (CeFi)** and **Decentralized Finance (DeFi)**.

CeFi – Centralized Finance

- Controlled by banks or institutions
- Uses middlemen (bank staff, payment processors)
- Users must share personal information
- Higher fees
- Slower transactions

DeFi – Decentralized Finance

- No central authority
- Peer-to-peer transactions
- Lower fees
- Faster
- More privacy
- Based on blockchain

DeFi is the system used by most cryptocurrencies.

4. Types of Cryptocurrencies

Bitcoin (BTC)

- First and most famous cryptocurrency
- Used mainly for payments and value storage

Ethereum (ETH)

- Supports **Smart Contracts**
- Used to build applications on the blockchain
- Has flexible and advanced uses

Each cryptocurrency has:

- Its own network
- Its own purpose
- Its own market value

5. Factors That Affect Cryptocurrency Prices

1. Supply and Demand

Higher demand → price increases
Lower demand → price decreases

2. Market Capitalization (Market Cap)

Market Cap = circulating coins × price of one coin

High market cap means:

- Greater stability

- Less risk

3. Opening Price

The price of the coin at the **start of the day**.

4. Closing Price

The price of the coin at the **end of the day**.

Changes between opening and closing show whether the currency is rising or falling.

6. Reading Cryptocurrency Market Data

You may be asked to:

- Read daily price tables
- Identify change in value
- Calculate the **percentage change**

Formula:

Percentage Change = (Closing Price – Opening Price) ÷ Opening Price × 100

Example:
If Opening = 10
Closing = 12
Change = +20%

7. CryoPay Platform

CryoPay is a cryptocurrency platform launched in 2021.

It allows users to:

- Buy and sell cryptocurrencies
- Convert between different coins
- Use digital wallets
- Track transactions
- Follow market prices

CryoPay depends on:

- Blockchain security
- Fast processing
- Transparency

8. Using Python to Analyze Cryptocurrency Data

Steps:

1. Load data from Excel using Python
2. Use Pandas to read and explore the data
3. Use `correlation()` to find relationships between variables

A **correlation matrix** helps you see:

- Strong positive relationships (close to +1)
- Strong negative relationships (close to –1)
- No relationship (close to 0)

Example relationships:

- Higher trading volume might relate to a higher price
- Higher market cap often correlates with price stability

Understanding correlation allows analysts to make predictions.

9. Important Definitions

- **Cryptocurrency:** Digital, encrypted money
- **Blockchain:** Permanent digital ledger
- **Decentralized finance (DeFi):** Finance without banks
- **Centralized finance (CeFi):** Finance controlled by banks
- **Market Cap:** Value of all circulating coins
- **Opening Price:** Price at the start of the day
- **Closing Price:** Price at the end of the day
- **Supply and Demand:** Determines rise or fall in price
- **Correlation:** Measures relationship between two variables
- **CryoPay:** A platform for buying and selling crypto