GRADE 9 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

PART 2: UNIT 2 – LESSON 1

Artificial Intelligence (AI) and Data Science (DS)

1. What is Data?

Data is information such as:

- Text
- Numbers
- Images
- Sound
- Video

Data becomes meaningful only after analysis.

2. Big Data

Big Data refers to extremely large amounts of data that are:

- Too big
- Too fast
- Too complex

for humans to process manually.

Examples:

- YouTube video history

- Instagram likes
- GPS data from millions of devices
- Hospital records

Big Data requires AI and Data Science to analyze it.

3. Artificial Intelligence (AI)

AI is when computers:

- Learn from experience
- Make decisions
- Perform tasks without exact step-by-step instructions

Examples of AI:

- Face recognition
- Voice assistants
- Game opponents
- Self-driving cars

- Autocorrect
- Recommendation systems (YouTube, Netflix)

4. Data Science (DS)

Data Science is the field that:

- Collects data
- Cleans data
- Analyzes data
- Finds patterns
- Makes predictions

Examples:

- Identifying diseases from MRI scans
- Predicting heart attacks
- Recommending videos or products
- Understanding customer behavior

5. Relationship Between AI and DS

AI needs data to learn.

DS prepares and analyzes data.

Together they create intelligent systems.

General process:

Big Data → Data Science → AI Model → Prediction/Recommendation

Example:

- Netflix collects your watching history (Data Science)
- AI recommends movies based on patterns

6. Applications of AI and DS

Healthcare

- Reading CT and MRI scans
- Detecting diseases early
- Tracking patient data
- Smartwatches measuring heart activity

Communication

- Translators

- Chatbots
- Voice assistants
- Speech recognition

Entertainment

- Movie and music recommendations
- Game difficulty adjustment
- AI that guesses drawings

Daily life

- Smart home devices
- Weather checks
- Smart speakers
- Automated reminders

7. AI in Gaming

AI can:

- Control NPCs
- Adjust game difficulty
- Predict player's actions
- Improve gameplay experience
  Example:
  In the "Quick, Draw!" game, AI tries to guess your drawing by comparing it to thousands of previous drawings.

8. Smart Homes

Smart home devices use AI to perform actions such as:

- Controlling lights
- Checking weather
- Playing music
- Answering questions

These devices connect to the internet and respond to voice commands.