Ministry of Higher Education and
Scientific Research
Kurdistan Region – Iraq

SALAHADDIN UNIVERSITY - ERBIL

Department of Physics

College of Science

Salahaddin University-Erbil

Subject: Computer programing

Second year Students

Course Book - (2nd year student)

Assistant lecturer. name: **Riyadh Saeed Agid**

(MS.c in Physics-Applied physics)

Academic year: 2022-2023

General Information

Title	**Computer programming**	**College**	**Science**
Level	**Bachelor (2nd Stage)**	**Credits**	**3 unit**
Module Leader (ML)	**Riyadh Saeed Agid**	**Semester**	**First Semester**
Department	**Applied Physics (branch of communications)**	**E-mail**	riyadh.agid@su.edu.krd
Course Type	**Main, Core learning activity**	ResearchGate	https://www.researchgate.net/profile/Riyadh-Agid
Academic Title	**Assistant Lecturer**	**Module Code**	SPhM 209
Class Hours/Week	**Theory :2** **Practical :2**	**Office Hours**	**9:00 Am-2:00 0Pm (Sunday)** **10:30 Pm – 2:00 Pm (Wednesday)**
Courses Language	**English**	**Support Language**	**English-Kurdish-Arabic**
Mode of Delivery	**Face to Face (On Campus)**	**Keywords**	Python Language, Programming, NumPy, SciPy, and matplotlib python packages.
Phone No.	**+96457507166841**		
Confirmation Date	**11/09/2022**		

Module Description, Learning Outcomes, Student's obligations, Pedagogical approach and required	
Description	This course is the theoretical and practical outline to recognize on fundamentals of python programming and their application. Python is a high-level, interpreted, interactive, and object-oriented scripting language., I try to apply 21st century skills in teaching methods and assessment tools like (Group team working, flipped classroom PowerPoint presentations, Pen and Board, Simulations, animations, videos, arts, body language and others) that engage the students with lecture and the knowledge transferring become easier. Also, the Students able to create scientific discussion inside and outside the class.
Learning Outcomes	At the end of the course the students will able to: 1. Recognize and understand the fundamental of python programing. 2. To understand why Python is a useful scripting language for developers. 3. Execute creating code to solve physics problems. 4. Distinguish between NumPy, SciPy, and matplotlib python packages. 5. To be able to plotting.

Students' obligations	1. Examinations according to the university standardization. 2. Students should attend all the lectures and they may take notes during the lectures 3. Participation would be an advantage for them to extend their knowledge and understand the module systematically 4. Students' activity like questions, creating posters, presentations and solving the HomeWorks (i.e., formative assessment) either during the lecture or outside are very important. 5. If students missed few lectures, they would have difficulty getting back on track. 6. All exams and tests are closed 7. Mobile phones are not allowed to use during the lecture.
Pedagogical approach	The style of teaching in this module depends on techniques in 21st century skills, methods in teaching and bologna process: 1. Students Center Learning (SCL) 2. Students can make a scientific discussion inside the classroom 3. Students are divided onto small groups during the semester to work as a team 4. Students can increase scientific note or further description to my slides

Weekly Syllabus	
Chapter One **Introduction**	
Weeks	**Subjects**
1st Week	- **Computer Programming** - **Installation of Python** - **Interpreter** - **Compiler**
2nd Week	- **Data type** - **Types of numbers** - **Types of basic arithmetic operation** - **Variables** - **Dynamics type** - **Indexing and slicing** - **String properties** - **String methods**
Chapter two **Data types**	
3rd Week	- **Lists** - **Methods of Lists** - **Dictionaries(dict)** - **Tuple** - **Set** - **Boolean**
4th Week	- **Python Packages** - **Numpy (Numeric python)** - **Scipy (Scientific python)** - **Matplotlib** - **operations**
5th Week	- **Arrays** - **Append** - **Extend** - **Arrange** - **Operations With Array, Vector Algebra, Dot and Cross Product Of Vectors.**

Chapter Three Matplotlib package	
6th Week	- Basic plotting - Markers - Line plots - Colour - Marker Size Line Width, Labels and Title. - Formatting - Style - Grid - Legend - Subplots Scatter Plots, Alpha
7th Week	- Array statistics - roots of polynomial - Histograms - Bars - Pie Charts - Python strings.

Chapter Four Polynomial plotting & Writing and plotting Python straight line program	
8th Week	- Straight line - Input and data plotting - Saving a program.
9th Week	- Reading and writing files - Deleting and renaming files in Python

Chapter Five Graphical User Interface	
10th Week	- What are GUI concepts - What is Tkinter? - create window - Method syntax - Widgets
11th Week	- Type of widgets - Label widget - Button widget

Q1/ What is the difference between a compiler and an interpreter show your answer by the diagram? **(10 Marks)**

Q2/ Let us have two variables below (x and y) write functions using different syntax in python? **(10 Marks)**

x=4 and y= 5

syntax	Alternative Syntax	Result
x / y		
x % y		
xy**		

*Q3/*Define array to represent the following vectors **(10 Marks)**

```
>>> a = array([1, 3, 5], dtype =float)
>>> b = array([4, 2, 6], dtype=float)
```

a = i+3j+5k
b = 4i+2j+6k

Find 1- The dot and cross product (use required python code)
2- Addition (a+b) and subtraction (a-b) of vectors

Q4/ write the output for the following: **(10 Marks)**

1-
```
x= []
x.append("physics")
x.extend([5,6,7])
x.append(4)
Print(x)
```

2-
```
import numpy as np
y=np.arange(75,5,-5)
Print(y)
```

3-
```
from numpy import*
T=linspace(4,30,5)
print(T)
```

Good luck

M.Sc. Riyadh S. Agid