AMITY UNIVERSITY
UTTAR PRADESH

FORMAT FOR COURSE CURRICULUM

Course Title: Python for Biologist

Course Code: **Units: 04**

L	T	P/ S	SW/FW	TOTAL CREDIT UNITS
3	0	2	0	4

Course Objectives:

The course will enable students to apply Python for bioinformatics applications. The course will also enable the students to apply concepts of object oriented programming and its modules. The course will enable students to analyze data using Python.

Pre-requisites: Basic knowledge about computer programming.

Student Learning Outcomes:

- By the end of the semester, students will be able to utlilze Python with reference to bioinformatics
- The students will be able to proficiently describe Object oriented programming in Python and different modules
- The students will be able to describe advanced analysis techniques using Python

Course Contents/Syllabus- Theory:

	Weightage (%)
Module I	**20**
Descriptors/Topics: Introduction History, Features, Setting up path, Working with Python, Basic Syntax, Variable and Data Types, Operator, Expression and Statements.	
Module II	**30**
Descriptors/Topics: Python Programming If , If- else, Nested if-else, For loop ,While loop ,Nested loops, Break ,Continue ,Pass, Function and Methods, recursion, Exception handling . List: Traversing, list operation, list slices, list method, list and strings, Tuples: tuple assignment, tuple as a return type, list and tuples, Dictionary: Dictionary as a set of counter, Looping and dictionaries. .	
Module III	**30**

Descriptors/Topics: Basics commands in Bio-Python Storing strings in variables, DNA concatenation, finding length of a string, extracting sub-strings, reading text from a file, writing text to a file, reading and writing a FASTA file, Splitting a string to make a list, Percentage of amino acid residues.	
Module IV	**20**
Descriptors/Topics: Bioinformatics analysis using Python Searching for a pattern in a string, Building Seq sequences from strings, Plotting codon frequency, Fetching a SwissProt entry from a file, SwissProt to FASTA, Running Blast and Clustalw.	

Pedagogy for Course Delivery:

Lectures: 41
Tutorial:
Presentation/ Seminar: 3
Class Test: 1
Total: 45

Practical

Practical : 28
Lab internal : 2
Total : 30

List of Experiments:

1. Create and run Python programs using basic scalars.
2. Implement and manipulate strings, functions, operators, lists, loops, and arrays.
3. Format output and list content.
4. Read external files in Python.
5. Create practical programs that interact with the user and the operating system.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
75%	25%	100%

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment						End Term Examination
Components (Drop down)	**Class Test 1**	**Viva**	**Home Assignment**		**Attendance**	
Weightage (%)	10	5	10		5	70

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment				End Term Examination			
Components (Drop down	**Performance**	**Lab record**	**viva**	**Attendance**	**Lab record**	**Performance**	**Viva**	**Total**
Weightage (%)	10	10	5	5	10	50	10	70

Text:

- Jason Kinser, “Python for Bioinformatics”, Jones & Bartlett Publishers, 2008.
- Mark Lutz, “Learning Python”, 3rd edition, O'Reilly, 2007.
- Alex Martelli, David Ascher, “Python cookbook”, O'Reilly, 2002.
- Libeskind-Hadas, Ran, and Eliot Bush. Computing for biologists: Python programming and principles. Cambridge University Press, 2014.

REFERENCE

- http://www.biopython.org
- **Marin-Sanguino, Alberto. "Book Review: Computing for Biologists: Python Programming and Principles." Frontiers in Genetics 7 (2016): 86.**