final

Course name: Basic programming with Python and its application in database management, artificial intelligence and machine learning (AI/ML).

Level of the course: Certificate

Course objective To teach the students of Pharmacy Python programming language as well as to train them in database management, artificial intelligence machine learning using Python to improve their career opportunities.

Proposed course structure:

Class	Content/Topic	Required Time (in hour)/Credit hour	Year
Unit 1	**Introduction to Python**		**2nd**
1	History, use and basics of Python	1	2nd
2	Data types: Understanding different data-types, size and use	1	2nd
3	Operators: Explanation about relational, conditional, logical, modulo-division, Boolean operators with different examples and programming implementations	1	2nd
Unit 2	**Conditional statement**		**2nd**
1	Conditional statement -1: Explaining the syntax of if, if-else and elif	1	
2	Conditional statement -2: Programming examples and implementation of all the conditional statements	1	2nd
Unit 3	**Loop**		
1	[illegible]		2
2	[illegible]		2
	[illegible]		2
Unit 4	**Lists, Tuple and Dictionary**		
1	[illegible]	1	2nd
2	Lists: Use of [illegible] and *while* loop with different examples and programming implementation.	1	2nd

3	Tuple: Tuple constructs, syntax and use with programming examples	1	2nd
4	Dictionary: Dictionary constructs, syntax and use with programming examples	1	2nd
Unit 5	**Functions and Class**		
1	Functions-1: Introductions to functions, use and classifications of functions	2	2nd
2	Functions-2: Programming examples and implementations of built-in functions and user-defined functions	2	2nd
3	Class concepts: Introduction to object-oriented programming (OOP) with Class with programming implementations	2	2nd
	Exam-1	2	2nd
Unit 6	**Important python packages**		
1	NumPy: Introduction to numPy, numPy array, uses of NumPy in mathematical calculations	1	2nd
2	SciPy: Introduction to SciPy and uses of SciPy in mathematical calculations.	1	2nd
3	Database management with Pandas: Introduction to Pandas and its uses in database handling. Introduction to different data formats (e.g., .csv, .xlsx).	1	2nd
4	Database management with Pandas: How to import export the different data types with Pandas and how to edit the data and obtain statistical results	1	2nd
Unit 7	**Artificial Intelligence and Machine Learning**		
1	AI/ML: Introduction to AI and ML -concepts about supervised and unsupervised learning	1	2nd
2	ANN: Basic concept of artificial neural network, introduction to Perceptron	1	2nd
3	[illegible]	2	2nd
4	[illegible]	2	2nd
Unit 8	**Applications of AI/ML in Pharmacy**		2
1	[illegible]	2	
	Critical pharmaceutical [illegible] to a specific pharmaceutical target from ChEMBL and Binding DB using Pandas and NumPy) and other databases		

2	Cheminformatics. Basic concepts of cheminformatics and how to calculate molecular descriptors and fingerprints using various non-commercial packages.	2	2nd
3	Rdkit and molecular descriptors. Introduction to Python based Rdkit program to import data, convert data formats and calculations of molecular descriptors and fingerprints.	2	2nd
4	How to use Scikit-learn for developing ANN models for the pharmaceutical datasets.	2	2nd
5	How to use Tensorflow for developing ANN models for the pharmaceutical datasets.	2	2nd
6	Transformer-CNN: Development of Transformer-CNN models using SMILES notations of chemical compounds	2	2nd
	Exam-2		
	Total	**40**	

Requirement:

Human resource. Will be conducted by selected faculties of Dr. B. C. Roy College of Pharmacy and A. H. S. (BCRCP)

Course coordinators: (a) Mr. Soumen Banerjee, Assistant Professor, BCRCP

(b) Dr. Amit Kumar Halder, Associate Professor, BCRCP

Proposed by: I T Cell, BCRCP

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