Department of Computer Science (Entire)
Revised Syllabus of III Year Diploma Program (UG)

Title of Program: Artificial Intelligence with Python

Syllabus Structure (UG)

Year	Semester	Course No.	Course Code	Contact Hours	Credits (1Credit=15 H)	Total Marks
2	V	CT V	DCSET 505	30	2	75
		CL V	DCSEL 505	60	2	75
	VI	CT VI	DCSET 606	30	2	75
		CL VI	DCSEL 606	60	2	75
	Annual	CP III	DCSEP 303	60	2	100
	Industrial and or Incubation and or Research and or Field Training			30	1	-
			Total	270	11	400

Semester V

CT-V: DCSET 505: Title: Machine Learning Concepts-I

(Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students will be able to

1. To understand various Machine learning algorithms.
2. To apply supervised learning algorithms.

Unit I: Introduction to Machine learning (15)

Concept of machine learning, Essential concepts in Artificial Intelligence and Machine learning. Machine learning basics: Key terminology, Key tasks of machine learning. choosing the right algorithm, Steps in developing a machine learning application. How we split data in Machine, Best Python libraries for Machine Learning.

Unit II: Supervised Learning (15)

Supervised Learning The k-Nearest Neighbors classification algorithm, Parsing and importing data from a text file, creating scatter plots with Matplotlib, Normalizing numeric values. Decision tree, Tree construction, plotting trees in Python. Testing and storing the classifier.

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Semester V

CT-V: DCSET 505: Title: Machine Learning Concepts-I
(Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students will be able to

1. To understand various Machine learning algorithms.
2. To apply supervised learning algorithms.

Unit I: Introduction to Machine learning (15)

Concept of machine learning, Essential concepts in Artificial Intelligence and Machine learning. Machine learning basics: Key terminology, Key tasks of machine learning, choosing the right algorithm, Steps in developing a machine learning application. How we split data in Machine, Best Python libraries for Machine Learning.

Unit II: Supervised Learning (15)

Supervised Learning The k-Nearest Neighbors classification algorithm, Parsing and importing data from a text file, creating scatter plots with Matplotlib, Normalizing numeric values. Decision tree, Tree construction, plotting trees in Python. Testing and storing the classifier.

Learning Outcomes:

After completion of the syllabus:

1. Students will be able to understand various Machine learning algorithms.
2. Students will be able to apply supervised learning algorithms.

Reference Books:

1. Machine Learning and Artificial Intelligence, Ameet V. Joshi, Springer, Edition first 2020
2. Artificial Intelligence and Machine Learning Fundamentals,ZsoltNagy,Packt Publication 2018
3. Machine Learning in Action.Peter Harrington. Manning publications, April 2012
4. Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber,Third edition,2012

CL-V: DCSEL 505: Title: Lab on DCSET 505

(Contact Hrs: 60 Credits: 02)

Learning Objectives:

Students will be able to:

1. To understand python programming with Pandas.
2. To create programs using Scipy.
3. To create various operations on Pandas.
4. To create operations on DataFrames.

List of Practical's

1. Machine Learning and its application oriented algorithms.
2. Introduction to Machine Learning using Python and its libraries.
3. Installation of pandas and use of pip command.
4. Example on Pandas.
5. Python program using NumPy for some basic mathematical operations
6. Implementing KNN- classification algorithm using Python on IRIS dataset.
7. Python script using Scipy for image manipulation.
8. Program to get index and values of series in Pandas
9. Program to specify an index while creating series in Pandas.
10. Program to get the first or last few rows from Series in Pandas.
11. Program to rename DataFrame columns name in Pandas.
12. Program to Filter multiple rows using isin in DataFrame
13. Program to Adding new columns to existing DataFrame in Pandas
14. Program to select multiple columns in a Pandas Dataframe.
15. Program to check whether a pandas DataFrame is empty or not.

Learning Outcomes:

After completion of the syllabus:

1. Students will be able to understand python programming with Pandas.
2. Students will be able to create programs using Scipy.
3. Students will be able to create various operations on Pandas.
4. Students will be able to create operations on DataFrames.

Reference Books:

1. Machine Learning and Artificial Intelligence, Ameet V. Joshi, Springer, Edition first 2020
2. Artificial Intelligence and Machine Learning Fundamentals, ZsoltNagy, Packt Publication 2018
3. Machine Learning in Action, Peter Harrington, Manning publications, April 2012
4. Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Third edition, 2012

Semester VI

CT-VI: DCSET 606: Title: Machine Learning Concepts-II

(Contact Hrs: 30 Credits: 2)

Learning Objectives:

Students will be able to

1. Understand concepts of unsupervised learning.
2. Apply Recommendation System techniques in Python.

Unit I: Unsupervised learning
(15)

Unsupervised learning: Clustering, Grouping unlabelled data using K-Means clustering, K-means Algorithm, Naïve Bayesian decision theory, Conditional probability, classifying with conditional probabilities, Document classification with naïve Bayes, classifying text with python, Case study: classifying spam email with naïve Bayes.

Unit II: Recommender System
(15)

Recommender System: Introduction, Understanding Recommendation Systems, Content Based Filtering, User Based Collaborative Filtering, Item Based Collaborative Filtering, Methods and tricks of the trade, Issues in Recommendation Systems, Recommender System in Python.

Learning Outcomes:

After completion of the syllabus,

1. Student will be able to understand concepts of unsupervised learning.
2. Student will be able to apply Recommendation System techniques in Python.

Reference Books:

1. Machine Learning and Artificial Intelligence, Ameet V. Joshi, Springer, Edition first 2020
2. Artificial Intelligence and Machine Learning Fundamentals.ZsoltNagy,Packt Publication 2018
3. Machine Learning in Action,Peter Harrington, Manning publications, , April 2012
4. Artificial Intelligence (Third Edition) McGraw-Hill Elaine Rich, Kevin Knight,2008

CL-VI: DCSEL 606: Title (Practical):

(Contact Hrs: 60 Credits: 02)

Learning Objectives:

Students will be able to

1. Understand different Libraries in Python.
2. Create programs in NumPy using Python.
3. Create programs using Pandas.
4. Create arrays in NumPy.

List of Practical's

1. Python script using Scikit-learn for Decision Tree Classifier.
2. Python program using Theano for computing a Logistic Function.
3. Python program using TensorFlow for multiplying two arrays.
4. Python program using Pandas for arranging a given set of data into a table.
5. Python program using Matplotlib for forming a linear plot.
6. Python program on your local python interpreter, provided you have installed the required libraries.
7. Import numpy package for arrays and stuff.
8. Program to check all elements are NaN in a NumPy Array in Python.
9. Program to check NumPy array is empty or not in Python.
10. Program to check for NaN elements in a NumPy array in Python or Not.

Learning Outcomes:

After completion of the syllabus,

1. Student will be able to understand different Libraries in Python.
2. Student will be able to create programs in NumPy using Python.
3. Student will be able to create programs using Pandas.
4. Student will be able to create arrays in NumPy.

Reference Books:

1. Machine Learning and Artificial Intelligence, Ameet V. Joshi, Springer, Edition first 2020
2. Artificial Intelligence and Machine Learning Fundamentals,ZsoltNagy,Packt Publication 2018
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