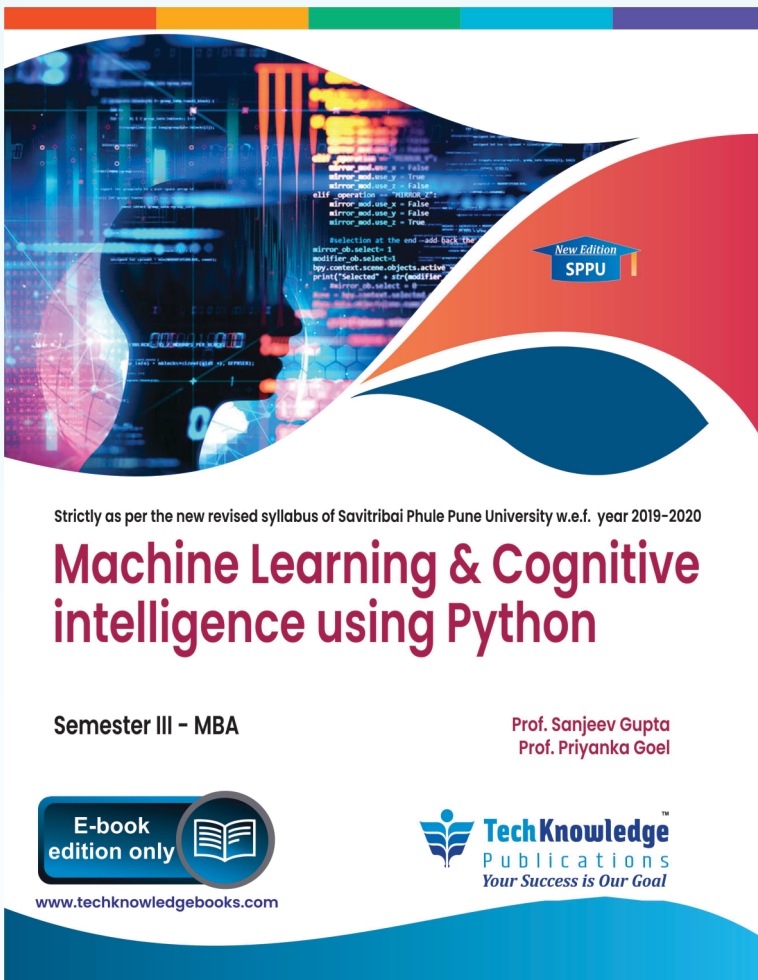


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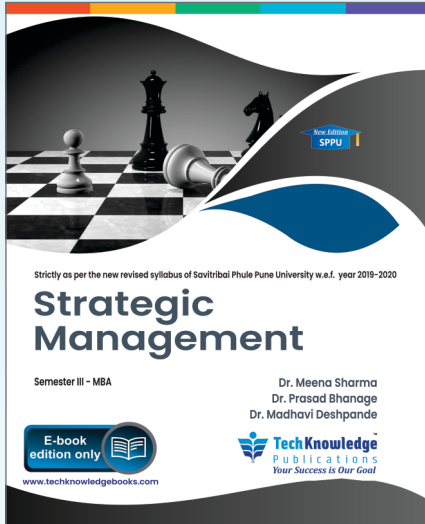


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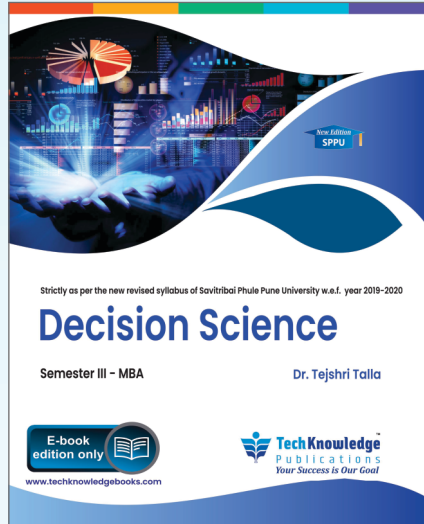
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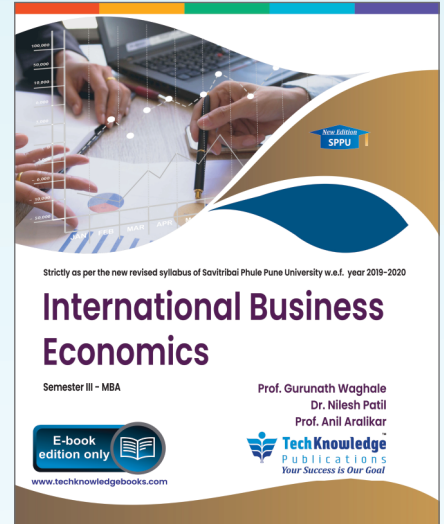
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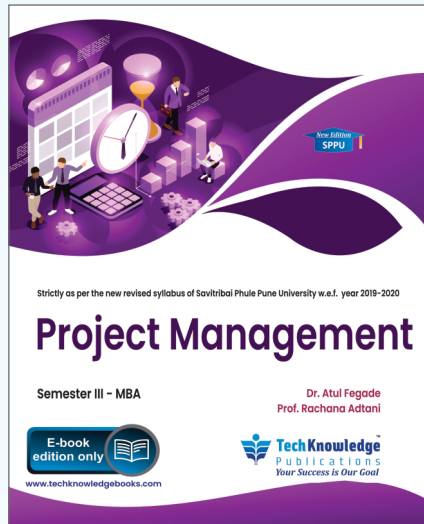
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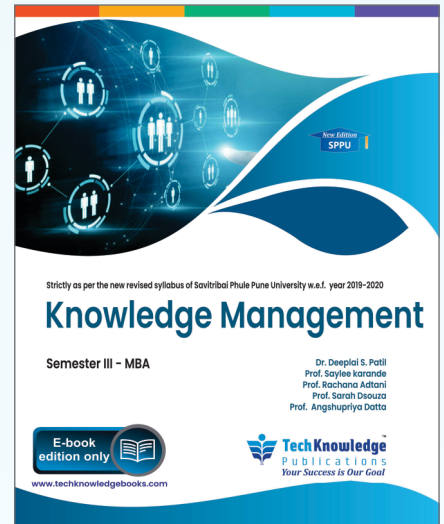
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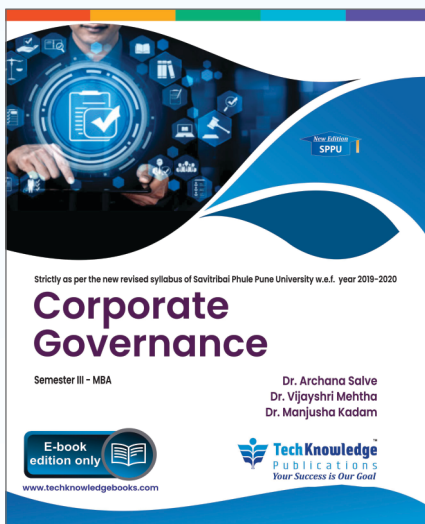
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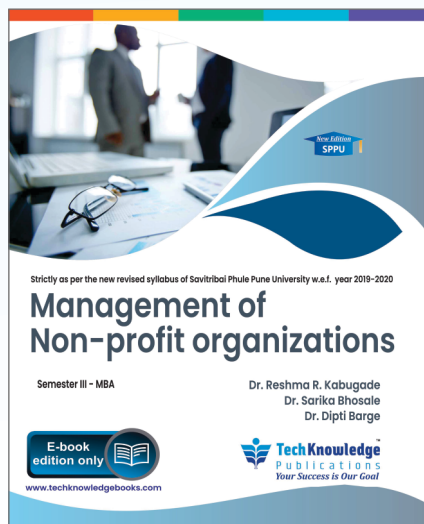
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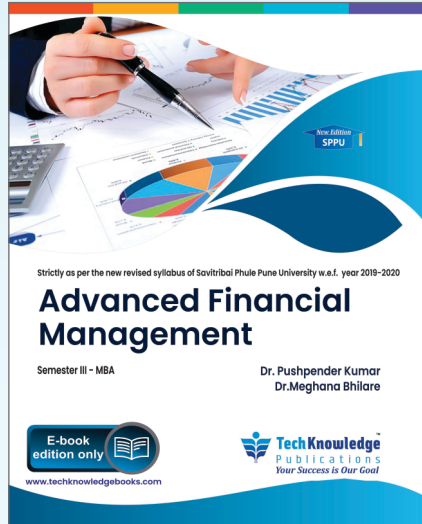
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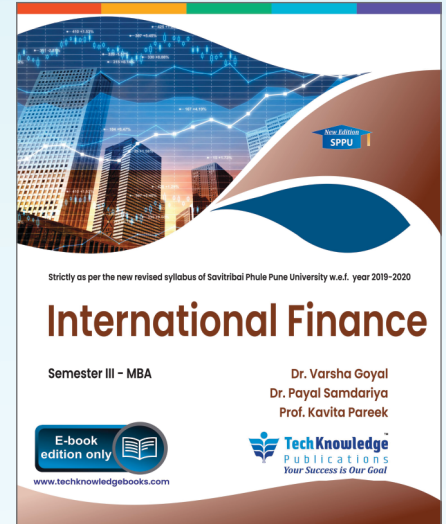
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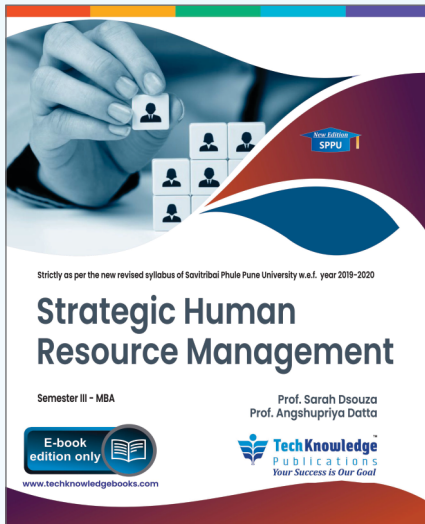
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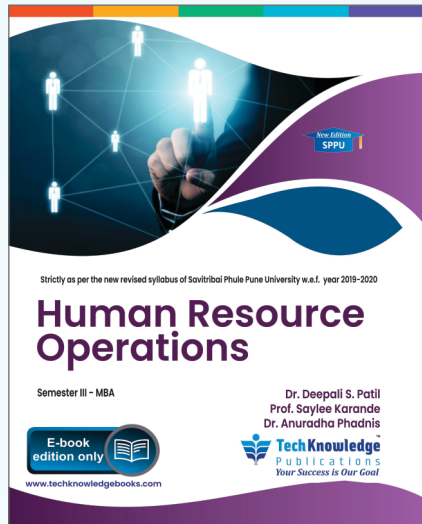
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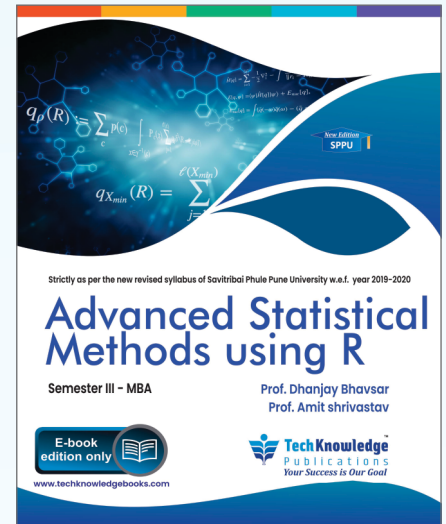
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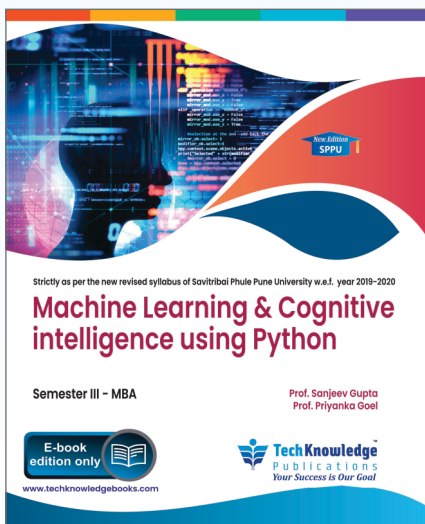
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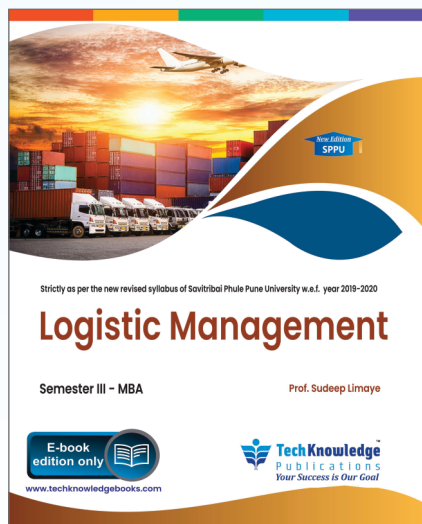
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Machine Learning & Cognitive Intelligence using Python

Ms. Priyanka Goel, Sanjeev Gupta

Semester III – Master of Business Administration (MBA) (SPPU)

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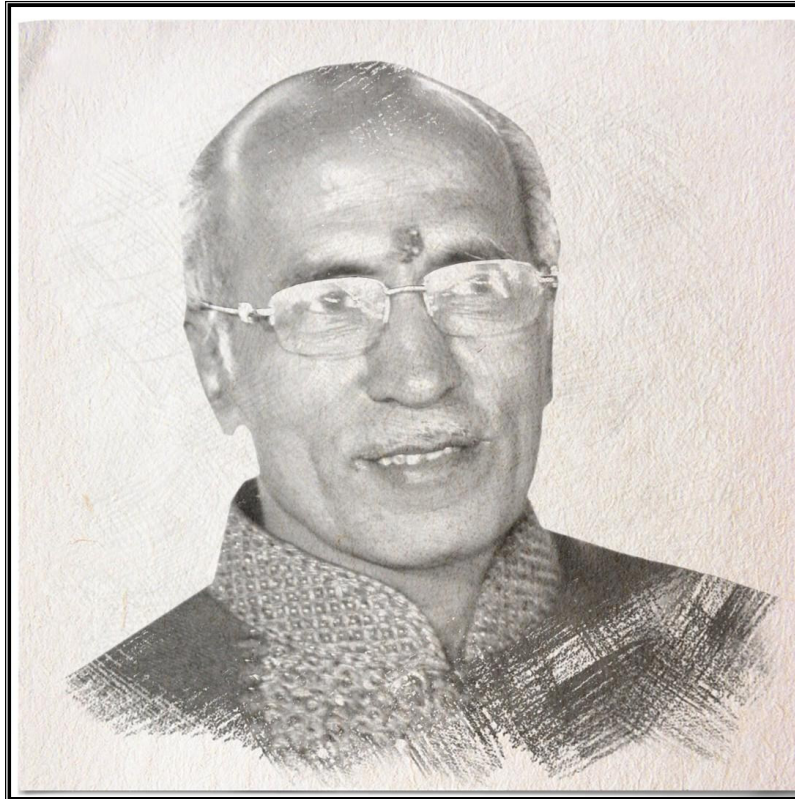
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*We dedicate this Publication soulfully and wholeheartedly,
in loving memory of our beloved founder director,
Late Shri.Pradeepji Lalchandji Lunawat,
who will always be an inspiration, a positive force and strong support
behind us.*



“My work is my prayer to God”

- Lt. Shri. Pradeepji L. Lunawat

*Soulful Tribute and Gratitude for all Your
Sacrifices, Hardwork and 40 years of Strong Vision...*

Preface

My Dear Students,

We are extremely happy to present the book of “ **Machine Learning and Cognitive Intelligence using Python**” for you. We have divided the subject into small chapters so that the topics can be arranged and understood properly. The topics within the chapters have been arranged in a proper sequence to ensure smooth flow of the subject.

We present this book in the loving memory of **Late. Shri. Pradeepji Lunawat**, our source of inspiration and a strong foundation of “**TechKnowledge Publications**”. He will always be remembered in our hearts and motivate us to achieve our new milestone.

We are thankful to Seema P. Lunawat, Vaishali Nisargand and Dr. Deepali Patil for the encouragement and support that they have extended. We are also thankful to the staff members of TechKnowledge Publications and others for their efforts to make this book as good as it is. We have made every possible efforts to eliminate all the errors in this book. However if you find any, please let us know, because that will help us to improve the book quality further.

We are thankful to my family members and friends for their patience and encouragement.

- Authors

□□□

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- Mr. Sanjeev Gupta

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- Ms. Priyanka Goel



Syllabus

Semester III		Machine Learning & Cognitive Intelligence using Python (305 BA)
3 Credits	LTP: 2:1:1	Subject Core (SC) Course – Business Analytics

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
CO305BA.1	Remembering	DEFINE the key terms in Python, Machine Learning and Cognitive Intelligence.
CO305BA.2	Understanding	EXPLAIN the applications of Machine Learning in multiple business domains and scenarios
CO305BA.3	Applying	DEVELOP a thought process to think like data scientist/business Analyst
CO305BA.4	Analysing	ANALYSE data using supervised and unsupervised Learning Techniques
CO305BA.5	Evaluating	SELECT the right functions, arrays of Python for Machine Learning algorithms.
CO305BA.6	Creating	COMBINE various tools and functions of Python language in developing Machine Learning algorithms and use them in live analytical projects in multiple business domain and scenarios.

1. **Python Basics** : Overview, Python Features, Basic Syntax, Variable Types, Basic Operators, decision making, Loops, Python Data Structures – Lists and Tuples, Sets, Dictionaries, Date & time, Functions, Scope of Variables, Function overloading, Operator overloading ,Objects and Classes. **(Refer chapter 1)**
2. **Working with Data in Python** : Reading files with Open, writing files with Open, loading data with Pandas, working with and saving with Pandas, Array oriented Programming with Numpy, Data cleaning and preparation, Plotting and Visualization, data Aggregation and Group Operations. **(Refer chapter 2)**
3. **Machine Learning and Cognitive Intelligence** : Introduction to Machine Learning- History and Evolution, Machine Learning categories: Supervised, Unsupervised and Reinforcement learning. Framework for building ML Systems- KDD process model, CRISP-DM & SEMMA, Machine learning Python packages, Machine Learning Core Libraries. Introduction to Cognitive Intelligence, Features of Cognitive Intelligence **(Refer chapter 3)**
4. **Supervised Learning** : Introduction to classification, Linear Regression, Metrics for evaluating linear model, Multivariate regression, Non-Linear Regression, K-Nearest Neighbour, Decision Trees, Logistic Regression, Support Vector Machines, Model Evaluation, Applications of supervised learning in multiple domains. **(Refer chapter 4)**
5. **Unsupervised Learning** : Clustering, Hierarchical clustering, Partitioning Clustering- K-mean clustering, Applications of unsupervised learning in multiple domains. **(Refer chapter 5)**



Index

Unit 1

Chapter 1 : Basics Of Python	1-1 to 1-28
1.1 History and Evolution	1-2
1.2 Why is Python Becoming Popular?.....	1-2
1.3 Features of Python	1-3
1.4 Installation Process	1-3
1.5 Writing First Python Program.....	1-4
1.6 Basic Syntax of Python.....	1-4
1.6.1 Indentation.....	1-4
1.6.2 Comments	1-4
1.6.3 Keywords.....	1-5
1.7 Variables and their Types.....	1-5
1.8 Basic Operators	1-6
1.8.1 Arithmetic Operators	1-6
1.8.2 Assignment Operators	1-6
1.8.3 Identity Operators	1-7
1.8.4 Membership Operators	1-7
1.8.5 Relational Operators	1-7
1.8.6 Bitwise Operators	1-8
1.8.7 Logical Operators	1-8
1.9 Decision Making.....	1-8
1.10 Python Data Structures	1-10
1.10.1 Lists.....	1-10
1.10.2 Tuples.....	1-12
1.10.3 Dictionaries.....	1-13
1.10.4 Sets	1-16
1.11 Date and Time.....	1-17
1.12 Scope of Variables	1-18
1.13 Functions	1-20
1.13.1 How the Functions Work?.....	1-20
1.13.2 Parameters of A Function	1-21
1.13.3 The Pass Statement	1-21
1.13.4 Parameter Passing Mechanism In Python.....	1-22
1.14 Function Overloading	1-22
1.14.1 Overloading Built-in Functions	1-22
1.14.2 Overloading User-Defined Functions	1-22



1.15	Operator Overloading.....	1-23
1.16	Objects And Classes.....	1-24
1.16.1	Creating a class.....	1-24
1.16.2	Class and Instance Variables.....	1-25
1.16.3	Object Methods.....	1-25
1.17	Inheritance.....	1-26
1.18	Method Overriding.....	1-26
1.19	Multiple Inheritance.....	1-27

Unit 2

Chapter 2 : Working with Data in Python**2-1 to 2-16**

2.1	File Handling in Python.....	2-2
2.1.1	Opening file in Python.....	2-2
2.1.2	Reading Opened Files.....	2-3
2.1.3	Writing into a File.....	2-4
2.2	Loading Data with Pandas.....	2-5
2.2.1	Creating Dataframes.....	2-5
2.2.2	Conversion into csv,json and SQL file.....	2-5
2.2.3	DataFrame Operations.....	2-6
2.2.4	Applications of pandas.....	2-6
2.2.5	How to implement pandas?.....	2-6
2.3	Array Oriented Programming with Numpy.....	2-7
2.3.1	Basic Terminology.....	2-7
2.3.2	Starting with Numpy.....	2-7
2.3.3	Basic Operations on Arrays.....	2-8
2.3.4	Copies and Views.....	2-9
2.4	Data Cleaning and Preparation.....	2-10
2.4.1	Dropping Unnecessary Columns in DataFrame.....	2-10
2.4.2	Changing Index in a DataFrame.....	2-11
2.4.3	Data Tidying.....	2-11
2.4.4	Melting.....	2-11
2.4.5	Pivoting.....	2-11
2.4.6	Parsing Data.....	2-11
2.4.7	Concatenation of Data.....	2-11
2.5	Plotting and Visualization.....	2-11
2.5.1	Matplotlib Library.....	2-12
2.5.2	Seaborn.....	2-13
2.6	Data Aggregation and Group Operations.....	2-15
2.6.1	Steps to Perform Data Aggregation and Applying Group Operations.....	2-15



2.6.2	Creating Groups in the DataFrame	2-15
-------	----------------------------------------	------

Unit 3

Chapter 3 : Machine Learning and Cognitive Intelligence	3-1 to 3-21
----------------------------------------------------------------	--------------------

3.1	Introduction to Machine Learning (MI)	3-2
3.1.1	What is Learning?	3-2
3.1.2	What is Machine Learning?	3-3
3.1.3	How Machine Learning works?	3-4
3.2	History of Machine Learning	3-5
3.3	Types of Machine Learning	3-6
3.4	Machine Learning Framework	3-7
3.5	Kdd Process Model (Knowledge Discovery in Databases).....	3-9
3.6	Crisp-Dm Model	3-14
3.7	MI Python Packages/Libraries	3-16
3.7.1	Pandas	3-16
3.7.2	NumPy.....	3-16
3.7.3	Scikit-Learn.....	3-17
3.7.4	Tensorflow	3-17
3.7.5	Keras	3-18
3.7.6	SciPy	3-18
3.7.7	Matplotlib	3-18
3.7.8	Seaborn.....	3-19
3.8	Cognitive Intelligence	3-19
3.8.1	Introduction.....	3-19
3.8.2	Features	3-19

Unit 4

Chapter 4 : Supervised Learning	4-1 to 4-36
----------------------------------------	--------------------

4.1	Introduction to Classification.....	4-2
4.1.1	Classification as Two-Step Process	4-4
4.1.2	Difference between Classification and Prediction.....	4-5
4.1.3	Issues in Classification.....	4-6
4.2	Regression.....	4-7
4.2.1	Linear Regression Analysis.....	4-7
4.2.2	When to Choose Liner Regression?.....	4-8
4.2.3	Goals of Regression Analysis	4-9
4.2.4	Regression Using the Method of Least Squares : An Example.....	4-9
4.2.5	Multiple Regressions.....	4-10



4.3	K-Nearest Neighbors Algorithm (K-Nn).....	4-14
4.3.1	Pseudo code of k-NN Algorithm.....	4-15
4.3.2	Advantages and Disadvantages of k-NN Algorithm.....	4-16
4.3.3	Where to use KNN.....	4-16
4.4	Decision Trees.....	4-16
4.4.2	Why are DT Classifier so Popular?.....	4-17
4.4.3	Decision Tree Algorithm.....	4-18
4.4.4	Issues in Decision Tree Induction.....	4-22
4.5	Overfitting.....	4-22
4.6	Support Vector Machine (SVM).....	4-23
4.6.1	How Does SVM Work?.....	4-23
4.6.2	Key Terms.....	4-24
4.6.3	Nonlinear Hyperplane.....	4-25
4.6.4	The Kernel.....	4-25
4.6.5	Applications of SVM.....	4-26
4.7	Logistic Regression.....	4-27
4.7.1	Assumptions of Logistic Regression.....	4-27
4.7.2	Logistic Function & Logistic Regression Model.....	4-27
4.7.3	Key terms used in Logistic Regression.....	4-27
4.7.4	Advantages and Disadvantages of Logistic Regression.....	4-28
4.8	Model Evaluation.....	4-28
4.8.1	Methods for Evaluating a Model's Performance.....	4-29
4.8.2	Popular Evaluation Matrices.....	4-30
4.9	Applications of Supervised Machine Learning.....	4-31

Unit 5

Chapter 5 : Unsupervised Learning	5-1 to 5-21	
5.1	Introduction.....	5-2
5.2	Clustering.....	5-3
5.2.1	Quality of a Good Clustering.....	5-4
5.2.2	Distance Function and matrix.....	5-4
5.2.3	Difference between clustering and classification.....	5-6
5.3	Types of Clustering.....	5-6
5.3.1	Hierarchical Approach.....	5-7
5.3.2	Partitioning approach.....	5-12
5.4	Applications of Unsupervised Learning in Multiple Domains.....	5-17
5.5	Conclusion.....	5-18



Unit 1

Python Basics



Syllabus

Overview, Python Features, Basic Syntax, Variable Types, Basic Operators, decision making, Loops, Python Data Structures – Lists and Tuples, Sets, Dictionaries, Date & time, Functions, Scope of Variables, Function overloading, Operator overloading, Objects and Classes.

Unit 2

Working with Data in Python

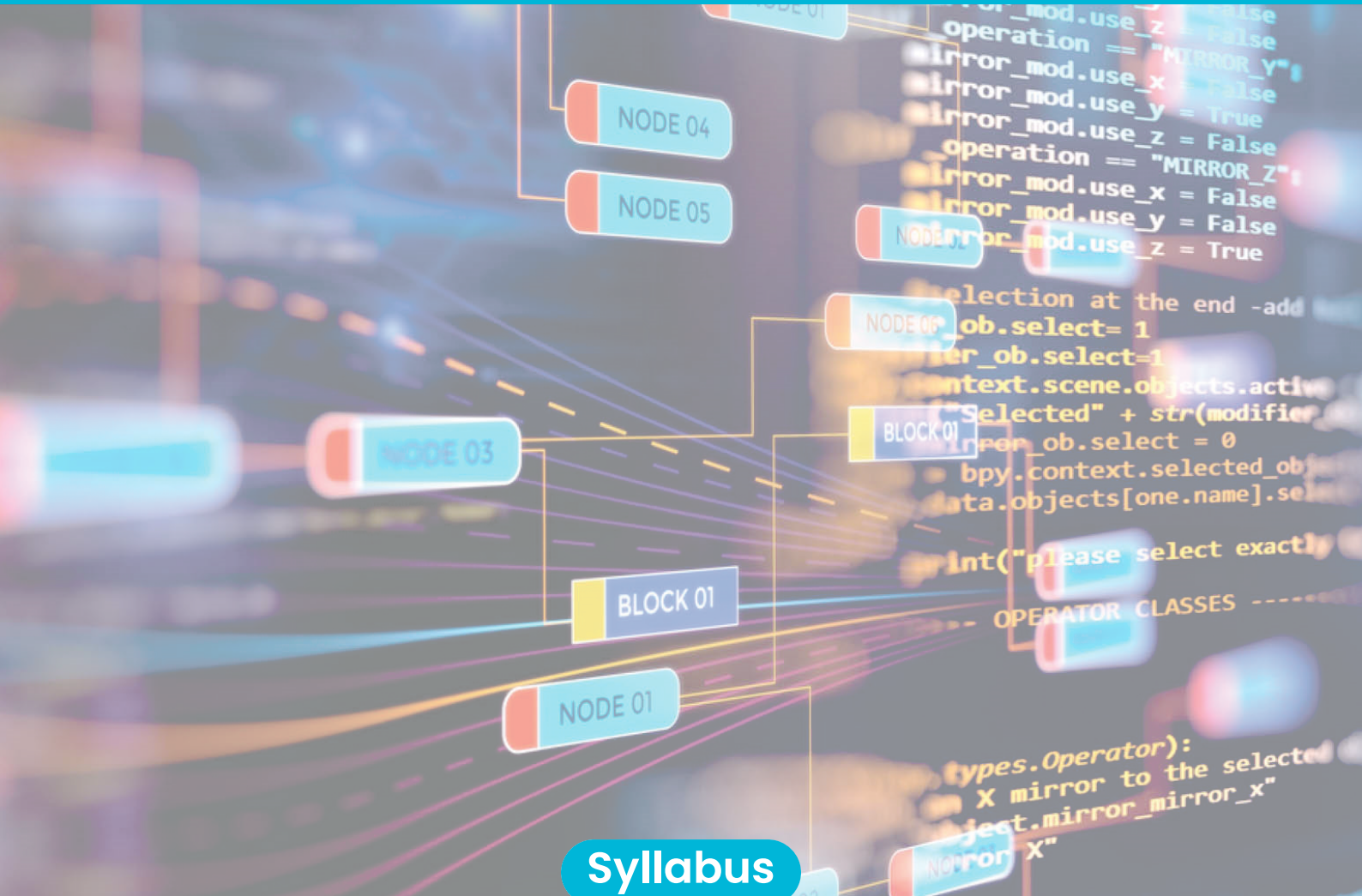


Syllabus

Reading files with Open, writing files with Open, loading data with Pandas, working with and saving with Pandas, Array oriented Programming with Numpy, Data cleaning and preparation, Plotting and Visualization, data Aggregation and Group Operations.(

Unit 4

Supervised Learning



Syllabus

Introduction to classification, Linear Regression, Metrics for evaluating linear model, Multivariate regression, Non-Linear Regression, K-Nearest Neighbour, Decision Trees, Logistic Regression, Support Vector Machines, Model Evaluation, Applications of supervised learning in multiple domains.

Unit 5

Unsupervised Learning

```
each: function(e, t, n) {
  var r, i = 0,
      o = e.length,
      a = M(e);
  if (n) {
    if (a) {
      for (; o > i; i++)
        if (r = t.apply(e[i], n), r === !1) break
    } else
      for (i in e)
        if (r = t.apply(e[i], n), r === !1) break
  } else if (a) {
    for (; o > i; i++)
      if (r = t.call(e[i], i, e[i]), r === !1) break
  } else
    for (i in e)
      if (r = t.call(e[i], i, e[i]), r === !1) break;
  return e
},
trim: b && !b.call("\uffeff\u00a0") ? function(e) {
  return null == e ? "" : b.call(e)
} : function(e) {
  return null == e ? "" : (e + "").replace(C, "")
},
makeArray: function(e, t) {
  var n = t || [];
  return null != e && (M(Object(e)) ? x.merge(n, "string" == typeof e ? [e] : e) : h.call(n, e)), n
},
isArray: function(e, t, n) {
  var r;
  if (t) {
    if (a) return a.call(t, e, n);
    for (r = t.length, n = n ? t[n] : t + n; r > n; n++)
      if (n in t && t[n] ===

```

Syllabus

Clustering, Hierarchical clustering, Partitioning Clustering- K-mean clustering, Applications of unsupervised learning in multiple domains.