### Syllabus Part 2: DSC 400 - Big Data Technology and Algorithms

#### Course Resources

**Course Text(s):**

1. “Python for Data Analysis” by Wes McKinney, O’Reilly Media, ISBN-13: 978-1491957660. 2. “Data Science from Scratch: First Principles with Python” by Joel Grus, O’Reilly Media, ISBN-13: 978-1492041139.

**Required Resources:**

- Python (latest version).

- Internet Access for research and supplementary resources.

- Jupyter Notebook or Google Colab for coding exercises.

- GitHub account for code repository and project submissions.

#### Course Schedule

| Week | Topic | Reading Assignment |
| --- | --- | --- |
| 1 | Introduction to Big Data and Python Fundamentals | “Python for Data Analysis”: Chapter 1-2 |
| 2 | Data Collection and Wrangling | “Data Science from Scratch”: Chapter 3-4 |
| 3 | Data Visualization Techniques | “Python for Data Analysis”: Chapter 4-5 |
| 4 | Database Management for Big Data | “Data Science from Scratch”: Chapter 5-6 |
| 5 | Distributed Computing Foundations | Supplementary Resources on Spark:  https://spark.apache.org/docs/latest/api/python |
| 6 | Machine Learning Fundamentals with Big Data | “Python for Data Analysis”: Chapter 6-7 |
| 7 | Deep Learning Applications in Big Data | “Data Science from Scratch”: Chapter 8-9 |
| 8 | Advanced Natural Language Processing (NLP) | Supplementary Resources on NLP: https://www.nltk.org/book |
| 9 | Time Series Analysis with Big Data | “Python for Data Analysis”: Chapter 10-11 |
| 10 | AI for Big Data Analytics | “Data Science from Scratch”: Chapter 10-11 |
| 11 | Project: Comprehensive Big Data Analysis Project | Project Work |

#### Course Activities

* **Discussion/Participation:** Engage in online forums for discussion on weekly topics, sharing insights, and peer collaboration. Expected participation: 8-10 posts per week.
* **Hands-on Exercises:** Weekly practical tasks focusing on data analysis, machine learning models, and visualization techniques.
* **Term Project:** An in-depth project that covers the entire data analysis process, from data collection to AI application.

#### Point Breakdown

|  |  |  |  |
| --- | --- | --- | --- |
| Component | Percentage | Point Value Each Week | Total |
| Discussion/Participation | 15% | 25 Points each | 275 |
| Weekly Hands-on Assignments | 50% | 100 Points each | 1000 |
| Final Project | 35% |  | 609 |
| **Total** | **100%** |  | 1740 |

#### Late Work and Participation Policies

* **Late Work:** Not accepted except in extraordinary circumstances, subject to instructor’s discretion.
* **Participation:** Expected to engage regularly with course materials, discussions, and assignments.

#### Expectations for Students and Faculty

* **Students** should allocate 15-20 hours per week for course activities, uphold academic integrity, and maintain respectful interactions.
* **Faculty** will foster an inclusive learning environment, provide timely feedback, and support student learning and project work.